


INTEGRATED SYSTEMS TM

IMX/GMX 416/832

INSTALLATION AND FIELD
MAINTENANCE MANUAL

Part No. 440.8075
Issue 1, November 1994



IMX/GMX 416/832

INSTALLATION AND FIELD MAINTENANCE MANUAL

NOTICE

IMX & GMX COMBINED INTO ONE MANUAL

With the new 1995 North American Numbering Plan software releases, the IMX 416/832 and GMX-416/832 products are identical except for the station instruments that can be installed on them. To provide better service, condense reference materials, streamline training, and facilitate technical support, the installation manuals for the two systems have been combined into one generic manual.

When using this combined manual to help sell, install, or service a particular system, be aware that not all of the station instruments described in this manual are available on both products. Listed below are the station instruments that can be installed on each product.

IMX 416/832 Station Instruments

- Digital Keysets (including PCDPMs & MDPMs)
- IMX AIM Keysets (including "dual-circuit" keysets)
- IMX (non-AIM) Keysets
- GX Keysets
- Attendant Computer Consoles
- Digital DSS/BLF Units
- IMX DSS/BLF Units
- GX DSS/BLF Units
- Enhanced Single-Line Sets (ESLs)
- IMX Single-Line Instruments (SLIs)
- Single-Line DTMF Sets

GMX-416/832 Station Instruments

- Inter-Tel/DVK Keysets
- GMX Keysets
- GX Keysets
- Attendant Computer Consoles
- Inter-Tel/DVK DSS/BLF Units
- GMX DSS/BLF Units
- GX DSS/BLF Units
- GMX Single-Line Instruments (SLIs)
- GX SLIs
- Single-Line DTMF Sets

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NOTICE

This *IMX/GMX 416/832 Installation and Field Maintenance Manual* is released by INTER-TEL INTEGRATED SYSTEMS, INC. as a guide for certified service personnel. It provides information necessary to properly install, program, operate, and maintain the system.

The contents of this manual, which reflect current INTER-TEL standards and which document software versions 827.8218-8223 and 827.8164-8168, are subject to revision or change without notice. Software packages released after the publication of this manual will be documented in addenda to the manual or succeeding issues of the manual.

For additional information and/or or technical assistance, certified technicians may contact:

Customer Support Department
INTER-TEL INTEGRATED SYSTEMS, INC.
7300 West Boston Street
Chandler, AZ 85226-3224
(602) 961-9000

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IMX/GMX 416/832 ISSUE 1 — INDEX OF NEW FEATURES

For those individuals who are already familiar with the Issue 1 manuals for the IMX 416/832 and GMX-416/832 Systems, the following new items are documented in this Issue 1 combination manual. For complete information on each item, refer to the page numbers following the brief explanation. Also, throughout the manual, “change bars” like the one at the right have been placed in the margins to indicate any new or revised information since the original manuals.

IMX And GMX Combined Into One Manual

With the new 1995 North American Numbering Plan software releases, the IMX 416/832 and GMX-416/832 products are identical except for the station instruments that can be installed on them. To provide better service, condense reference materials, streamline training, and facilitate technical support, the installation manuals for the two systems have been combined into one generic manual. When using this combined manual to help sell, install, or service a particular system, be aware that not all of the station instruments described in this manual are available on both products. See page 2-2 for a list of the station instruments that can be installed on each product.

North American Numbering Plan (NANP)

The growth of telecommunications services has created an increasing demand for more telephone numbers. To meet the demand, Bellcore has prepared a long-range North American Numbering Plan (NANP) to provide additional telephone numbers. The plan expands the capacity of the current numbering system by making area and office codes interchangeable. That is, numbering patterns formerly reserved for office codes can be used as new area codes, and office codes within existing area codes can have the same pattern as other area codes. This version of software supports the new numbering plan. See pages 4-28 and 5-90.

Home And Local Area Codes

In many areas, the telephone company has created call-cost arrangements that refer to “home” and “local” area codes. The home area code is the area code within which the system resides. The local area codes are additional area codes that, when called, use the local or toll local call-cost rate instead of the long distance rate. Up to three local area codes can be programmed and then extended within toll restriction programming to provide proper call costing. See pages 4-29 and 5-172.

Loop Start Trunk Glare Protection

During a “glare” connection, the software now allows the incoming call to remain connected, while still protecting against possible toll fraud. See pages 2-19 and 5-68.

Station Exchange

This programmable station feature allows a station user to exchange the extension numbers of two station circuits. This swaps the database and user programmed features of the extension numbers between two station circuits without the need for database programming. The circuit number of the station locations are unchanged, but the extension numbers are changed. See pages 4-99 and 5-31.

Digital Cards, Digital Keysets, And Digital DSS/BLF Units

The IMX 416/832 System can now support the digital station instruments originally designed for the Inter-Tel AXXESS System. See pages 2-2, 2-10, 2-17, 2-18, 2-26 to 2-32, 2-41, 2-42, 2-52, 3-8, 3-23, 3-29, 3-30, 3-89, 3-90, 3-105 to 3-113, 3-133, 3-134, 4-24, 4-40, 4-50, 5-24, 5-47, 5-136, 6-2, 7-1, and 7-4.

All digital keysets utilize DSP shared resources for speakerphones, and Executive Digital Keysets have enhanced displays. See pages 2-27, 4-40, and 4-41.

A PC Data Port Module (PCDPM) must be installed on digital keysets to provide the secondary voice path needed for the OHVA feature. See pages 2-28, 3-109, and 4-61.

A customer-provided, modem-equipped data device may be attached to any digital keyset with a PC Data Port Module (PCDPM) and a Modem Data Port module (MDPM) installed. See pages 2-28, 3-113, and 4-101.

Feature And Speed-Dial Keys On DSS/BLF Units

DSS/BLF Units can have feature keys or system speed-dial keys programmed in their keymaps. See pages 4-50, 4-87, and 5-50.

INDEX OF NEW FEATURES (continued)

Keypad “Hot” Dial Pad Keys

There is a system-wide option that, if enabled, allows keypad users to dial line access codes and feature codes without lifting the handset or pressing the SPKR or SPCL key. This programmable feature is called “hot dial pad” to indicate that the dial pad keys are always activated. See pages 4-4, 4-42, and 5-68.

Private Intercom Call Override

If a keypad station has the Private Intercom Override feature enabled, the user can place a handsfree call by pressing * or # when calling a keypad station that has handsfree mode disabled. See pages 4-56, 5-30, and 5-52.

“Silent” Ring Tone Selection

When setting the ring tone on a keypad, the keypad user can enter 0 to disable ring tones. See page 4-48.

Toll Security Feature Set

The *Extended* software package now includes the following Toll Security features:

Weekly Toll Limits: When enabled, the weekly toll limit feature keeps track of the accumulated call cost for specified types of toll calls. The feature can monitor 7- and 10-digit toll calls and/or operator-assisted/international calls. Alarm messages have been added for toll limit management. See pages 4-10, 4-30, 4-62, 4-63, 4-83, 4-112, 4-125, 5-97, and 6-8.

Inter-Tel Services: The weekly toll limit feature can only be enabled by Inter-Tel Services. See page 6-41.

Enhanced DISA Security Codes: DISA security codes can be 4-7 digits long. A DISA caller will have only three opportunities to enter a valid security code. If the caller fails three times, the failure will generate a system alarm and that trunk will be inoperable for five minutes. See pages 4-38, 5-111, 5-115, and 6-8.

DISA Toll Restriction: DISA lines can be given day and/or night mode toll restrictions like those for individual stations (except LCR-Only). See pages 4-38, 5-106, 5-111, and 5-116.

SMDR Blocked DISA Calls Option: A programming flag has been added to SMDR that allows blocked DISA calls to appear in the SMDR report. See pages 4-38, 4-123, and 5-143.

DISA And Hunt Group Information In SMDA Summary Reports

DISA call information has been added to the System Summary report and a new Hunt Group option has been added to the Summary Report. See pages 4-38, 4-115, 4-118, and 5-141.

End-Of-Dialing Digit Suppression

Display And Redial: A system programming flag allows the programmer to specify whether all dialed digits or just the digits that make up the valid call are displayed and stored in the redial buffer. If desired, the “extra” digits used for dial-up banking machine, voice mail, automated attendant, or other purposes can be suppressed. Suppressing the extra digits prevents entries, such as PIN numbers and other codes, from being displayed when they are dialed. See pages 4-93 and 5-69.

SMDR Reports: A programming flag has been added to the SMDR report programming prompts that allows you to specify whether all dialed digits or just the digits that make up the valid call appear in the SMDR report. See pages 4-123 and 5-143.

Account Code Enhancements

LCR Toll Forced Account Code: Forced account codes for toll calls only can be programmed for stations with LCR-Only toll restriction in day *and* night modes. When this account code type is enabled, the user only has to enter an account code if the system detects that a toll call has been dialed when LCR is used. See pages 4-33, 4-66, 5-32, and 5-55.

Validated Forced Account Codes: Forced account codes can be validated or non-validated. See page 4-66, 5-32, 5-33, and 5-55.

INDEX OF NEW FEATURES (continued)

Voice Mail/Computer Enhancements

Do-Not-Disturb Breakthrough: Normally, calls to a station through DISA, the automated attendant, or a voice computer are not blocked by placing the station in do-not-disturb. If desired, individual stations can be set to prevent these calls from breaking through do-not-disturb. See pages 4-14, 4-21, 4-38, 4-95, 5-30, and 5-52.

Voice Mail/Computer Hunt Groups In All Software Packages: In any software package, any hunt group can be designated as a voice computer hunt group. See pages 4-16, 4-21, 5-61, and 5-62.

Automated Attendant Hunt Groups: Voice computer hunt groups can be designated as automated attendant hunt groups. See pages 4-21 and 5-63.

Dial Rules: Voice mail/computer hunt groups can be assigned dial rules. See pages 4-21 and 5-63.

Recall Destination: A voice mail/computer hunt group can have an assigned recall destination. See pages 4-21 and 5-64.

Overflow/Announcement Stations: Voice mail/computer hunt groups can serve as overflow/announcement stations. See page 5-66.

Extended DTMF Feedback Tones: The progress tones that are normally sent to a voice computer can be replaced with DTMF "feedback" tones that determine call status. See pages 4-21, 5-31, and 5-52. If feedback tones are enabled, the "extended" set of feedback tones can also be enabled in system-wide programming. See pages 5-67 and 5-68.

Allow Cross-Tenant Voice Mail/Computer Traffic: The programmer can determine whether voice mail units and voice mail computers will be allowed to place intercom calls, forward intercom calls, or transfer intercom or outside calls to stations that are in different tenant groups. See pages 4-21 and 5-67

Version Feature Code: When entered at a voice computer port this feature code generates a four-digit DTMF code that indicates the last four digits of the software part number. It is used by voice processing software to ensure that the KSU software is compatible with the voice processing features. See page 4-7.

Remote Hunt Group Remove/Replace

The Hunt Group Remove/Replace feature can be controlled from the attendant's station using the Remote Hunt Group Replace feature code. See pages 4-10, 4-19, and 4-111.

Hunt Group Enhancements

There is a system option that can be enabled to send *all* unanswered hunt group calls first to the announcement station and then to the overflow station. See pages 4-17 and 5-68.

If a station that receives a recalling hunt group call chooses to transfer the call back to the hunt group, the call retains its original queue position in the hunt group. Also, calls that go to the announcement and overflow stations do not lose their places in the queue. While the call is at a playback device announcement or overflow station (except voice computer overflow/announcement stations) it continues to circulate through the hunt group. If a hunt group member picks up the call, it is pulled back from a playback device overflow/announcement station and connected to the hunt group station. See pages 4-18 and 4-19.

Station Off-Hook Alarm

The STATION OFF HOOK alarm now indicates the station that is off hook. Also, the alarm clears automatically when the station user hangs up. See pages 4-112, 4-125, and 6-7.

Equal Access "101XXXX" Numbers Supported

The system supports the "101XXXX" and "10XXXX" equal access numbers. Toll restriction SCOS 7 has also been modified to support equal access dialing. See pages 4-27, 4-28, 5-88, and 5-113.

Password Required

The password prompt will always appear when a programmer logs in to a programming session. In the default state there is no database programming password and pressing RETURN will allow access to the database. See page 5-10.

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FCC REGULATIONS

IMPORTANT:

1. This equipment complies with Part 68 of FCC rules. On the back of the main equipment cabinet is a label that contains, among other information, the FCC registration number and ringer equivalence number (REN) for this equipment. Customers connecting this equipment to the telephone network shall, before such connection is made, give notice to the telephone company of the particular line(s) to which such connection is to be made, and shall provide the telephone company with the following information:

- Complies with Part 68 of FCC rules
- FCC registration number: BE2USA-60751-MF-E (for MF-rated systems) or BE2USA-61845-KF-E (for KF-rated systems)
- Quantities and USOC numbers of required interface jacks (see chart on next page)
- Sequence in which trunks are to be connected
- Ringer equivalence number (REN) or service order code (SOC), as applicable, by position (see chart on next page)

NOTE: The REN is used to determine the quantity of devices which may be connected to the telephone line. Excessive RENs on the telephone line may result in the devices not ringing in response to an incoming call. In most, but not all areas, the sum of the RENs should not exceed five (5.0). To be certain of the number of devices that may be connected to the line, as determined by the total RENs, contact the telephone company to determine the maximum REN for the calling area.

- Facility interface code (FIC) by position (see chart on next page)

The telephone company should also be given notice upon final disconnection of this equipment from the particular line(s).

It is also the responsibility of the customer to provide the telephone company with registration numbers of any other devices which are configured for connection to the telephone network.

2. This equipment cannot be used on public coin service provided by the telephone company. Connec-

tion to party line service is subject to state tariffs. (Contact the state public utility commission, public service commission, or corporation commission for information.)

3. If this equipment causes harm to the telephone network, the telephone company will notify the customer in advance that service may be temporarily discontinued. But if advance notice is not practical, the telephone company will notify the customer as soon as possible. Also, the customer will be advised of the right to file a complaint with the FCC, if necessary.
4. The telephone company may make changes in its facilities, equipment, operations, or procedures which may affect the operation of this equipment. If so, the customer shall be given advance notice so that any necessary modifications can be made in order to maintain uninterrupted service.
5. If trouble is experienced with this equipment, contact a local authorized factory service representative for repairs and/or warranty information. The customer, users, and unauthorized technicians should not repair, make adjustments to, or attempt to service this equipment in any way.

In the event of trouble with the telephone line(s), this equipment must be disconnected from the telephone line(s). If trouble ceases, the equipment must be repaired by an authorized factory service representative. If the trouble continues to occur with the equipment disconnected, the telephone company should be notified that they have a problem. If this is the case, repairs or adjustments made by the telephone company will be made at their expense.

6. Allowing this equipment to be operated in such a manner as to not provide proper answer supervision signaling is in violation of Part 68 of FCC rules. This equipment returns answer supervision signals to the public telephone network when: answered by the called station, answered by the attendant, routed to a recorded announcement that can be administered by the equipment user, and routed to a dial prompt. This equipment also returns answer supervision on all DID calls forwarded back to the public telephone network. Permissible exceptions are: a call is unanswered, busy tone is received, and reorder tone is received.

TYPE OF PORT INTERFACE	FACILITY INTERFACE CODE (FIC)	SERVICE ORDER CODE (SOC) OR REN	USOC JACK CONNECTOR
2-Wire Loop	02LS2	0.6B	RJ21X
2-Wire Ground*	02GS2	0.6B	RJ21X
2-Wire DID**	02RV2-T	0.0B	RJ21X
OPX Class C***	0L13C	9.0F	RJ21X
2-Wire, Type I E&M	TL11M	9.0F	RJ2EX
2-Wire, Type II E&M	TL12M	9.0F	RJ2FX
4-Wire, Type I E&M	TL31M	9.0F	RJ2GX
4-Wire, Type II E&M	TL32M	9.0F	RJ2HX
D4 Superframe	04DU9-B	6.0P	RJ48C
Extended Superframe (ESF)	04DU9-C	6.0P	RJ48C
ESF with B8ZS	04DU9-S	6.0P	RJ48C

* Available with MF-rated systems only. According to FCC regulations, tariffs do not permit the use of ground-start facilities with KF-rated systems.

** When using T1 facilities to provide DID service, do not use the DID facility interface code (FIC) as listed above; instead, provide the telephone company with DID answer supervision code "AS.2" and the FIC for the requested T1 service.

*** Also interfaces with Class A and B.

7. This equipment does not currently comply with the amended Part 64 of FCC rules (CC Docket No. 91-35), which requires that equipment sold and installed in the "call aggregator" market (i.e., hotels, motels, hospitals, universities, etc.) must allow users equal access to the long distance carriers of their choice (i.e., must allow the 10XXX dialing sequences normally used for "operator-assisted" calls, while blocking those normally used for "direct-dial" calls). In the future, this equipment may be modified to comply with this requirement.

NOTICE: THE TELEPHONE INSTRUMENTS SPECIFICALLY DESIGNED FOR THIS SYSTEM HAVE HEARING-AID COMPATIBLE HANDSETS THAT ARE IN COMPLIANCE WITH SECTION 68.316 OF THE FCC RULES.

WARNING: This equipment generates and uses radio frequency energy and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio and television reception. It has been type tested and found to comply with the limits for a Class A computing device in accordance with the specifications in Subpart J of Part 15 of FCC Rule. Operation of this equipment in a residential area may cause unacceptable interference to ra-

dio and TV reception requiring the operator to take whatever steps are necessary to correct the interference. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient the receiving antenna
- Relocate the equipment cabinet with respect to the receiver
- Check that the equipment cabinet and receiver are not on the same circuit; the equipment cabinet must be powered from an isolated, dedicated AC outlet

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions. The user may find the following booklet prepared by the FCC helpful: "How to Identify and Resolve Radio-TV Interference Problems"

This booklet is available from the U.S. Government Printing Office, Washington, D.C. 20402, Stock No. 004-000-00398-5.

If RFI problems persist, contact Inter-Tel Customer Support.

SAFETY REGULATIONS

The Inter-Tel IMX and GMX-416/832 Systems are listed by Communication Certification Laboratory (CCL) as meeting the Product Safety Requirements of UL 1459, Standard for Telephone Equipment. CCL is approved by the Occupational Health and Safety Administration (OSHA) as a Nationally Recognized Testing Laboratory (NRTL). *Before installation, also check the local electrical codes for important information concerning the installation of telephone and electronic equipment.*

The following safety information is reprinted from UL 1459.

IMPORTANT SAFETY INSTRUCTIONS

When using your telephone equipment, basic safety precautions should always be followed to reduce the risk of fire, electric shock, and injury to persons, including the following:

1. Read and understand all instructions.
2. Follow all warnings and instructions marked on the product.
3. Unplug this product from the wall outlet before cleaning. Do not use liquid cleaners or aerosol cleaners. Use a damp cloth for cleaning.
4. Do not use this product near water (for example, in a wet basement).
5. Do not place this product on an unstable cart, stand, or table. The product may fall, causing serious damage to the product.
6. Slots and openings in the cabinet and the back or bottom are provided for ventilation, to protect it from overheating; these openings must not be blocked or covered. This product should never be placed near or over a radiator or heat register. This product should not be placed in a built-in installation unless proper ventilation is provided.
7. This product should be operated only from the type of power source indicated in the manual. If you are not sure of the type of power source to your building, consult your dealer or local power company.
8. This product is equipped with a three-wire grounding type plug, a plug having a third (grounding) pin. This plug will only fit into a grounding type power outlet. This is a safety feature. If you are unable to insert the plug into the outlet, contact your electrician to replace your obsolete outlet. Do not defeat the safety purpose of the grounding type plug.
9. Do not allow anything to rest on the power cord. Do not locate this product where the cord will be abused by persons walking on it.
10. Do not use an extension cord with this product's AC power cord. The AC outlet for this product should not be used for any other electrical equipment.
11. Never push objects of any kind into this product through cabinet slots as they may touch dangerous voltage points or short out parts that could result in a risk of fire or electric shock. Never spill liquid of any kind on the product.
12. To reduce the risk of electric shock, do not disassemble this product, but take it to a qualified serviceman when some service or repair work is required. Opening or removing covers may expose you to dangerous voltages or other risks. Incorrect reassembly can cause electric shock when the product is subsequently used.
13. Unplug this product from the wall outlet and refer servicing to qualified service personnel under the following conditions:
 - A. When the power supply cord or plug is damaged or frayed.
 - B. If liquid has been spilled into the product.
 - C. If the product has been exposed to rain or water.
 - D. If the product does not operate normally by following the operating instructions. Adjust only those controls that are covered by the operating instructions because improper adjustment of other controls may result in damage and will often require extensive work by a qualified technician to restore the product to normal operation.
 - E. If the product has been dropped or the cabinet has been damaged.
 - F. If the product exhibits a distinct change in performance.
14. Avoid using a telephone (other than a cordless type) during an electrical storm. There may be a remote risk of electric shock from lightning.
15. Do not use the telephone to report a gas leak in the vicinity of the leak.

SAVE THESE
INSTRUCTIONS

LIMITED WARRANTY

For a period of one (1) year from the date of shipment to Buyer, INTER-TEL warrants the Equipment (except for fuses and lamps) to be free from defects in material, workmanship, or both, and to comply with specifications for the Equipment, as set forth in the *Installation and Field Maintenance Manual*. Buyer's sole and exclusive remedy for breach of this Limited Warranty shall be to have the defective Equipment (or parts) repaired or replaced at INTER-TEL's option. Shipping costs incurred returning warranty work to INTER-TEL shall be paid for by the Buyer. *This Limited Warranty extends only to the Buyer, not to any customer, user, or third party.* This Limited Warranty does not apply to Equipment (or parts) damaged by improper handling, normal wear and tear, accidents, lightning damage, negligence, or improper use or maintenance, and does not apply to Equipment altered without authorization by INTER-TEL. This Limited Warranty does not extend to any claims, suits, damages, liabilities, costs, and expenses arising from any act, action, or inaction of Buyer. Although the Moss-Magnuson Act should not apply, in the event that it is held to apply by a court of competent jurisdiction, the implied warranty of fitness for a particular purpose shall extend for the one-year (1-year) period from the date that the Equipment was shipped to the Buyer.

THIS WARRANTY IS IN LIEU OF AND EXCLUDES ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THIS LIMITED WARRANTY. IN NO EVENT SHALL INTER-TEL BE LIABLE FOR LOSS OF ANTICIPATED PROFITS, INCIDENTAL OR CONSEQUENTIAL DAMAGES, LOSS OF TIME OR OTHER LOSSES INCURRED BY BUYER IN CONNECTION WITH THE PURPOSE, POSSESSION, OPERATION, OR USE OF THE EQUIPMENT, SUCH CLAIMS BEING EXPRESSLY WAIVED BY THE INSTALLING COMPANY.

For complete information on returning equipment, refer to the current Inter-Tel *Material Return Policy* (document part number 835.1065). This document includes specific information on the following subjects: warranty, procedures to follow when returning equipment, equipment damaged in shipment, insurance, repair policy, and advance replacement policy.

OVERVIEW

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1. INTRODUCTION

1.1 The 416/832 System is a state-of-the-art, digital, voice/data, hybrid telephone system. As a hybrid system, it incorporates many of the user-friendly features of key systems with many of the expanded features and flexibility of private branch exchange (PBX) systems.

1.2 The 416/832 System is designed to meet the needs of growing businesses. In fact, the system's unique structure (including digital signal processing) allows it to be easily adapted and expanded as business communication needs change. The modular design makes the system easy to install and service. And, the programmable features provide an abundance of user-friendly applications to meet each customer's needs. Highlights of the system's design include:

- Advanced microprocessor technology
- Modular, easily replaceable hardware with add-on capabilities for optional features
- Flexible programming to customize many system and station features

2. SYSTEM CAPACITIES

2.1 The main equipment cabinet has 26 slots for station and trunk cards. If the optional expansion cabinet is installed, it too has 26 slots for station and trunk cards. *The actual number of stations and trunks available depends on the number and type of cards, station instruments, and power supply modules installed.*

2.2 For example, if all 52 cards in an expanded system are station cards, there can be a maximum of 832 station instruments installed. Or, if only one of the cards is a type of Keypad Card (required), 18 are T1 Cards (the maximum allowed), and the other 33 are Loop/Ground Start Cards, the system maximum is 16 stations (using digital keysets or using 8-line IMX AIM keysets, which can be installed two to a circuit) and 696 trunks. Of course, in most circumstances, the maximums listed below will never be reached due to the variety of cards and station instruments installed. (See page 2-26 for additional information on determining maximum station capacities.)

2.3 A fully expanded 416/832 System has the capacity for up to:

- 832 Ports (52 available card slots with a maximum 16 circuits per card equals 832 ports. Although it is theoretically possible to equip more than 832 ports [e.g., using T1 Cards and/or digi-

tal or 8-line IMX AIM keysets], the system limits the number to 832 [or 416 for standard-size systems]. See page 2-6 for more information.)

- **450-464 Non-Blocking Voice Channels** (The exact number of voice channels available depends on the number of DTMF decoders installed in the system. The voice channels are available for outside calls, intercom calls, and paging on a first-come, first-served basis. See page 2-6 for more information.)
- **696 Central Office (CO) Trunks** (Loop start and/or ground start trunks installed in increments of up to eight or 24, depending on the number of Loop/Ground Start Cards [LGCs], Loop Start Cards [LSCs], and/or T1 Cards [T1Cs] installed in the system. LGCs and LSCs can have up to eight CO trunks installed, while T1Cs can have up to 24 CO trunk circuits installed.)

NOTE: The system is limited to nine T1 Cards in the main equipment cabinet and nine T1 Cards in the expansion cabinet, for a system maximum of 18 T1 Cards. (18 cards with up to 24 circuits per card equals 432 possible T1 trunk circuits.) However, with certain power supply Quad Modules, there are some additional power restrictions (see page 2-11 in SPECIFICATIONS for details).

- **696 Direct Inward Dialing (DID) Trunks** (Direct station access trunks installed in increments of up to eight or 24, depending on the number of Inward Dialing Cards [IDCs] and/or T1 Cards installed in the system. IDCs can have up to eight DID trunks installed, while T1Cs can have up to 24 DID trunk circuits installed.)
- **564 E&M Trunks** (Special "tie" trunks between two supporting telephone systems [e.g., between two 416/832 Systems] installed in increments of up to four or 24, depending on the number of E&M Cards [EMCs] and/or T1 Cards installed in the system. EMCs can have up to four E&M trunks installed, while T1Cs can have up to 24 E&M trunk circuits installed.)
- **832 Stations** (Combinations of keysets, DSS/BLF Units, Attendant Computer Consoles, and single-line sets in increments of up to eight or 16, depending on the number of Digital Keypad Cards [DKSCs], Keypad Cards [KSCs or KSC-Ds], Single-Line Cards [SLCs], and/or Inward Dialing Cards [IDCs] installed in the system. The various Keypad Cards can have from eight to 16 stations connected depending on the type of

keysets used, SLCs can have up to 16 stations connected, and IDCs can have up to eight.)

NOTE: At least one DKSC, KSC, or KSC-D must be installed to provide an attendant (equipped with a display keypad or an Attendant Computer Console) to program selected system data, act as the attendant for unsupervised CO recalls, receive system alarm messages, etc.

- **50 Keypad Circuits Equipped With Direct Station Selection/Busy Lamp Field (DSS/BLF) Units** (Digital DSS/BLF Units are physically attached to and programmed to be used with specific digital keysets. Up to four units may be attached to one keypad. The units are powered by their own AC transformers and do not require a DKSC circuit that is separate from the keypad's circuit. Analog keysets, analog DSS/BLF Units, and Attendant Computer Consoles use separate KSC or KSC-D circuits. For each analog DSS/BLF Unit installed, one less analog keypad or Attendant Computer Console may be installed. Up to four analog DSS/BLF Units may be connected to a single Keypad Card, and as many units as desired can be used with a single keypad. See page 2-32 for more information.)

3. SOFTWARE PACKAGES

3.1 The 416/832 System is available in four software "packages" (refer to REPLACEMENT PARTS for the part numbers). The customer can choose between one KF-rated system and three MF-rated systems. The KF-rated system permits only one trunk to be accessed per trunk key, and users can access only one auto trunk and only one trunk in each of the trunk groups. The MF-rated systems permit one-key access to multiple outgoing trunks. The four software packages are listed below.

- MF-rated, *Basic* package:

- This software package has all of the features described in this manual except Toll Security, Intercom/Outside Directory, Automated Attendant, Station Message Detail Accounting (SMDA), T1, and E&M.

- MF-rated, *Extended* package:

- This software package has all of the features described in this manual except T1 and E&M.

- MF-rated, *Extended plus T1 and E&M* package:

- This software package has all of the features described in this manual.

- **KF-rated, *Extended plus T1 and E&M* package:**

- This software package has all of the features described in this manual except Least-Cost Routing (LCR).

3.2 The IMX 416/832 system has an additional software package that has all of the features described in this manual, plus it allows the GX station instruments to be installed on the system. (Refer to Appendix A in the back of the manual for complete information.)

NOTE: According to FCC regulations, if a customer wishes to change from an existing KF-rated system to an MF-rated system (or vice versa), the installing company must advise the customer "to notify the telephone company of the change if they want the [KF or MF] rate and that they may have to certify in writing to the telephone company that the equipment is configured as a key system and pay appropriate service order charges."

3.3 Each of the standard software packages listed above consists of seven (IMX) or six (GMX) floppy disks (which are the same for all five packages) and a Matrix Peripheral Processor Chip (which is different for all five packages). The chip determines the specific software package that the system will use.

3.4 If an expansion cabinet is to be installed, the *Expanded* software package is also needed (see **REPLACEMENT PARTS** for the part number). This software package consists of eight (IMX) or seven (GMX) floppy disks (which are used in place of the seven or six floppy disks described in the preceding paragraph) and an Expansion Peripheral Processor Chip (which allows the system to have an expansion cabinet installed).

4. HARDWARE SUMMARY

4.1 The **SPECIFICATIONS** section of this manual explains environmental requirements of the system, de-

scribes the hardware, and gives pre-installation information. The hardware descriptions include: main equipment cabinet, expansion cabinet, main power supply, expansion power supply, computer drives and cards, telecommunication cards, station instruments, and additional equipment needed for other optional features.

5. INSTALLATION, PROGRAMMING, AND MAINTENANCE SUMMARY

5.1 The modular design and self-diagnostic capabilities of the system facilitate installation and repair with minimal down-time. Strict quality control standards for manufacturing and thorough field testing provide the system with the reliability demanded by today's high-technology market.

5.2 The **INSTALLATION** section contains instructions for assembling the main distribution frame (MDF) and for installing the main equipment cabinet, optional expansion cabinet, power supply(s), computer drives and cards, telecommunication cards, station instruments, and other optional hardware.

5.3 The **PROGRAMMING** section describes the procedures for programming the system features. After the system is installed, the flexible software allows the database to be customized to meet the customer's needs. A programming monitor and keyboard are used to perform this task.

5.4 The **TROUBLESHOOTING** section gives instructions for correcting system problems and replacing defective parts. Part numbers and a recommended inventory of spare parts are listed in the **REPLACEMENT PARTS** section.

6. FEATURES SUMMARY

6.1 System, keyset, single-line set, DSS/BLF Unit, Attendant Computer Console, and attendant features are listed on the following pages. *Those features marked with an asterisk (*) require additional equipment.* For complete descriptions and operating instructions, refer to the SPECIFICATIONS and FEATURES sections of this manual.

A. SYSTEM FEATURES

Hardware and General System Features

- Four available software packages
- Flexible station instrument configuration and numbering plan
- Hard disk drive for storing the system software and database
- Floppy disk drive for loading the system software and for backing up and restoring the system database
- Two DB9 connectors on the 68000 Co-Processor (Pro68) Card (or the new "expanded" Pro68 Card, called the Pro68E Card) for connecting to the peripheral connector panel on the back of the equipment cabinet, which in turn connects to the optional SMDR/SMDA output devices
- * Optional station message detail recording (SMDR) and/or station message detail accounting (SMDA) output device(s)
- Adjustable baud rates for the optional SMDR/SMDA output devices (110, 300, 600, 1200, 2400, 4800, 9600, and 19200 baud)
- DB9 connector on the Monitor Card for connecting to the peripheral connector panel on the back of the equipment cabinet, which in turn connects to the programming monitor
- * Monochrome monitor with a standard DB9 connector
- 5-pin DIN connector on the PC Motherboard for connecting to the peripheral connector panel on the back of the equipment cabinet, which in turn connects to the programming keyboard
- * IBM AT-compatible keyboard with a standard 5-pin DIN connector
- System status panel for providing a quick indication of overall system function
- Easily accessible system voltage test points on the front edge of the Matrix Card (MXC) and, if installed, the Expansion (EXP) Card
- * One relay on the MXC is dedicated as a power failure transfer relay; the other three relays are general

purpose relays that can be used for night transfer, general signaling devices, etc.

- * Four general purpose relays on the EXP can be used for night transfer, general signaling devices, etc.
- * Two relays on the T1 Card (T1C) can be used as T1 trunk alarm relays
- Modem Card with software auto-baud for remote programming (300, 1200, or 2400 baud)
- Variable system timers
- Industry-standard message waiting capability on SLCs (using -108VDC derived from a combination of system voltages)
- * Optional Attendant Computer Consoles (personal computers equipped with headsets or handsets; allow the user to view system activity on the monitor and to process calls and messages using the keyboard)
- * Two optional external music sources
- * Optional off-premises extensions (OPXs) with variable ring cadence
- * Optional OPX repeaters
- * Optional multi-port voice mail system
- * Optional talkback speaker equipment
- * Optional facsimile machine
- * Optional doorbox
- * Optional battery back-up
- * Optional external paging equipment
- * Optional playback devices for use with the automated attendant and hunt group features

System Organization and Record Keeping Features

- Ten paging zones and nine external paging ports
- * Station message detail recording (SMDR)
- * Station message detail accounting (SMDA) — available only in the *Extended* and *Extended plus T1 and E&M* software packages
- * Programmable reports for toll restriction, Least-Cost Routing (LCR), and station data
- * Customized database reports (stand-alone programming only)
- Call cost accounting (estimated)
- Forced, forced LCR toll, standard, optional, and class-of-service account codes (forced account codes can be validated or non-validated)
- Flexible attendant arrangements
- Tenant groups and departments
- * Hunt groups with individually programmed timers (may have optional overflow and announcement sta-

tions with playback devices and/or supervisor with monitoring ability)

- System alarm display and reporting
- Voice computer hunt groups with optional DTMF feedback tones

Trunk Features

- Auto trunks and trunk groups (restricted to accessing a single trunk on KF-rated systems)
- Automatic incoming trunk answering
- Dual-tone multi-frequency (DTMF) or dial-pulse signaling
- Loop start and/or ground start compatibility
- Hybrid balancing (ideal, loaded, or unloaded) for optimal CO trunk performance
- CO trunk receive and transmit adjustments for optimal voice volume levels
- Relaxed ring detection (ground start trunks on LGCs only)
- Outgoing-access, allowed-answer, and ring-in assignments on a station-by-station basis (day lists and night lists)
- Day and night modes of operation (by tenant group)
- Day and night toll restriction on a station-by-station basis (including provisions for eight area/office code restriction user groups and E&M, PBX, absorbed-digit, and equal access dialing)
- Least-Cost Routing (LCR) (may be programmed on a station-by-station basis to be transparent to the user)—not available in the *KF-rated, Extended plus T1 and E&M* software package
- System-wide call privacy release option
- Trunk reseat capability on a station-by-station basis
- Direct inward system access (DISA) — in the *Extended* and *Extended plus T1 and E&M* software packages, DISA lines can have toll restriction class of service similar to station toll restrictions
- * Automated attendant — available only in the *Extended* and *Extended plus T1 and E&M* software packages
- Basic T1 trunk emulation — available only in the *Extended plus T1 and E&M* software packages
- Basic E&M networking (tie trunks) — available only in the *Extended plus T1 and E&M* software packages
- Direct inward dialing (DID) trunks
- Flexible DID ring-in assignments

- Programmable wink, immediate, or delay start options for DID and E&M trunks
- Toll security with weekly limits for 7- and 10-digit and/or operator-assisted and international calls — available only in the *Extended* and *Extended plus T1 and E&M* software packages

General Station Features

- Programmable feature codes for easy station operation
- Call privacy/privacy release
- Station-to-station intercom calls
- Off-hook voice announce (OHVA) calls (the ability to place or receive OHVA calls depends on the type of station instrument used, and may be enabled/disabled on a station-by-station basis)
- Inter-station messages and message cancel
- Station exchange
- Ring intercom always
- Private intercom call override
- Automatic camp on to busy stations, trunks, and LCR (ability to camp on to LCR may be disabled on a station-by-station basis)
- Busy trunk/station callback (queue)
- Individual hold
- Call splitting
- Hold recall
- Call waiting
- Call transfer to outside telephone numbers and extension numbers
- Transfer to hold
- Transfer recall
- Reverse transfer and group call pick-up
- Conference calls — capacity ranges from 10 simultaneous three-party conferences to four simultaneous 8-party conferences
- System forwarding (routes calls based on the type of call and the status of the intended station)
- Call forward to extension numbers and hunt group pilot numbers
- Call forward to outside telephone numbers
- System speed dialing (including non-display and tenant-specific numbers) — can be programmed to override station class of service
- Station speed dialing
- Redial (last number dialed or, at keysets only, last number saved)
- Do-not-disturb with customized messages (the ability to place a station in do-not-disturb may be enabled/disabled on a station-by-station basis)

- Cancel miscellaneous operations
- Hookflash (over all types of trunks)
- Hunt group remove/replace
- House phone
- Silent messaging (leaves a message at a station without placing an actual call)

B. KEYSSET FEATURES

- Various digital and analog keyset models are available (for a complete listing of all the keyset models available and the optional equipment that may be installed on them, refer to the information in SPECIFICATIONS beginning on page 2-26)
- Digital keysets, AIM keysets, and Inter-Tel/DVK keysets allow the users to individually control voice and tone volume levels for intercom calls, outside calls, background music, etc.
- * Liquid crystal display (LCD) (optional on some models) for viewing: numbers dialed; speed-dial numbers; inter-station, do-not-disturb, and reminder messages; date/time; keyset identification; station programming; etc.
- * Optional Data Port Module on IMX 12-/24-line keysets and Inter-Tel/DVK keysets for installing a modem-equipped data device (for simultaneous voice/data communication), or for installing a loud ringing adapter (LRA) and signaling device(s)
- * Optional Personal Computer Data Port Module (PCDPM) on digital keysets for off-hook voice announce receive capability and to allow a digital DSS/BLF Unit and/or an optional Modem Data Port Module to be installed
- * Optional Modem Data Port Module (MDPM) on digital keysets for installing a modem-equipped data device (for simultaneous voice/data communication) or a single-line set — requires a PCDPM
- 12-key pushbutton keypad
- “Hot” keypad — allows dialing of feature codes, extension numbers, and trunk access codes without pressing the SPCL key or lifting the handset
- Up to 20 key maps (30 on expanded systems) for determining the exact layout and function of the keys
- Feature keys for one-key access to feature codes (some of the keys may be designated as user programmable)

- IC/CO speed-dial (SD) keys with light-emitting diode (LED) indicators
- Call appearance keys with LED indicators (for incoming call indication/access)
- Secondary call keys with LED indicators (show ring-in indications for the designated “primary” station)
- Individual trunk keys with LED indicators (for incoming and outgoing call indication/access)
- Trunk group keys with LED indicators (for outgoing call access and trunk group status)
- Speakerphone (allows handsfree operation on outside calls and intercom calls)
- Speakerphone on/off
- Slide-out directory card
- Ring and voice volume controls
- User-programmable ring tone
- Self-test function
- Hearing aid-compatible (HAC) handset
- Reversible baseplate and cradle hook for wall mounting
- * Optional headset
- * Optional handset amplifier
- * Background music (two sources)
- Microphone mute
- Handsfree answer enable/disable
- On-hook dialing/monitoring
- System hold
- Station call monitoring (hunt group supervisors only)
- Call barge (break through to a busy station)
- Do-not-disturb override (the ability to override do-not-disturb may be enabled/disabled on a station-by-station basis)
- Activity release feature (primarily intended for use with the Attendant Computer Console; entering this feature code terminates any current activity and returns the station to idle or dial tone)
- Page remove/replace
- Intercom (extension number) and outside (system speed-dial number) directories — available only in the *Extended* and *Extended plus T1 and E&M* software packages
- Automatic intercom and/or outside call access

**C. ENHANCED SINGLE-LINE SET (ESLS)
FEATURES**

- 12-key pushbutton keypad
- User-programmable feature keys for one-key access to feature codes
- Timed hookflash (FLASH) key
- Neon lamp for message waiting indication
- Ring volume control
- Selectable ring tone (HI or LO)
- Hearing aid-compatible (HAC) handset
- Reversible baseplate and cradle hook for wall mounting
- Selectable AC/DC ringer
- * Optional handset amplifier

**D. SINGLE-LINE INSTRUMENT (SLI)
FEATURES**

- 12-key pushbutton keypad
- User-programmable feature keys for one-key access to feature codes
- Timed hookflash (FLASH) key
- Ring volume control
- Hearing aid-compatible (HAC) handset
- Reversible baseplate for wall mounting
- Selectable AC/DC ringer
- Optional message waiting indication tones
- * Optional handset amplifier

**E. DIRECT STATION SELECTION/BUSY
LAMP FIELD (DSS/BLF) UNIT FEATURES**

- * Up to 50 keyset circuits may have units installed
- Each unit has 60 keys with LED indicators for one-key access to up to 60 extension numbers (the LEDs show the status of the assigned stations and/or hunt groups)
- Up to eight key maps (12 on expanded systems) for determining the layout and numbers accessed by the keys

**F. ATTENDANT COMPUTER CONSOLE
FEATURES**

- IBM XT-, AT-, or 386-compatible computer
- CGA, EGA, or VGA monitor and Monitor Interface Card
- 122-key custom keyboard
- Headset operation
- Visual display of system call activity, system directory, system alarms, date and time, etc.
- Automatic call priority
- Quick, simple call answering and transfer

NOTE: For additional information on the Attendant Computer Console, along with detailed installation and programming instructions, refer to the manual included with the console.

G. ATTENDANT FEATURES

- System speed-dial number/name programming
- Remote canceling of do-not-disturb and call forward for stations served
- System alarm reporting/clearing
- Enable/disable system night mode
- Set date and time of day
- Attendant recall
- System do-not-disturb and reminder message programming
- Station feature programming (user name, tenant group, department, and attendant)
- * Immediate off-hook voice announce (OHVA) calls (requires special programming and an Attendant Computer Console or a DSS/BLF Unit)
- Enable/disable background music to external paging speaker(s)
- Trunk maintenance feature for taking trunks out of service and placing them back in again
- SMDA report can be generated at any time by entering a feature code

H. MAXIMUM CAPACITIES

6.2 Some of the features have maximum capacities that are dependent on the availability of system channels and/or circuits. The features with such capacities are listed in the following table. The numbers listed under the heading labeled "small" are for standard-size systems, while the numbers listed under the heading labeled "large" are for systems with an expansion cabinet installed.

FEATURE	CAPACITY	
	SMALL	LARGE
Non-blocking voice channels/ports	216	464
Paging zones	10	10
External paging ports	9	9
Conference circuits available	32	32
Parties per conference	8	8
Simultaneous conferences	10 ^a	10 ^a
System speed dialing		
Numbers per system	400	500
Digits per number	32	32
Station speed dialing		
Numbers per keyset - CO	10	10
Numbers per keyset - IC	10	10
Numbers per single-line set - CO and/or IC	10	10
Digits per entry - CO	16	16
Digits per entry - IC	4 ^b	4 ^b
Redial numbers per station	1	1
Digits per number	48	48
LCR		
Route groups	19	19
Facility groups	24	32
Trunk groups per facility group	102	142
Dial rules (16 digits each)		
- total	32	32
- programmable	29	29
Facility group callback requests per system	50	50
Camp on requests per system	50	50
Callback (queue) requests per station	1	1
Camp on by a station	1	1
Stations camped on to a station	415	831
Stations camped on to a trunk group	400	816
Inter-station messages per system	446	862
Programmable reminder messages	20	20
Message requests per system	120	120
Do-not-disturb messages	20	20
Messages per system	416	832
Ring-in/allowed-answer patterns	40	60

FEATURE	CAPACITY	
	SMALL	LARGE
System forwarding paths	200	400
Paths per station	3	3
Points per path	4	4
Toll restriction user groups	8	12
Extended area codes per group	4	4
Allowed long distance numbers	20	30
Digits per number	10	10
Alternate carrier numbers	20	30
Digits per number	10	10
Account codes		
Forced	416	832
Standard	64	120
Digits per code	8	8
SMDA account codes	415 ^c	831 ^c
Attendants	317	634
Attendant Computer Consoles	192	384
DSS/BLF-equipped circuits	50	50
Extension numbers per DSS/BLF Unit	60	60
Hunt groups		
Per system	30	40
Stations per hunt group	680 ^d	800 ^d
Announcement stations per hunt group	3	3
Overflow stations per group	1	1
Overflow counts	0-127 ^e	0-127 ^e
Tenant groups	8	12
Departments per tenant group	10	10
Trunks		
Auto trunks	344	696
CO/E&M trunk groups	102	142
Trunks per group	344	696
DID trunk groups	11	16
Trunks per group	344	696
DID entries	600	800
Entries per DID group	600 ^f	800 ^f
Map group assignments		
Keyset	20	30
DSS/BLF	8	12
Secondary call key stations per primary station	10	10
Secondary call keys per station	16	16

^a 3-party

^b If using three-digit extension numbers, an extension number can be preceded with a pound (#) to speed dial private intercom calls to the station. Or, a "4" (the default feature code for reverse transfer) may be entered before a station extension number or hunt group pilot number to quickly reverse transfer (pick up) calls from that station or hunt group.

^c Plus 1 overflow

^d As many as desired until a total of 680 (small) or 800 (large) for all hunt groups is reached

^e Or unlimited

^f As many as desired until a total of 600 (small) or 800 (large) for all DID trunk groups is reached

SPECIFICATIONS

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1. INTRODUCTION

1.1 This section of the manual describes the following 416/832 System hardware:

- Cabling and the Main Distribution Frame (MDF)
- Main Equipment Cabinet
- Expansion Cabinet
- Main Power Supply
- Expansion Power Supply
- Computer Complex
- Telecommunications Complex
- Station Instruments
- Additional System Equipment

1.2 The main equipment cabinet has 26 slots available for station and trunk cards. If an expansion cabinet is installed, it too has 26 slots. *The maximum number of stations and trunks that can be installed depends on the number and type of cards, station instruments, and power supply modules used.* For example, in a fully expanded system, there could be as many as 696 trunks installed (using one Keypad Card [required], 18 T1 Cards [the maximum allowed], and 33 other-type trunk cards). Or, there could be as many as 832 stations (using a combination of digital keysets, 8-line IMX AIM keysets, and single-line sets). See page 2-26 for additional information on determining maximum station capacities.

NOTE: Generally, one station instrument can be installed on each available station circuit. However, the new 8-line "dual-circuit" IMX AIM keyset has been specially designed so that two of these keysets can be installed on a single circuit, if desired.

1.3 The trunks and stations are controlled by the computer cards and telecommunication cards in the equipment cabinet.

1.4 A wide variety of station instruments can be used on the Inter-Tel IMX and GMX-416/832 Systems, including:

IMX 416/832 Digital Station Instruments

- Standard Digital Keysets (also referred to as Standard Digital Terminals) — display and non-display
- Executive Digital Keysets (also referred to as Executive Digital Terminals) — display only

- Digital Direct Station Selection/Busy Lamp Field (DSS/BLF) Units

IMX 416/832 Analog Station Instruments

- 24-Line AIM Keysets (display only)
- 12-Line AIM Keysets (display only)
- 8-Line Dual-Circuit AIM Keysets (display only)
- 24-Line Keysets (standard and display)
- 12-Line Keysets (standard and display)
- 8-Line Keysets (non-display only)
- Attendant Computer Consoles
- DSS/BLF Units
- Enhanced Single-Line Sets (ESLs)
- Single-Line Instruments (SLIs)
- Industry-Standard Single-Line, Dual-Tone Multi-Frequency (DTMF) Sets

NOTE: With the proper software package, the Inter-Tel GX station instruments can also be installed on the IMX 416/832 System. Refer to Appendix A in the back of the manual for complete information.

GMX-416/832 Analog Station Instruments

- Inter-Tel/DVK 24-Line Keysets (standard and display)
- Inter-Tel/DVK 12-Line Keysets (standard and display)
- Inter-Tel/DVK 8-Line Keysets (standard and display)
- GMX 24-Line Keysets (standard and display)
- GMX 12-Line Keysets (non-display only)
- GX 24-Line Keysets (standard and display)
- Attendant Computer Consoles
- Inter-Tel/DVK Direct Station Selection/Busy Lamp Field (DSS/BLF) Units (single or tandem)
- GMX DSS/BLF Units (single only)
- GX DSS/BLF Units (single or tandem)
- GMX Single-Line Instruments (SLIs)
- GX SLIs
- Industry-Standard Single-Line, Dual-Tone Multi-Frequency (DTMF) Sets

NOTE: For more information on the GX and GMX station instruments, refer to appendixes A and B in the back of this manual.

1.5 A wide variety of optional system equipment can also be installed, including:

- Off-premises extensions (OPXs) and OPX repeaters, refer to pages 2-35 and 3-31.
- Playback devices, see pages 2-35 and 3-138.
- Output device(s) for the Station Message Detail Recording (SMDR), error recording, and Station Message Detail Accounting (SMDA) features, refer to pages 2-36 and 3-141.
- System battery back-up (uninterruptable power supply or standby power supply), refer to page 2-38.
- Two external music sources, refer to pages 2-14 and 3-142.
- Power failure transfer equipment, refer to pages 2-14 and 3-31.
- Night switch equipment, refer to pages 2-15 and 3-31.
- General signaling devices, refer to pages 2-15 and 3-31.
- External paging speaker equipment, refer to pages 2-7 and 3-141.
- Doorbox, refer to page 2-38.
- Multi-port voice mail equipment, see page 2-38.
- Facsimile machine, refer to page 2-38.
- Talkback speaker equipment, see page 2-38.

2. CABLING AND THE MAIN DISTRIBUTION FRAME (MDF)

2.1 Connections between the trunks, station instruments, external equipment, and the station and trunk circuit cards are made at the MDF. The MDF is made up of industry-standard, 66M1-50-type terminal blocks and, if using T1 Cards, eight-conductor (RJ48C) modular jack assemblies. Bridging clips are used on all terminal blocks to complete the connections. As many as 54 blocks may be needed, including any combination of the following:

- 1-51 blocks for CO trunk terminations and Loop/Ground Start Card (LGC) and/or Loop Start Card (LSC) terminations.
- 1-51 blocks for DID trunk terminations and Inward Dialing Card (IDC) terminations.
- 1-51 blocks for E&M trunk terminations and E&M Card (EMC) terminations.
- 1-52 blocks for station cabling terminations and Digital Keypad Card (DKSC), Keypad Card (KSC or KSC-D), Single-Line Card (SLC), and/or Inward Dialing Card (IDC) terminations.
- 1-2 blocks for optional system equipment terminations and Matrix Card (MXC) and/or Expansion (EXP) Card terminations.

2.2 The MDF requires at least a 4 × 8-foot (1.2 × 2.4-meter), ¾-inch plywood backboard. (Depending on the number of stations and trunks installed, a larger backboard may be necessary.) This will allow room to

mount the terminal blocks, modular jack assemblies, and any optional peripheral equipment.

A. STATION CONNECTIONS

2.3 For each keyset, analog DSS/BLF Unit, Attendant Computer Console, single-line set, and playback device, three-pair (24 AWG) twisted cable is run from the station location to the MDF. All station cables are terminated on blocks at the MDF and on six-conductor modular jack assemblies at the station locations.

NOTE: It is recommended that three-pair twisted cable and six-conductor modular jacks be used for all station connections. This allows the various types of station instruments to be easily interchanged if necessary. However, if desired, ESLs, SLs, single-line DTMF sets, and playback devices can be installed using one-pair twisted cable and four-conductor modular jacks.

2.4 Industry-standard, 25-pair telephone cable is used to connect the station blocks to their corresponding station cards. Female 50-pin amphenol-type connectors on the cables attach to the male connectors on the station cards in the cabinet.

2.5 To meet Part 15 of FCC Regulations, all station cables must be equipped with ferrite beads. Two ferrite "split" beads (two half beads) are installed on each 25-pair cable just below the amphenol-type connector. The beads help to reduce electromagnetic interference (EMI) and radio frequency interference (RFI).

NOTE: Each ferrite split bead, which is actually half of a full bead, is ordered individually (see **REPLACE-MENT PARTS** for the part number). Two split beads are required to form one complete bead.

B. TRUNK CONNECTIONS

2.6 The CO, DID, and E&M trunks are terminated on telephone company RJ-type blocks, as required by FCC regulations. Cross-connect cable is used to connect the RJ-type blocks to the CO, DID, and E&M terminal blocks on the MDF. The trunks are then connected to the Loop/Ground Start Cards (LGCs), Loop Start Cards (LSCs), Inward Dialing Cards (IDCs), and/or E&M Cards (EMCs) using industry-standard, 25-pair cable. Female 50-pin amphenol-type connectors on the cables attach to the male connectors on the cards.

2.7 To meet Part 15 of FCC Regulations, all trunk cables must be equipped with ferrite beads. Two ferrite "split" beads (two half beads) are installed on each 25-pair cable just below the amphenol-type connector. The beads help to reduce electromagnetic interference (EMI) and radio frequency interference (RFI).

NOTE: Each ferrite split bead, which is actually half of a full bead, is ordered individually (see **REPLACEMENT PARTS** for the part number). Two split beads are required to form one complete bead.

2.8 T1 spans are terminated on telephone company RJ48C modular jacks (or on RJ-type blocks that are then cross-connected to modular jack assemblies), as re-

quired by FCC regulations. Four-pair, non-reversing, mod-to-mod line cord is used to connect each T1 span directly to the T1 jack on the corresponding T1 Card. (Or, to use the optional DB15 connector instead, see page 3-21.)

2.9 It is recommended that gas discharge tubes with silicon avalanche suppressors be installed on all non-T1 trunks for lightning protection. (For T1 spans, the CSU itself provides the lightning protection.) Also, in areas with frequent occurrences of lightning, it is recommended that the cable between the telephone company termination and the gas discharge tubes be at least 75 feet long (the cable may be coiled up if desired).

2.10 The 416/832 System has the following trunk characteristics:

CHARACTERISTICS

Loss from:	
CO to keyset	0dB (@1kHz, 0 ft.)
CO to single-line set	0dB (@1kHz, 0 ft.)
CO to CO	0dB (@1kHz, 0 ft.)
Ringer equivalence	0.6B
Ring voltage	40VRMS minimum
Ring frequency	17-63Hz
Loop current	20mA minimum

PROTECTION

Tip-to-ring	400V transient
-------------	----------------

3. EQUIPMENT CABINET

A. MAIN EQUIPMENT CABINET DESCRIPTION

3.1 The main 416/832 equipment cabinet is comprised of three major sections: the computer complex, the telecommunications complex, and the system power supply. The top half of the main cabinet houses the computer complex (front) and the system power supply (back), while the bottom half of the main cabinet houses the telecommunications complex. For drawings of the main equipment cabinet, see Figures 2-3 and 2-4 on pages 2-39 and 2-40.

3.2 The dimensions of the main equipment cabinet are as follows:

Height	40.0 in. (101.6 cm.)
Width	32.0 in. (81.3 cm.)
Depth	23.0 in. (58.4 cm.)
Weight	
- Empty	170 lbs. (76.5 kg.)
- Loaded	230 lbs. (103.5 kg.)

3.3 The computer complex in the main equipment cabinet consists of the following items: IBM AT-compatible motherboard (called the PC Motherboard), hard disk drive, floppy disk drive, 68000 Co-Processor (Pro68) Card (or the new expanded Pro68E Card), High-Level Data Link Control (HDLC) Card, Disk Controller Card, Monitor Card, and Modem Card.

3.4 The telecommunications complex in the main equipment cabinet contains a 27-slot cardfile assembly and the telecommunication cards, including: Telecom Motherboard, Matrix Card (MXC), T1 Cards (T1Cs), E&M Cards (EMCs), Loop/Ground Start Cards (LGCs), Loop Start Cards (LSCs), Digital Keypad Cards (DKSCs), Keypad Cards (KSCs or KSC-Ds), Single-Line Cards (SLCs), and Inward Dialing Cards (IDCs).

B. EXPANSION CABINET DESCRIPTION

3.5 The 416/832 expansion cabinet is essentially the same as the telecommunications complex in the main equipment cabinet. The expansion cabinet also houses a 27-slot cardfile assembly and the various telecommunication cards, including the Expansion Card (EXP). The expansion cabinet is installed directly underneath the main equipment cabinet.

3.6 The dimensions of a fully expanded equipment cabinet are as follows:

Height	64.0 in. (162.6 cm.)
Width	32.0 in. (81.3 cm.)
Depth	23.0 in. (58.4 cm.)
Weight	
- Empty	246 lbs. (123 kg.)
- Loaded	366 lbs. (165 kg.)

C. FUNCTIONAL DESCRIPTION

3.7 Together, the computer complex, the main telecommunications complex, and the expansion telecommunications complex (if installed) perform the switching activities for the system; detect incoming calls; process data-controlled features; control the interaction of station instruments, trunks, and intercom calls; etc.

3.8 The system is a microprocessor-controlled, pulse code modulation (PCM), time-division multiplex (TDM) system. Memory includes 1 megabyte (MB) random access memory (RAM) on the PC Motherboard and up to 4MB RAM on the Pro68/ Pro68E Card. In addition, each keypad contains a microprocessor that communicates with the computer complex via a Keypad Card and the Matrix Card (or the Expansion Card).

3.9 When added to the main equipment cabinet, the expansion circuitry and software combine to produce an "integrated switching matrix" of 512 time slots (16 PCM highways [buses] × 32 time slots). Of the 512 time slots, 32 are reserved for conferencing and 16 are reserved for DTMF decoders. If additional DTMF decoders are installed (up to 14), additional time slots are also reserved. This leaves between 450 and 464 time slots available for voice channels. (For a diagram of the system voice channel allocation, refer to Figure 2-1 on page 2-8.)

3.10 In the main equipment cabinet, there are 208 to 216 non-blocking voice channels available (depending on the number of additional DTMF decoders installed on the Matrix Card).

3.11 In the expansion cabinet, there are 242 to 248 non-blocking voice channels available (depending on the number of additional DTMF decoders installed on the Expansion Card).

3.12 Therefore, the total number of non-blocking voice channels available on an expanded system ranges from 450 to 464.

3.13 Whenever there is a change in the system's circuit card configuration, all equipped cards are assigned to one of the PCM highways (also called buses). The individual circuits on each card may use only those voice channels available on the assigned PCM highway. The software automatically distributes the cards to make the best possible use of the available voice channels.

3.14 If there is a large number of cards installed in a single cabinet, two or more cards may be assigned to the same PCM highway. The voice channels on each PCM highway are then allocated to the assigned cards for outside calls, intercom calls, and pages on a first-come, first-served basis. Since each two-way conversation requires two voice channels, the maximum number of simultaneous two-way conversations available on an expanded system ranges from 225 to 232.

3.15 If, on a single PCM highway, there are more ports equipped than there are voice channels, there is a remote possibility that all the voice channels could be in use at one time (see Figure 2-1 on page 2-8). If this happens, a user attempting to place a call or page hears reorder tones and must try again (the system also generates an error message to indicate that no voice channels were available). Generally, a voice channel will be available on the second attempt.

NOTE: It is possible to equip more ports than there are available voice channels, especially when installing a number of T1 spans, single-line sets, digital keysets, or 8-line keysets installed two to a circuit. (In fact, the programmer can equip up to 416 ports on a standard-size system and up to 832 ports on an expanded system.) For total non-blocking applications, it is necessary to limit the number of circuit cards installed in each cabinet. Also, whenever possible, all circuit cards (especially T1 Cards) should be evenly distributed between the two cabinets. For example, if four T1 Cards are to be installed in an expanded system, put two cards in the main equipment cabinet and two cards in the expansion cabinet. (See PROGRAMMING, page 5-174, for information on designating certain circuit cards as non-blocking and generating voice channel allocation data for traffic analysis.)

3.16 As many as nine external paging ports can be used for connecting external paging speaker equipment. Each external paging port requires an available SLC, LGC, or LSC circuit.

NOTE: When installing external paging equipment on an LGC or LSC circuit, use a paging amplifier that provides talk battery. When installing external paging equipment on an SLC circuit, use a paging amplifier that *DOES NOT* provide talk battery.

CAUTION

Using a paging amplifier with talk battery on an SLC circuit will damage the card.

3.17 The 416/832 System has two music channels. If desired, two different music sources (port 1 and port 2) may be connected to the Matrix Card. By entering a feature code, individual keyset users can choose to listen to background music from either of the two music sources. Internal users will also hear music from the selected source when on hold and when camped on. For outside callers, the source for the Music-On-Hold feature is assigned on a trunk group-by-trunk group basis.

3.18 In the main telecommunications complex, the slot on the far right (27th slot) is reserved for the Matrix Card. Likewise, the slot on the far right (54th slot) of the expansion cabinet is reserved for the Expansion Card. After that, any station or trunk card may be placed in any of the remaining 52 slots.

NOTE: Information on the type of card installed in each telecommunication card slot must be entered through database programming. See PROGRAMMING, page 5-174.

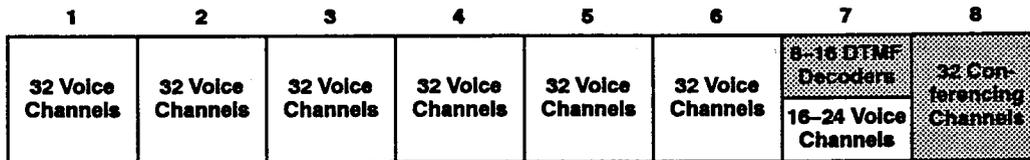
3.19 The system status panel is located in the upper-left corner of the front of the main equipment cabinet. The panel has LED indicators to show high power supply temperature (POWER ALARM), major system alarms (MAJOR ALARM), minor system alarms (MINOR ALARM), main processor operation (CPU ACTIVE), and hard disk drive activity (DISK ACTIVE). Refer to the TROUBLESHOOTING section of this manual for detailed LED information.

3.20 The peripheral connector panel is located in the upper-left corner of the back of the main equipment cabinet. (For a drawing, see Figure 3-27 on page 3-44.) The panel can be used for connecting a programming monitor, programming keyboard, and SMDR/SMDA output devices to the system (see page 2-36 for requirements).

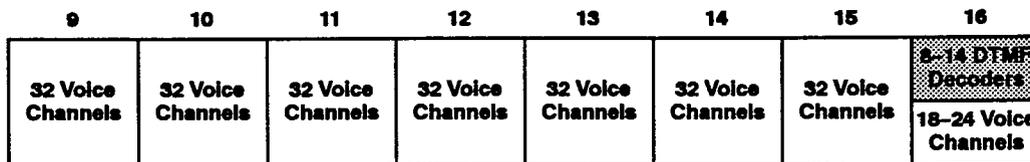
3.21 The Telecom Motherboard power cable, which comes pre-routed in the main equipment cabinet, is used to connect the main system power supply to the main Telecom Motherboard. Likewise, the expansion power cable is used to connect the expansion power supply chassis to the expansion Telecom Motherboard.

3.22 If an expansion cabinet is installed, the EXP-to-MXC data cable is used to permit communication between the expansion cabinet and the telecommunications complex in the main equipment cabinet. The expansion cabinet is shipped with one end of the cable already attached to the Expansion Card slot on the expansion Telecom Motherboard. The other end of the cable is then attached to the Matrix Card slot on the main Telecom Motherboard.

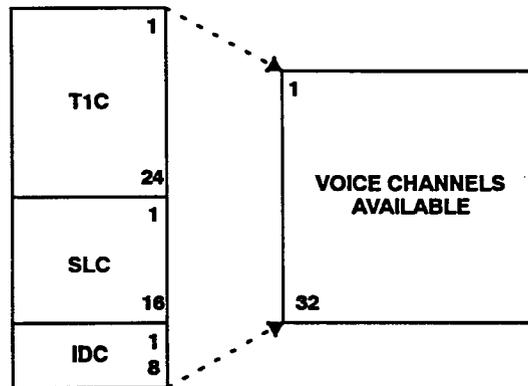
FIGURE 2-1. VOICE CHANNEL ALLOCATION



MAIN EQUIPMENT CABINET — 8 PCM HIGHWAYS WITH 32 TIME SLOTS PER HIGHWAY



EXPANSION CABINET — 8 PCM HIGHWAYS WITH 32 TIME SLOTS PER HIGHWAY



SAMPLE ALLOCATION FOR ONE PCM HIGHWAY

NOTE: The above example shows a sample voice channel allocation for one PCM highway (voice bus) in a heavily loaded equipment cabinet. The system has assigned one T1 Card, one Single-Line Card, and one Inward Dialing Card to the same PCM highway. If all three cards are designated as “blocking” in database programming, the 48 circuits will vie for the 32 voice channels on a first-come, first-served basis. If, however, the T1 Card is designated as “non-blocking,” the system will rebalance the cards so that the T1 Card is assigned to a highway that has no more than 32 equipped ports. (Refer to PROGRAMMING, page 5-174, for information on designating certain circuit cards as non-blocking and generating voice channel allocation data for traffic analysis.)

D. ENVIRONMENTAL REQUIREMENTS

3.23 The equipment cabinet, expansion cabinet, and the station instruments require the following environmental conditions:

REQUIREMENTS	IN OPERATION	IN STORAGE
Temperature (Cabinet)	32° to 104° F 0° to 40° C	-40° to 185° F -40° to 85° C
Temperature (Station Instruments)	32° to 113° F 0° to 45° C	-40° to 185° F -40° to 85° C
Relative Humidity (Non-Condensing)	5% to 95%	5% to 95%
Altitude	Up to 10,000 ft. (3,048 m.)	Up to 40,000 ft. (12,192 m.)

NOTE: It is recommended that the maximum operating temperature (as listed above) *never* be exceeded. Therefore, when installing the equipment cabinet, expansion

cabinet, and station instruments, allow a sufficient margin for error in case of air conditioning failure, routine mechanical maintenance, plant shutdown, etc. As a general guideline, if the conditions are suitable for office personnel, they are also suitable for all equipment and station instrument operation. A properly controlled environment will help to extend the operating life of the equipment.

3.24 While in operation, a fully loaded main equipment cabinet generates approximately 1950 British Thermal Units (BTUs) of heat per hour. A fully loaded expanded system generates approximately 3200 BTUs. The maximum amount of heat generated per individual station instrument is 6.8 BTUs per hour.

NOTE: This information is provided so that any cooling needed to meet the proper environmental conditions (as listed in the chart) can be calculated.

E. SYSTEM POWER SUPPLIES

3.25 The main system power supply, which is located in the top half of the back side of the main equipment cabinet, is installed to provide power to the computer complex, the main telecommunications complex, and to all associated stations. The expansion power supply, which is installed next to the main power supply, is used to provide power to the cards and associated station instruments in the expansion cabinet. Each power supply is comprised of a metal chassis with various modules installed.

3.26 The power supply(s) *must* have an isolated, dedicated, 105-125VAC, 30A, 57-63Hz, single-phase commercial power source (for more details, refer to the first NOTE on page 3-4 in INSTALLATION). Also, since the system AC power cable is terminated on a NEMA L5-30 twist-lock plug, a compatible AC receptacle (L5-30R) is needed.

Main Power Supply Chassis

3.27 All *main* power supplies must be equipped with two Quad Modules, one Master 30V Module, one -48V Module, and one Ring Generator Module. The first Quad Module supplies power (+5V, -5V, +12V, and -12V) to the computer complex, while the second Quad Module supplies power to the telecommunications complex. Depending on the number and type of keysets installed, one or two Slave 30V Modules may also be needed, as outlined in the following paragraph. (Refer to REPLACEMENT PARTS for the part numbers.)

3.28 Based on the number of 8-line IMX AIM keysets and other-type keysets installed, the following chart can be used to determine the number of Slave 30V Modules needed in the main power supply chassis. (The programming System Configuration window will also display a message if additional modules are needed.)

3.29 Located on the front side of the main power supply chassis are the ON/OFF power switch (which also

$$(8\text{-line AIMs} \times 0.0755) + (\text{other analog keysets} \times 0.125) + (\text{digital keysets} \times 0.060) = y$$

If $y \leq 8$, only the Master 30V Module is required.

If $y > 8$, but ≤ 16 , one Slave 30V Module is also required.

If $y > 16$, but ≤ 24 , two Slave 30V Modules are also required.

If $y > 24$, the maximum system capacity for keysets in a single cabinet is being exceeded.

acts as a 20A breaker), a 30A fuse that isolates the AC power source from the system, and all of the connectors for the various power cables.

3.30 Located on the back side of the main power supply chassis are the AC power cable (and its termination strip and strain relief clamp), two auxiliary AC receptacles (for connecting items such as a programming monitor, a printer, etc.), a 10A fuse for the auxiliary receptacles, an expansion power supply receptacle (for connecting the expansion power supply chassis, if used), a 15A fuse for the expansion receptacle, and a grounding lug to connect the equipment cabinet to an earth ground.

Expansion Power Supply Chassis

3.31 All *expansion* power supplies must be equipped with one Quad Module and one Master 30V Module. If any SLCs, IDCs, LGCs, or EMCs are used in the expansion cabinet, one -48V Module must also be installed. (DKSCs, KSCs, KSC-Ds, LSCs, and T1Cs do not use -48VDC.)

3.32 Based on the number of 8-line IMX AIM keysets and other-type keysets installed in the expansion cabinet, the chart following paragraph 3.28 can be used to determine the number of Slave 30V Modules needed in the expansion power supply chassis. (The programming System Configuration window will also display a message if additional modules are needed.)

3.33 Located on the front side of the expansion power supply chassis are the ON/OFF power switch, a 15A fuse that isolates the AC power source from the system, and all of the connectors for the various power cables.

NOTE: Since the fuse on the main power supply chassis also protects the expansion power supply, newer-version expansion power supply chassis are not equipped with a fuse.

3.34 Located on the back side of the expansion power supply chassis is the AC power cable, which plugs into the AC expansion receptacle on the back side of the main power supply chassis.

3.35 The expansion power supply can be turned on and off independent of the main power supply. However, when the entire system is to be powered down, first "park the heads" if using a hard disk drive that does not have self-parking heads (as outlined on page 3-154), then turn off the main power supply before turning off the expansion power supply. This sequence allows the hard disk drive to shut down properly; the reverse does not allow proper shutdown and may damage the hard disk drive. When bringing the system back up, turn on the main power supply first and then turn on the expansion power supply. The system download will return the hard disk drive to normal operation.

NOTE: IDE-type Quantum Pro-Drive 40AT, Conner CP3000, Conner CP341, and Seagate ST3120A hard disk drives are equipped with "self-parking" heads. *Do not attempt to park the heads on a hard disk drive that has self-parking heads.* Also, newer-version main power supply chassis have been modified so that turning off the AC power switch will also turn off the expansion supply.

Power Supply Modules

3.36 Currently, there are three versions of power supply modules used on the 416/832 System: (A) part numbers 440.0102-0106, (B) part numbers 440.0118-0122, and (C) part numbers 440.0112-0115. (Refer to REPLACEMENT PARTS for a complete list of the part numbers.)

3.37 Version A and B power supply modules are compatible with each other, and they use the same chassis. However, due to numerous design enhancements, version C modules and chassis are not compatible with versions A and B. Either use all version A and B power supply modules and chassis, or use all version C modules and chassis. *Do not mix the two types.*

3.38 The version A Ring Generator Module has a 3 amp fuse, while all other version A power supply modules have 6 amp fuses. Maximum power outputs for each version A module are shown below.

QUAD MODULE	-48V MODULE
+5VDC, 18A	-48VDC, 5A
-5VDC, 4A	
+12VDC, 6A	
12VDC, .5A	
MASTER 30V MODULE	SLAVE 30V MODULE
+30VDC, 8A	+30VDC, 8A
RING GENERATOR MODULE	
90VAC (RMS), 20W	
Ring Frequency, 20Hz	

3.39 Except for the Quad Module (5A fuse, +5VDC output of 23A, and +12VDC output of 4A), version B and C power supply modules have the same fuses and maximum power outputs. Also, there is only one version

C 30V Module, which can be used as either a master or a slave.

NOTE: For easier power supply module removal, each version C power supply chassis is shipped with an extractor tool attached to the inside of the back cover. The extractor tool may be used with version B and C modules only.

Special T1 Card Requirements

3.40 When using version B or C Quad Modules, the system allows nine T1 Cards in the main equipment cabinet and nine T1 Cards in the expansion cabinet, for a system maximum of 18 T1 Cards. However, *when using a version A Quad Module*, there can be only four T1 Cards installed in the associated cabinet and still have all other card slots filled. If, while using a Version A Quad Module, more than four T1 Cards are installed in a single cabinet, there must be two empty card slots in that cabinet for each T1 Card over four. For example, if six T1 Cards are installed in a cabinet using a version A Quad Module, there must be four empty card slots in that cabinet (two empty slots for each number over four).

Voltage Surge and Spike Protection

3.41 To reduce the effects of AC voltage surges and spikes that may cause system malfunctions, false logic, and/or damage to the electronic components, a surge/spike protector is provided. (Refer to REPLACEMENT PARTS for the part number.) Its specifications are:

- Clamp voltage transients at 300VDC within 5 nanoseconds when exposed to waveforms as described in the ANSI/IEEE Standard C62.41-1980 (IEEE 587).
- Reduces RFI/EMI noise by at least 20dB at frequencies between 5kHz and 30MHz.
- Designed to interface with the power supply's NEMA L5-30 twist-lock plug and the L5-30R (or compatible) AC receptacle.

Battery Back-Up

3.42 To provide back-up power in the event of a power failure or brownout condition, the main and expansion power supplies can have optional battery back-up using customer-provided uninterruptible power supply (UPS) units or standby power supply (SPS) units. Refer to page 2-38 for more information.

F. COMPUTER COMPLEX

NOTICE

Personal computer (PC) technology is continually evolving. As it does, the 416/832 System will continue to incorporate important design enhancements. Thus, depending on the actual version of equipment that is shipped, the following specifications could vary somewhat. If revised information is included with the equipment, refer to it instead.

3.43 The computer drives and cards are installed in the front of the top half of the main equipment cabinet. The drives and cards are:

- 1 Hard Disk Drive
- 1 Floppy Disk Drive
- 1 PC Motherboard
- 1 68000 Co-Processor (Pro68) Card (or Pro68E Card)
- 1 Disk Controller Card
- 1 High-Level Data Link Control (HDLC) Card
- 1 Monitor Card
- 1 Modem Card

3.44 Descriptions of the computer drives and cards are given in the following paragraphs. Drawings of each are located in the INSTALLATION section.

CAUTION

Only the items described in the following paragraphs may be installed in the computer complex. *Installation of other types of equipment and/or circuit cards will void the warranty.*

Hard Disk Drive

3.45 The hard disk drive is the main storage device for the operating system software, the 416/832 System software, the database, and the history files.

3.46 Currently, there are two types of hard disk drives used on the 416/832 System: 5¼-inch MFM-type (Mini-Scribe 8425 or Seagate ST-225), and the new 3½-inch IDE-type (Quantum Pro-Drive 40AT, Conner CP3000, Conner CP341, or Seagate ST3120A). These two hard disk drive types, along with their associated Disk Controller Cards and hard disk-to-controller interface cables, are not compatible. Either use all IDE-type equipment, or use all MFM-type equipment. *Do not mix the two types.*

Floppy Disk Drive

3.47 The floppy disk drive is used to initially load the 416/832 System software onto the hard disk drive. Thereafter, it is used for saving and restoring the system database and for performing software updates.

PC Motherboard

3.48 The IBM AT-compatible PC Motherboard is the main computing device of the computer complex. It controls the majority of tasks performed by the 416/832 System.

3.49 Currently, there are five versions of PC Motherboards used on the 416/832 System: PCC (PC Calc), SUNTAC, VLSI, MXIC, and the new M396F. The cards can usually be identified by the label on several of the processor chips.

NOTE: The SUNTAC PC Motherboard cannot be used with the new IDE-type Disk Controller Card. And, the VLSI, MXIC, and M396F PC Motherboards can only be used with HDLC Cards that have been modified and labeled with ECN-2279 or stamped with artwork number 826.3806-1, -2, or higher.

3.50 There is a 5-pin DIN connector on the bottom edge of the card for connecting a cable to the internal side of the peripheral connector panel on the back of the equipment cabinet, which in turn is connected to a programming keyboard. The keyboard must be an IBM AT-compatible keyboard (an XT-compatible keyboard cannot be used, unless it is equipped with an XT/AT selector switch).

68000 Co-Processor (Pro68) Card

3.51 The Pro68 Card or the new "expanded" Pro68 Card, called the Pro68E Card, controls the call processing functions of the 416/832 System. The Pro68/Pro68E Card is equipped with a Motorola MC68000 16½-bit microprocessor.

3.52 If the Pro68 Card is used, it comes with 1 megabyte (MB) RAM. *For standard-size systems (main equipment cabinet only),* the Pro68 Card must be equipped with a 512k Memory Card. *For large-size systems (expansion cabinet installed),* the Pro68 Card must be equipped with a 3MB Memory Card. (See REPLACEMENT PARTS for the part numbers.)

3.53 If the Pro68E Card is used, it comes with 2MB RAM, which is enough memory for a standard-size system. *If an expansion cabinet is installed,* two 1MB single in-line memory modules (SIMMs) must be attached to the Pro68E Card to provide an additional 2MB RAM. (Refer to REPLACEMENT PARTS for the part number.)

3.54 There are two DB9 connectors (9-pin, subminiature "D", female connectors) on the bottom edge of the Pro68/Pro68E Card for connecting cables to the internal side of the peripheral connector panel on the back of the equipment cabinet, which in turn connects to the optional SMDR/SMDA output devices. For more information, refer to page 2-36.

3.55 The Pro68/Pro68E Card also has a 60-pin ribbon cable connector so that it can be connected to the HDLC Card. These cards are connected to permit control of the HDLC serial link to the telecommunication cards.

NOTE: The ribbon cable for the new Pro68E Card is much shorter than the ribbon cable that is used with the older Pro68 Card. If an existing Pro68 Card is replaced with a new Pro68E Card, the shorter cable may be used instead. (Refer to REPLACEMENT PARTS for the part numbers.)

Disk Controller Card

3.56 The Disk Controller Card is the interface between the PC Motherboard and the hard and floppy disk drives. The card is connected to the disk drives through ribbon cables. In addition to controlling hard and floppy disk drive operation, the card monitors disk drive performance and provides error-checking capability.

3.57 Currently, there are two types of Disk Controller Cards used on the 416/832 System: MFM-type, and the new IDE-type. These two card types, along with their associated hard disk drives and hard disk-to-controller interface cables, are not compatible. Either use all IDE-type equipment, or use all MFM-type equipment. *Do not mix the two types.*

3.58 The IDE-type Disk Controller Card is shorter and narrower than the MFM-type Disk Controller Card. The single IDE-type hard disk-to-controller interface cable is a 40-conductor ribbon cable, while the two MFM-type hard disk-to-controller cables are 34-conductor and 20-conductor ribbon cables.

NOTE: The IDE-type Disk Controller Card cannot be used with the SUNTAC PC Motherboard. Instead, use the PCC, VLSI, MXIC, or M396F PC Motherboards.

High-Level Data Link Control (HDLC) Card

3.59 The HDLC Card is used to transfer data between the computer complex and the telecommunications complex via an HDLC-compatible communications link. In addition, it provides certain computer system resources that enhance the reliability of the dual-processor computer complex.

NOTE: Only HDLC Cards that have been modified and labeled with ECN-2279 or stamped with artwork num-

ber 826.3806-1, -2, or higher can be used with the VLSI, MXIC, and M396F PC Motherboards.

3.60 The HDLC Card has a 60-pin ribbon cable connector so that it can be connected to the Pro68/Pro68E Card. It also has a DB15 connector (15-pin subminiature "D" female connector) to link it to the Matrix Card in the telecommunications complex.

3.61 A reset switch on the front edge of the HDLC Card is used to manually reset the system during troubleshooting. This is a hardware reset (major reset), not a software reset (minor reset). Pushing this switch drops all calls in process and erases the SMDR buffer (up to 427 records).

NOTE: All T1 spans should be "busied out" and disconnected from their cards before pressing the reset switch on the HDLC Card.

Monitor Card

3.62 The Monitor Card is used to connect a monochrome programming monitor to the system. There is a DB9 connector (9-pin subminiature "D" female connector) on the bottom edge of the Monitor Card for connecting a cable to the internal side of the peripheral connector panel on the back of the equipment cabinet, which in turn is connected to a programming monitor.

Modem Card

3.63 The Modem Card contains an auto-answer, software auto-baud modem for remote system access (300-, 1200-, or 2400-baud, depending on the specific model installed). There is an RJ11 modular jack on the bottom edge of the card (labeled LINE or WALL) for connecting a line cord to the modular jack (single-line port) on the Matrix Card.

3.64 The device used for stand-alone/remote programming must be an IBM AT-compatible personal computer with a *minimum*: 6MB available memory on the hard disk drive, 5¼-inch double sided/high density (1.2MB) floppy disk drive, 640k RAM (with minimum 512k available), MS-DOS 3.3 (or 5.0, 6.0, or 6.2), 300 (or 1200 or 2400) baud modem, and monochrome or color monitor (CGA is not recommended). A programming mouse is optional. Refer to PROGRAMMING, page 5-3, for information on remote system maintenance and programming.

G. TELECOMMUNICATIONS COMPLEX

3.65 The bottom half of the main equipment cabinet contains the main Telecom Motherboard and telecommunication circuit cards that control and coordinate the functions of the main system. Up to 27 cards may be connected to the main Telecom Motherboard, including:

- 1 Matrix Card (MXC) — required
- 1-26* Keyset Card (DKSC, KSC, or KSC-D) — at least one is required
- 1-25* Single-Line Card (SLC)
- 1-25* Inward Dialing Card (IDC)
- 1-25 Loop/Ground Start Card (LGC)
- 1-25 Loop Start Card (LSC)
- 1-25 E&M Card (EMC)
- 1-9 T1 Card (T1C)

* Refer to page 2-26 for station capacities.

3.66 The expansion cabinet, if installed, contains the expansion Telecom Motherboard and telecommunication circuit cards that control and coordinate the functions of the expanded system. Up to 27 cards may be connected to the expansion Telecom Motherboard, including:

- 1 Expansion (EXP) Card — required
- 1-26* Keyset Card (DKSC, KSC, or KSC-D)
- 1-26* Single-Line Card (SLC)
- 1-26* Inward Dialing Card (IDC)
- 1-26 Loop/Ground Start Card (LGC)
- 1-26 Loop Start Card (LSC)
- 1-26 E&M Card (EMC)
- 1-9 T1 Card (T1C)

* Refer to page 2-26 for station capacities.

3.67 Descriptions of the cards are given in the following paragraphs. Drawings of the cards are located in the INSTALLATION section.

Matrix Card (MXC)

3.68 The MXC provides the central digital switching element for the system. It contains the following system resources:

- **Voltage test points** for checking the system +5VDC, -5VDC, +12VDC, -12VDC, +30VDC, -48VDC, and AC ring voltage levels. To measure system voltage levels, voltmeter probes are inserted into the ground test point and the desired voltage test point. Refer to INSTALLATION, page 3-85, for details.
- **LED indicators** show functional readiness, board-level error occurrences, and external clock activity. Refer to TROUBLESHOOTING for detailed LED information.
- **Reset switch** is used to manually reset the system during troubleshooting. This is a software reset (mi-

nor reset), not a hardware reset (major reset). Pushing this switch does the following:

- Preserves the battery-backed database information, non-conference calls in progress, outside calls being dialed from keyset stations, inter-station messages, calls on individual hold, do-not-disturb messages, and reminder messages. A call on system hold is changed to individual hold at the station that placed it on hold.
- Restores DTMF decoders and speech channels, and resets the station clocks to match the system clock. Updates trunk key, DSS/BLF key, speed-dial key, and feature key lamp status.
- Interrupts system operation, which disconnects pages in progress, calls ringing in, calls using the conference resources (as described on the next page), and calls using DTMF decoders. Camped-on calls are disconnected and queue requests are canceled.
- Terminates system and user programming.
- **Male 50-pin amphenol-type connector** for connecting up to two music sources, a power failure transfer relay, and general purpose relays:
 - Up to two external music sources (such as radios, tape players, etc.) may be connected to the MXC. AGC circuits on the MXC automatically hold the volume of each music source to a predetermined level that is slightly lower than the normal voice volume, as required by FCC regulations. Optimal input level is 0.775VRMS (0dB). For installation instructions, see page 3-142.
 - Relay 1, which is the power failure transfer relay (and cannot be changed), can be used to connect one or more single-line sets to predetermined CO trunks in the event of processor card failure or a power failure. (If ground start trunks are used, the single-line set must be equipped with a ground start button.) The output is a normally open DPDT relay that is held closed during system operation. Additional equipment needed includes a customer-provided PFT relay card and card mounting case. The MXC relay contact ratings are listed below. (See also page 2-38).

MXC RELAY CONTACT RATINGS

0.6A at 125VAC
0.6A at 110VDC
2.0A at 30VDC

- Any of the relays 2-4 can be used to activate an external signaling device when a call rings in on assigned CO trunks. The dry contacts follow the normal keyset CO ringing cycle (two seconds

on/four seconds off). Ring in for the relay can be programmed for day and/or night modes.

- Any of the relays 2-4 can be used for night switch to turn on or off lights, an alarm system, or other devices. The relay, which is activated when an attendant in the designated tenant group places the system in night mode, causes the swing connection to move from the "break" to the "make" position.
- Any of the relays 2-4 can be used for activating external paging. The relay, which is activated when the paging zone to which it is assigned is accessed by a station user, causes the swing connection to move from the "break" to the "make" position. This contact can be used to activate the microphone input of an externally mounted paging amplifier.
- **Music-On-Hold (MOH) jumper straps** for enabling one or both of the external music sources that are heard by callers when they are placed on hold or camped on. If connecting an external music source, place the associated jumper strap in the ON position (over the top two pins). Then, in the database, each trunk group and each station can be assigned music port 1, music port 2, silence, or tick-tones. Refer to PROGRAMMING, page 5-103.
- **Maintenance modem circuit** (RJ11 modular jack) for connection to the Modem Card in the computer complex. When the system is in the default configuration, the modem is assigned as circuit number 27.3 and extension number 2600.
- **Conferencing resources** for connecting up to 32 parties in multiple conferences. There can be up to 10 simultaneous three-way conferences or four simultaneous eight-party conferences. Except for the fact that there can be only eight parties involved in a single conference, any combination using the 32 dedicated conference circuits is possible. The con-

ferencing resources also support the call forward, call transfer, station call monitoring, and DISA features when two trunks are connected. Conferencing utilizes a zero dB loss function so that there is no substantial loss in voice volume no matter how many people are in the conference.

- **DTMF decoding circuits** (eight) are used when single-line sets are dialing and when features such as DISA and automated attendant are used. They are also used for the Unsupervised CO Call Continuation feature (as described in paragraph 4.87 on page 4-37). These eight decoders convert DTMF signals to the digital codes used by the system. They are in use only while the dialed number is being processed, not for the duration of the call. If all eight DTMF decoders are busy, the user may camp on.

NOTE: If necessary, up to eight additional DTMF decoding circuits can be added to the Matrix Card by installing DTMF Expansion Chips (two chips per circuit; four chips per kit). Refer to REPLACEMENT PARTS for the part number.

- **Tone generating circuit** generates DTMF tones whenever needed by the system (for example, when a station user uses one of the system auto-dial features, such as LCR, call forward to the public network, station or system speed dialing, etc.). The circuit is also used to produce all of the system tones (busy, reorder, do-not-disturb, etc.) heard by digital keyset, single-line set, DISA, and automated attendant users. (Analog keysets generate their own system tones.)
- **DB15 connector** (15-pin subminiature "D" female connector) for connecting a cable between the Matrix Card and the HDLC Card.

3.69 If an expansion cabinet is to be installed, five MXC Expansion Chips are provided to allow the Matrix Card to operate properly in the expanded configuration.

Expansion (EXP) Card

3.70 The EXP Card, which works in conjunction with the Matrix Card, provides the central digital switching element for the expansion cabinet. It contains the following system resources:

- Voltage test points for checking the expansion power supply +5VDC, -5VDC, +12VDC, -12VDC, +30VDC, -48VDC, and AC ring voltage levels. To measure system voltage levels, voltmeter probes are inserted into the ground test point and the desired voltage test point. Refer to INSTALLATION, page 3-85, for details.
- LED indicator shows functional readiness and board-level error occurrences. Refer to the TROUBLESHOOTING section of this manual for additional LED information.
- Male 50-pin amphenol-type connector for connecting general purpose relays:

— The EXP Card relay contact ratings are:

EXP RELAY CONTACT RATINGS

0.6A at 125VAC
0.6A at 110VDC
2.0A at 30VDC

- Any of the relays 1-4 can be used to activate an external signaling device when a call rings in on assigned CO trunks. The dry contacts follow the normal keyset CO ringing cycle (two seconds on/four seconds off). Ring in for the relay can be programmed for day and/or night modes.
- Any of the relays 1-4 can be used for night switch to turn on or off lights, an alarm system, or other devices. The relay, which is activated when an attendant in the designated tenant group

places the system in night mode, causes the swing connection to move from the "break" to the "make" position.

- Any of the relays 1-4 can be used for activating external paging. The relay, which is activated when the paging zone to which it is assigned is accessed by a station user, causes the swing connection to move from the "break" to the "make" position. This contact can be used to activate the microphone input of an externally mounted paging amplifier.
- DTMF decoding circuits (eight) are used when single-line sets are dialing and when features such as DISA, DID, and automated attendant are used. They are also used for the Unsupervised CO Call Continuation feature (see paragraph 22.14 on page 4-83 in the manual). These eight decoders convert DTMF signals to the digital codes used by the system. They are in use only while the dialed number is being processed, not for the duration of the call. If all eight DTMF decoders are busy, the user may camp on.

If all the DTMF decoding circuits on the EXP Card are busy, devices installed in the expansion cabinet can use the decoders on the Matrix Card, if available. However, devices installed in the main equipment cabinet cannot use the decoders on the EXP Card. For this reason, it is recommended that DTMF-intensive features (such as DISA, DID, and automated attendant) be installed in the expansion cabinet, rather than in the main equipment cabinet.

NOTE: If necessary, up to six additional DTMF decoding circuits can be added to the EXP Card by installing DTMF Expansion Chips (two chips per circuit; four chips per kit). Refer to REPLACE-
MENT PARTS for the part number.

■ Keypad Cards (DKSCs, KSCs, or KSC-Ds) and Single-Line Cards (SLCs)

3.71 Station instruments are connected to the station cards in the equipment cabinet. Digital keysets are connected to Digital Keypad Cards. Analog keysets, analog DSS/BLF Units, and Attendant Computer Consoles are connected to Keypad Cards. Enhanced Single-Line Sets (ESLs), Single-Line Instruments (SLIs), industry-standard single-line DTMF sets, and playback devices are connected to either Single-Line Cards (AC-ringing instruments only) or Inward Dialing Cards (AC or DC). For more information on Inward Dialing Cards, refer to page 2-20.

3.72 Digital Keypad Card (DKSC): Each DKSC provides up to 16 circuits for connecting digital keysets. Each circuit has a self-correcting thermistor to protect the system from damage due to a short circuit in the station cabling. If a short circuit causes a thermistor to open, it will automatically close when the short is removed.

3.73 Up to 50 digital keysets may be equipped with up to four digital DSS/BLF Units each. The units are connected in series to the PC Data Port Module (PCDPM) on the back of the corresponding keypad. Unlike analog units, digital DSS/BLF Units do *not* require station cabling separate from the keypad's cabling; instead, they are powered by their own AC transformer.

3.74 Each DKSC has a green LED (CARD ON-LINE) to indicate the card's functional readiness and 16 green LEDs (CIRCUIT BUSY) to indicate whether any circuit on the card is busy (see Figure 3-53 on page 3-90).

3.75 Each DKSC comes equipped with one Digital Signal Processor (DSP) that provides resources for up to 12 shared speakerphones. If desired, a second DSP can be installed to provide an additional 12 shared speakerphone resources.

NOTE: For information on using shared speakerphones for digital keysets, see page 4-40 in FEATURES.

3.76 Keypad Card (KSC or KSC-D): Each KSC (or KSC-D; see the following note) provides up to eight circuits for connecting analog keysets, analog DSS/BLF Units, and Attendant Computer Consoles to the system. Up to 50 KSC circuits can be used for installing analog DSS/BLF Units. As many as four analog units can be connected to a single card. Some KSCs have a 2A, 250VAC, AGC 2 (fast-acting) fuse to protect the system from damage due to a short circuit in the station cabling. Newer version KSCs have eight self-correcting thermistors (one for each circuit) instead of the fuse. If a short

circuit causes a thermistor to open, it will automatically close when the short is removed.

NOTE: To install any 8-line IMX AIM keysets *two to a circuit*, the new "dual-circuit" version Keypad Card (KSC-D) must be used (see REPLACEMENT PARTS for the part number). To install 8-line AIM keysets *one to a circuit*, either the KSC or the KSC-D can be used.

3.77 Each KSC has an LED (CARD ACTIVE) to indicate the card's functional readiness. In addition, each individual circuit on each card has an LED to indicate the circuit's activity (lit green) or failure (lit red).

3.78 Single-Line Card (SLC): SLCs are used for connecting AC-ringing ESLs, SLIs, single-line DTMF sets, and playback devices. They can also be used for connecting external paging equipment. Off-premises stations cannot legally be connected to SLCs; instead, Inward Dialing Cards (IDCs) must be used (see page 2-20). Some SLCs have a fuse to protect the -48V output. *This fuse cannot be replaced in the field.* If the fuse is defective, the entire card must be sent in for repair. Newer version SLCs have a self-correcting thermistor instead of the fuse. If a short circuit causes a thermistor to open, it will automatically close when the short is removed.

NOTE: For optimal performance, it is recommended that voice mail units and automated attendant playback devices be installed on IDC circuits rather than SLC circuits. Doing this mutes any DTMF digits automatically dialed by the system (e.g., those generated when transferring or forwarding an outside caller to voice mail).

3.79 Each SLC has an LED (CARD ACTIVE) to indicate the card's functional readiness. In addition, each individual circuit on each card has an LED to indicate the circuit's activity (lit green) or failure (lit red).

3.80 Station configuration: Station instrument configuration depends on the number and type of station cards installed in the equipment cabinet. There can be any combination of station cards allowing combinations of keysets in eight-station increments (or 16-station increments if using digital keysets or 8-line dual-circuit IMX AIM keysets) and single-line sets or playback devices in increments of 16 (using SLCs) or in increments of eight (using IDCs).

NOTE: At least one Keypad Card (DKSC, KSC, or KSC-D) *must* be installed to provide an attendant (equipped with a display keypad or an Attendant Computer Console) that can receive system alarm messages, program system data, act as the attendant for unsupervised CO recalls, etc.

3.81 Each station card circuit is assigned a hardware address number according to the card's slot in the equip-

ment cabinet and the location of the circuit on the card. For example, circuit 1.2 is the second circuit on the first card installed in the equipment cabinet.

NOTE: In the default database configuration, there are no keyset circuits assigned for 8-line IMX AIM keysets installed two to a circuit (e.g., 1.2A and 1.2B).

3.82 When the system is first powered up, one of three default configurations (A, B, or C) will be used to assign extension numbers to the station circuits. If configuration A is used, telecommunication card slots 1-20 are considered KSCs and slots 21-26 are considered LGCs. If configuration B is used, slots 1-10 are considered KSCs, slots 11-19 are SLCs, and slots 20-26 are LGCs. If configuration C is used (IMX systems only), slot 1 is a KSC, slots 2-10 are DKSCs, slots 11-19 are SLCs, and slots 20-26 are LGCs. Changes to any of the configurations can be made through database programming. Re-

fer to PROGRAMMING, page 5-171, for more information.

NOTE: Configuration C, which contains Digital Keyset Cards, is used only on IMX systems.

3.83 The system assigns extension number 1000 to station circuit 1.1, extension number 1001 to station circuit 1.2, and so on to match the initial configuration. Circuit 1.1 is equipped as the primary attendant's keyset when the system is in the default configuration. If desired, the circuits can be assigned different extension numbers and/or three-digit extension numbers through database programming. Refer to PROGRAMMING, page 5-58, for more information.

NOTE: When 8-line IMX AIM keysets are assigned to dual circuits, the "B" circuits do not have extension numbers until they are assigned in database programming.

Loop/Ground Start Cards (LGCs) and Loop Start Cards (LSCs)

3.84 Each LGC and LSC has circuitry for up to eight trunks. LGC and LSC circuits may also be used for installing external paging equipment. LSCs can have only loop start trunks connected to them. LGCs can have either loop start or ground start trunks. Each circuit on the LGC has two jumper straps for designating whether the circuit is loop start or ground start. Individual trunks may be designated as either loop start or ground start in database programming.

NOTE: For each LGC circuit, both jumper straps must be in the proper (LS or GS) position. If the strap settings are mixed, or if one or both of the straps is missing, the circuit will not function properly. Also, when setting the straps, note the unique ordering of the LGC circuits as shown in Figure 3-57 on page 3-97.

3.85 For optimal CO trunk transmission performance, each LGC and LSC circuit should be "hybrid balanced" in database programming. Hybrid balancing refers to selecting the balance network — ideal, loaded, or unloaded — that best matches the trunk's impedance. Refer to PROGRAMMING, page 5-148, for details.

3.86 Should voice transmit or voice receive volume problems occur, the receive gain and/or the transmit gain for individual trunks can be adjusted in database programming. Refer to PROGRAMMING, page 5-103, for additional information.

3.87 Each LGC and LSC has 16 specially designed fuses soldered to the card to protect it from large voltage surges due to lightning. If a fuse is open (blown), it may mean that other parts of the card have also been damaged. For this reason, open fuses must not be replaced in the field. Instead, the entire card *must* be returned for testing and possible repair. Failure to follow this policy will void the warranty on the card.

3.88 When the system is in the default configuration, all trunks are configured for DTMF signaling. If necessary, some or all of the trunks can be reprogrammed for dial-pulse signaling through database programming. Although both the LGC and the LSC can use dial-pulse trunks, the pulse circuitry on the LGC is more sophisti-

cated and may provide better performance in certain situations.

NOTE: Single-line sets generate their own DTMF tones when dialing. If used on dial-pulse trunks, both the DTMF tones generated by the phone and the dial-pulse signals generated by the system are sent to the central office, which may be a problem if the central office recognizes both. To avoid this problem, single-line sets should be restricted to LCR only when using dial-pulse trunks. Then, only the LCR-generated dial-pulse signals will be sent to the central office.

3.89 With loop start trunks, it is sometimes possible for the user to attempt to place an outgoing call and instead be connected to an incoming call on the same trunk. This unintended connection, called glare, is due to the natural switching delay characteristics of the telco equipment and the system. Previously, if the user did not dial a valid outside number, the glare connection was dropped. The software now allows the incoming call to remain connected, while still protecting against possible toll fraud. A new system-wide programmable option, called Drop Incomplete Outgoing Calls, has been added to the Miscellaneous System-Wide information screen, as shown on page 5-67 in PROGRAMMING.

3.90 The CO circuits are assigned hardware address numbers according to the card's slot in the equipment cabinet and the location of the circuit on the card. For example, when using initial configuration number one (see paragraph 3.82), CO circuit 21.4 is the fourth circuit on the 21st card (an LGC) installed.

3.91 When the system is in the default configuration, the first four trunk keys on each keyset are assigned as call keys for incoming call indication/access. (The ANSWER key may also be used to access incoming calls.) No individual trunk keys or trunk group keys are assigned. Key assignments can be designated in database programming. Refer to PROGRAMMING, page 5-44, for more information.

3.92 CO trunk groups may be assigned on a tenant-by-tenant basis. Up to 102 CO trunk groups (142 on expanded systems) can be distributed among the tenant groups. Refer to FEATURES, page 4-15, for more information.

Inward Dialing Cards (IDCs)

3.93 IDCs are used for connecting direct inward dialing (DID) trunks and off-premises single-line stations. Like SLCs (described on page 2-17), IDCs may also be used for connecting on-premises single-line sets and playback devices. In fact, for optimal performance, it is recommended that voice mail units and automated attendant playback devices be installed on IDC circuits rather than SLC circuits. Doing this mutes any DTMF digits automatically dialed by the system (e.g., those generated when transferring or forwarding an outside caller to voice mail).

NOTE: IDCs do not support message waiting applications. If single-line sets with message waiting lamps are installed on IDCs, the lamps will not function.

3.94 On older-version IDCs, each IDC circuit has a 2-pin AC ENABLE jumper strap that must be removed when installing a DID trunk or a DC-ringing station. If the AC ENABLE jumper strap is installed, an AC-ringing off-premises station can be connected directly to the IDC circuit (*external* HVRA Units, power supplies, and ring generators are not needed).

3.95 On newer-version IDCs, each IDC circuit has a 3-pin RING SELECT jumper strap that must be set in either the AC/OPX position (over the bottom two pins) or the DC/DID position (over the top two pins).

NOTE: When setting the jumper straps on either version card, note the unique ordering of the IDC circuits as shown in Figure 3-56 on page 3-95.

3.96 Each IDC can have up to eight DID trunks or up to eight single-line sets, or any combination of the two.

3.97 DID trunks may be programmed to ring in to individual stations, multiple stations, or hunt groups. Or, they may be programmed to ring in as DISA calls. If programmed to ring in at a single station, the DID call will follow any programmed forward.

3.98 DID trunk groups may be assigned on a tenant-by-tenant basis. Up to six DID trunk groups (11 on expanded systems) can be distributed among the tenant groups. Refer to FEATURES, page 4-15, for more information. Also, DID trunk groups may be designated as immediate start, wink start, or delay start in database programming.

3.99 Each IDC has 16 specially designed fuses soldered to the card to protect it from large voltage surges due to lightning. If a fuse is open (blown), it may mean that other parts of the card have also been damaged. For this reason, open fuses must not be replaced in the field. Instead, the entire card *must* be returned for testing and possible repair. Failure to follow this policy will void the warranty on the card.

E&M Cards (EMCs)

3.100 E&M trunks, also called "tie" lines, are special trunks that tie individual telephone systems together. They allow the users of either telephone system transparent access to the users and resources of the other telephone system, often for less than what it would cost to use normal long distance service.

3.101 E&M (literally "ear" and "mouth") refers to the pair of wires that carry the signals between the trunk equipment and a separate signaling unit. The M lead *transmits* a ground or battery condition to the signaling equipment, while the E lead *receives* open or ground signals from the signaling equipment.

3.102 If designated for "auto ring-in," E&M trunks may be programmed to ring in to individual stations, multiple stations, or hunt groups on the other telephone system. (If programmed to ring in at a single station, the E&M call will follow any programmed forward.)

3.103 If designated for "dial repeating," E&M trunks may be programmed to ring in as DISA calls.

3.104 Additionally, LCR may be used to turn what would normally be a long distance call into a local call. For example, when a call is made from one telephone system to a long distance number that is local to the other telephone system, LCR could be programmed to route the call through the E&M network to make a local call from the other telephone system.

3.105 Each EMC has circuitry for up to four E&M trunks. Each individual circuit on the EMC has two jumper straps, one for selecting the signaling type (1, 2, 4, or 5) and one for selecting the audio type (2-wire or 4-wire). The signaling and audio type for each circuit must also be programmed in the database.

3.106 Although not currently operational, the EMC is equipped with a "make-busy" switch for removing all circuits on the card from service and placing them back in again. The switch is reserved for possible future use.

3.107 For optimal E&M trunk transmission performance, each 2-wire EMC circuit should be "hybrid balanced" in database programming (4-wire circuits cannot be hybrid balanced). Hybrid balancing refers to

selecting the balance network — ideal, loaded, or unloaded — that best matches the trunk's impedance. Refer to PROGRAMMING, page 5-148, for details.

3.108 Should voice transmit or voice receive volume problems occur, the receive gain and/or the transmit gain for individual E&M trunks can be adjusted in database programming. Refer to PROGRAMMING, page 5-103, for additional information.

3.109 Each EMC has 24 specially designed fuses soldered to the card to protect it from large voltage surges due to lightning. If a fuse is open (blown), it may mean that other parts of the card have also been damaged. For this reason, open fuses must not be replaced in the field. Instead, the entire card *must* be returned for testing and possible repair. Failure to follow this policy will void the warranty on the card.

3.110 When the system is in the default configuration, all E&M trunks are configured for DTMF signaling and dial repeating. If necessary, some or all of the trunks can be reprogrammed for dial-pulse signaling and/or auto ring-in through database programming.

3.111 The E&M circuits are assigned hardware address numbers according to the card's slot in the equipment cabinet and the location of the circuit on the card. For example, E&M circuit 21.4 refers to the fourth circuit on the 21st card (an EMC) installed in the equipment cabinet.

3.112 When the system is in the default configuration, the first four trunk keys on each keyset are assigned as call keys for incoming call indication/access. (The ANSWER key may also be used to access incoming calls.) No individual E&M trunk keys or trunk group keys are assigned. Key assignments can be designated in database programming. Refer to PROGRAMMING, page 5-44, for more information.

3.113 E&M trunk groups may be assigned on a tenant-by-tenant basis. Up to 102 E&M trunk groups (142 on expanded systems) can be distributed among the tenant groups. Refer to FEATURES, page 4-15, for more information. Also, E&M trunk groups may be designated as immediate start, wink start, or delay start in database programming.

T1 Cards (T1Cs)

NOTE: The acronym for the T1 Card — T1C — should not be confused with the special T1C digital carrier system (which operates at twice the data rate of the standard T1 carrier system). The 416/832 T1 Card does not support T1C.

3.114 The term “T1” refers to a specific digital method of transmitting voice and data; it is the basic 24-channel time-division multiplex (TDM), 1.544 Mb/s pulse code modulation (PCM) system as used in the United States.

3.115 The T1 standard, which was developed as a method of reducing cabling and increasing transmission quality between distant central offices, is actually a subset of a multi-level Digital Signal (DS) scheme. In popular usage, T1 refers to the DS1 rate as transmitted via any type of media (e.g., copper wire, fiber optics, or microwave).

3.116 Since each T1 span actually consists of 24 individual circuits (or channels) multiplexed together, it is often less expensive to purchase a single T1 span than it is to purchase multiple individual trunks. Each of the 24 T1 circuits can be programmed as a loop start, ground start, DID, E&M, or OPX trunk (or as unequipped). Any combination is possible.

3.117 “Fractional” T1, often called FT1, is a special T1 service where only a portion of the 24 channels are used and paid for. To implement fractional T1 (if available), equip only those circuits that are provided.

NOTE: Currently, the T1 Card is used to transmit voice signals only, not data. In the future, data transmissions over T1 circuits may also be supported.

3.118 To interface with the public network, each T1 Card must be equipped with a customer-provided, on-board Channel Service Unit (CSU) or a customer-provided, external CSU. If the optional on-board CSU is installed, the programmer must select the line build-out (LBO) attenuation, which is determined by the distance to the nearest public network T1 repeater. (This information is available from the T1 provider.) If an external CSU is installed instead, the programmer must select the DSX-1 line length, which is determined by the distance from the T1 Card to the external CSU. (The card and the external CSU must be located in the same building, and the cabling between them must be less than 655 feet.)

NOTE: The on-board CSU can now be purchased directly from Inter-Tel using part number 440.3004.

3.119 Although most T1 interfaces will be with the public network, it is possible to use T1 Cards to connect

two telephone systems together (e.g., two 416/832 Systems). To do this without CSUs, the two systems must be located in the same building and the cabling between them must be less than 655 feet. If each system is equipped with a CSU, they may be located in separate buildings and the cabling between them may be as long as 6000 feet. (See page 3-38 for more information on connecting two 416/832 T1 Cards together.)

NOTE: For information on programming various types of T1 installations, refer to pages 5-122 to 5-130.

3.120 In the future, a T1 span could possibly be used to connect the 416/832 System to a host computer via a Digital Multiplexed Interface (DMI). Also, the T1 Card has been designed to interface with the coming Integrated Services Digital Network (ISDN) features, when available.

3.121 When a T1 span is used to connect a 416/832 System to the public network or to another telephone system, it is important that the two endpoints communicate at the same frequency. Since it is practically impossible for both endpoints to have clocks running at identical frequencies, one endpoint is given “master” clock status and the other endpoint is given “slave” clock status. The slave clock can then extract and lock onto the master clock frequency from the incoming T1 information. This master/slave synchronization is programmed in the database. When connected to the public network, the 416/832 System is automatically designated as the slave clock.

3.122 When information (currently, voice only) is transmitted over a T1 span, a “framing” bit is added so that the receiving end can recognize where the information begins and ends (as long as the clock circuitry of the two endpoints is synchronized). Currently, the 416/832 System supports the two major types of framing schemes in use today: D4 Superframe, which is the most common, and Extended Superframe (ESF), which is required to support future ISDN and DMI features. For voice transmissions, D4 Superframe is quite adequate. However, for data transmissions (not currently supported), ESF is much more reliable and efficient.

3.123 Digital information is transmitted over the T1 span as a series of 1s and 0s (e.g., ...1000 000 0000 0001...). If there are too many consecutive zeroes, the T1 clock extraction circuitry will not operate correctly. To prevent this, T1 carrier equipment limits the number of consecutive zeroes. The 416/832 System supports the two major types of zero code suppression schemes in use today: Alternate Mark Inversion (AMI), also called bit-7 stuffing, and Bipolar Eight Zero Substitution (B8ZS). Again, for voice transmissions, AMI is quite adequate. However, for 64 kb/s clear channel data transmissions (not currently supported), B8ZS is required.

3.124 Like the T1 repeater distance, the framing scheme type and zero code suppression scheme type are also available from the T1 provider. In fact, when ordering a T1 span, always request the following information from the T1 provider:

- Framing scheme: D4 Superframe or ESF
- Zero code suppression scheme: AMI or B8ZS
- *If the optional on-board CSU is to be installed, distance from the MDF to nearest public network T1 repeater (for determining the line build-out attenuation): 0–1599 feet (15dB), 1600–2999 feet (7.5dB), or 3000–6000 feet (0dB)*

3.125 Each T1C has circuitry for up to 24 trunk channels. The 24 channels (or circuits) can be any combination of loop start trunks, ground start trunks, DID trunks, E&M trunks, or OPX trunks.

3.126 The T1 Card itself is equipped with the following resources:

- LED indicators are provided to show the status of each circuit and to show T1 trunk alarms and board-level error occurrences. Refer to the TROUBLESHOOTING section of this manual for additional LED information.
- Audio jack (8-pin, 8-conductor modular jack) for possible future use.

NOTE: The audio jack is currently used for engineering diagnostic purposes only.
- Alarm relay jack (8-pin, 8-conductor modular jack) for connecting optional T1 alarm signaling devices. The T1 Card relay contact ratings are:

T1C RELAY CONTACT RATINGS

0.6A at 125VAC
0.6A at 110VDC
2.0A at 30VDC

- Serial port jack (RS-232-C, 8-pin, 8-conductor modular jack) for possible future use.

NOTE: The serial port jack is currently used for engineering diagnostic purposes only.
- T1 span jack (RJ48C, 8-pin, 8-conductor modular jack) for connecting a single, 24-channel T1 span to the T1 Card. (If this jack is used, do not use the optional DB15 connector also provided on the card.)

NOTE: All T1 spans should be disconnected from their cards before turning the system power on or off. They should also be disconnected before pressing the reset switch on the HDLC Card.

- Dual bantam jack (with transmit and receive audio ports) for connecting T1 test equipment to the T1 Card and monitoring the transmit and receive signals.

CAUTION

When a live T1 span is installed on the T1 Card, test equipment should be used for monitoring purposes only. Do not attempt to send signals over either the transmit or receive audio ports on the T1 Card if a T1 span is installed. Also, be sure the test equipment is set in the "bridge" mode.

- Optional T1 span DB15 connector (15-pin sub-miniature "D" female connector) for connecting a single, 24-channel T1 span to the T1 Card.

NOTE: In certain situations (e.g., when using an external CSU equipped with a DB15 connector), it may be more convenient to use the optional DB15 connector instead of the standard RJ48C jack also provided on the card.

- Make-busy switch with LED for removing all circuits on the card from service and placing them back in again. Pressing the switch will light the LED and begin the process of "busying out" each circuit not in use. The circuits that are in use are then busied out as soon as the users hang up. When all circuits are busied out, the make-busy LED and all 24 circuit LEDs flash slowly, and the card can be removed from its slot in the cabinet. If the card is not removed within a certain amount of time, a programmable timer expires and the card returns to normal operation; however, the make-busy LED will then flash rapidly until the make-busy switch is released.
- Channel Service Unit (CSU) connector for installing the optional on-board CSU Module. If the T1 Card interfaces with the public network, either the on-board CSU Module or an external CSU must be connected to the card.
- DSX/CSU jumper plug for indicating whether the on-board CSU is installed. If the on-board CSU is installed, place the jumper plug in the CSU position. If there is no on-board CSU, place the jumper plug in the DSX position. This information must also be programmed in the database.
- Line build-out jumper plug for selecting the proper line build-out (LBO) attenuation of the T1 span connected to the card. This selection is necessary only if the optional on-board CSU is installed. If the distance between the equipment cabinet and the closest public network T1 repeater is less than 1600 feet, place the jumper plug in the 15dB position. If the dis-

tance is between 1600 and 2999 feet, place the jumper plug in the 7.5dB position. And, if the distance is between 3000 and 6000 feet, place the jumper plug in the 0dB position. This information, which can be obtained from the T1 provider, must also be programmed in the database.

3.127 Compared to the other trunk cards in the system, the T1 Card is very sophisticated and offers some unique programming options. The information that is programmed *common to all T1 Cards* installed in the system includes:

- **Dialing feedback configuration:** When a number is dialed over a T1 circuit, the user hears the feedback from the signals (either DTMF or dial-pulse, depending on how the circuit is designated). By adjusting the DTMF gain control or the dial-pulse gain control (from -15dB to 15dB), the programmer can determine how loud the signals appear to the user. If the circuit is designated for dial-pulse signaling, the programmer can also select the type of dial-pulse tone the user hears (23 different tones are available).
- **Error thresholds:** The programmer can set numerical thresholds (number per hour and number per day) for certain T1 Card errors. If a threshold is exceeded, an error is printed on the SMDR report.
- **Reference clock back-up priorities:** One of the T1 Cards installed in the system must be programmed as the system reference clock (see "reference clock programming" following paragraph 3.128). If more than one T1 Card is installed in the system, the programmer may designate one or more of the cards as a "back up" to the system reference clock. Then, if the T1 Card acting as the system reference clock fails or is taken out of service, the next T1 Card on the back-up priority list takes over.

3.128 The information that is programmed *specific to each T1 Card* installed in the system includes:

- **Card type:** The programmer must select the type of framing scheme, D4 Superframe or Extended Superframe (ESF), used by the T1 span connected to each card.
- **Zero code suppression scheme:** The programmer must select the type zero suppression scheme, AMI (bit-7 stuffing) or Bipolar Eight Zero Substitution (B8ZS), used by the T1 span connected to each card.
- **PCM encoding law:** In pulse code modulation (PCM) systems, there are two primary methods of encoding analog signals (sampled audio waveforms) into digital signals. In North America and Japan, the "mu-law" method is normally used. In other places, like Europe, the "a-law" method is widely

used. The programmer must select both the transmit and receive method of encoding used by the T1 Card. *In the United States, this will almost always be mu-law to mu-law.*

- **Relay activation:** If desired, the programmer may enable the two relays, T1 line error and T1 line OK, on the T1 Card.
- **Channel service unit (CSU):** The programmer must designate whether the optional on-board CSU is installed on the T1 Card. (The database selection must match the jumper selection on the card.)
- **Line build-out (LBO):** If the optional on-board CSU is installed, the programmer must designate the LBO attenuation of the T1 span connected to the card. This value is determined by the distance to the nearest public network T1 repeater. (The database selection must match the jumper selection on the card.)
- **DSX-1 line length:** If the optional on-board CSU is *not* installed, the programmer must designate the length of the cabling between the T1 Card and the external CSU, or between the T1 Card and the other telephone system to which it is connected.
- **Reference clock programming:** The programmer must first designate whether the T1 Card is connected to the public network. If it is, the card is automatically designated as a slave clock (the public network always acts as the master clock). If the card is not connected to the public network, but is instead connected to another T1 Card or a card in another telephone system, the programmer must designate whether the card is a master clock or a slave clock (in relation to the card on the other end).

In addition, one of the T1 Cards installed in the system must be programmed as the system reference clock. The reference clock then becomes the clock for all the other cards in the system. If there is no T1 Card acting as the reference clock, the Matrix Card becomes the system reference clock.

If a T1 Card is designated as both a master clock and the system reference clock, the programmer must then designate whether the card's on-board oscillator is the source of the clock or whether there is an external clock.

NOTE: The external clock option is provided for possible future use only. For now, always designate the card's on-board oscillator as the source of the clock.

- **Test tone:** If desired, the programmer can transmit a digital test tone (1007Hz, 0dBm, sine wave) over the selected T1 circuit. The tone can be verified by mon-

itoring the transmit audio port on the card's dual ban-tam jack.

- **Error diagnostics:** If desired, the programmer can generate the current T1 error counts (by hour and by day) for the selected card. The error counts can be displayed in a graphical or tabular format, printed (stand-alone/remote only), or saved in a file for future reference.

3.129 The information that is programmed *specific to each circuit* (i.e., each of the 24 channels) on the T1 Card includes:

- **Circuit type:** Each individual circuit can be programmed as a loop start, ground start, DID, E&M, or OPX trunk.
- **Digital gain control:** As with the other trunk cards, should voice transmit or voice receive volume problems occur, the programmer can adjust the receive gain and/or the transmit gain (-15dB to 15dB) for individual T1 circuits.
- **DTMF or dial-pulse signaling:** When the system is in the default configuration, all trunk circuits are configured for DTMF signaling. If necessary, some or all of the circuits can be reprogrammed for dial-pulse signaling.

3.130 The T1 circuits are assigned hardware address numbers according to the card's slot in the equipment cabinet and the location of the circuit on the card. For example, T1 circuit 6.21 is the 21st circuit on the 6th card, a T1C, installed in the equipment cabinet.

3.131 Special T1 cabling requirements: It is recommended that special high-speed data cable with the following characteristics be used for all T1 installations:

- 22 AWG
- Individually shielded two-pair (or with the transmit and receive pairs run in separate cables or binder groups)
- ABAM or PIC (a level-3 cable designed specifically for the T-carrier transmission rate)
- Maximum capacitance of 15pF/ft.
- Maximum attenuation of 5dB/1000 ft. at 772kHz and 70° F

NOTE: The programming prompts for LBO attenuation and DSX-1 line length assume that proper T1 cable (with the above characteristics) is being used. When transmitting over shorter distances (e.g., when the nearest public network T1 repeater is less than 2000 feet from the MDF), it may be possible to use standard two-pair voice frequency cable instead; however, the programmer may have to compensate by selecting longer LBO distances or DSX-1 line lengths. Also, no matter which type of cable is used, the transmit and receive pairs must be shielded from each other (or run in separate cables or binder groups).

3.132 If the optional DB15 connector on the T1 Card is used in place of the standard RJ48C jack, a flat, 28AWG, twisted-pair ribbon cable with a maximum capacitance of 16pF/ft. may be used for distances of up to 50 feet (see page 3-21 for more information). For distances longer than 50 feet, use the special high-speed data cable described in paragraph 3.131.

4. STATION INSTRUMENTS

A. MAXIMUM CAPACITIES

4.1 A wide variety of station instruments can be used on the 416/832 System. The combination of station instruments depends on the number and type of station cards, station instruments, and power supply modules installed.

4.2 The system capacity for stations is as follows:

Total Station Instruments	832
Keysets	
— Using Digital Keysets Only	0-800
— Using 8-Line Dual-Ckt. AIMs Only	0-634
— Using Other Type Keysets Only	0-384
Attendant Computer Consoles	0-384
Single-Line Sets	0-816*
DSS/BLF Units	
— Using Digital Units Only	0-200
— Using Analog Units Only	0-50**

* At least one Keypad Card must be installed to provide an attendant (equipped with a display keypad or an Attendant Computer Console) to receive system alarm messages, program system data, and receive unsupervised CO recalls. When the system is in the default configuration, circuit 1.1 is designated as a keypad and the primary attendant.

** Analog Keysets, analog DSS/BLF Units, and Attendant Computer Consoles use separate KSC or KSC-D circuits. Therefore, for each analog DSS/BLF Unit installed, one less analog keypad or Attendant Computer Console may be installed. (A DSS/BLF Unit cannot be programmed as the "B" circuit for an 8-line dual-circuit IMX AIM keypad.)

NOTE: Since most systems will be installed with a variety of station and trunk cards and a variety of station instruments, the maximum station and trunk capacities listed in this manual will rarely be reached.

4.3 The maximum number of digital keysets, 8-line dual-circuit IMX AIM keysets, and other-type keysets that can be installed in a single cabinet is determined by the +30V output from the corresponding power supply (see page 2-10). The following formula can be used to determine the maximum number of keysets that can be installed in a *single* cabinet.

$$(8\text{-line AIMs} \times 0.0755) + (\text{other analog keysets} \times 0.125) + (\text{digital keysets} \times 0.060) = y$$

The value of *y* must be less than or equal to 24. If *y* is greater than 24, too many keysets are being installed in a single cabinet.

B. IMX 416/832 KEYSETS

4.4 Refer to pages 3-105 and 3-114 for IMX 416/832 keypad installation instructions. The following digital and analog models are available:

- Standard Digital Keysets (also referred to as Standard Digital Terminals) — display and non-display
- Executive Digital Keysets (also referred to as Executive Digital Terminals) — display only
- 24-Line AIM Keysets (display only)
- 12-Line AIM Keysets (display only)
- 8-Line Dual-Circuit AIM Keysets (display only)
- 24-Line Keysets (standard and display)
- 12-Line Keysets (standard and display)
- 8-Line Keysets (non-display only)

NOTE: With the proper software package, the Inter-Tel GX station instruments can be installed on the system. Refer to the Appendix A in the back of the manual for complete information.

4.5 For illustrations of the keysets (and other station instruments), refer to the drawings beginning on page 2-41. The feature keys, speed-dial keys, call keys, and station programmable keys shown in the drawings are as they appear when the system is in the default configuration.

4.6 The *approximate* dimensions of both the Standard and Executive Digital Keysets are:

Height	3.0 in. (7.6 cm.)
Width	7.5 in. (19.1 cm.)
Length	9.0 in. (22.9 cm.)
Weight	2.3 lb. (1.0 kg.)

4.7 The IMX 12-line and 24-line keypad dimensions are:

Height	5.5 in. (14.0 cm.)
Width	9.0 in. (22.9 cm.)
Length	9.5 in. (24.1 cm.)
Weight	3.1 lb. (1.4 kg.)

4.8 The IMX 8-line keypad dimensions are:

Height	4.5 in. (11.4 cm.)
Width	6.5 in. (16.5 cm.)
Length	9.5 in. (24.1 cm.)
Weight	2.5 lb. (1.1 kg.)

4.9 All keysets (except as noted) have the following design features in their default configuration:

- 12-key pushbutton keypad
- A variety of feature keys (some of which may be designated as user programmable)
- IC/CO speed-dial (SD) keys with light-emitting diode (LED) indicators (8-line keysets do not have SD keys in the default configuration)

- Four call keys with LED indicators for incoming call access and indication
- Integrated speakerphone (digital keysets have access to shared speakerphone resources)
- Ring and voice volume controls (digital and AIM keysets have UP and DOWN keys for adjusting volume levels)
- Slide-out directory card
- Self-test feature (for testing keyset functions)
- Hearing aid-compatible (HAC) handset
- Reversible baseplate for wall mounting and reversible cradle hook for holding the handset on wall-mounted keysets

Integrated Speakerphone

4.10 A built-in, integrated speakerphone is standard in all IMX analog keysets. All digital keysets have a speaker and a microphone for handsfree intercom reply, but they do not have a true integrated speakerphone. However, the DSP(s) on the associated DKSC can be used to provide shared integrated speakerphone circuitry. (See page 4-40 for more information.)

NOTE: If there are no DSP speakerphone resources available when a digital keyset user attempts to use the speakerphone, the MUTE key lights and display keysets show NO SPKR AVAIL COME OFF HOOK. The user can only monitor the call and must lift the handset to speak.

4.11 The integrated speakerphone allows users to place and receive outside calls and intercom calls without lifting the handset. Once a call is connected, the keyset user may speak handsfree over the speakerphone or lift the handset to speak privately. When using the handset, the user may switch to the speakerphone by pressing the SPKR key and replacing the handset. If enabled, pages and/or background music may be broadcast over the speaker when the phone is not being used.

Liquid Crystal Display (LCD)

4.12 All Executive Digital Keysets and all IMX AIM keysets (24-line, 12-line, and 8-line) come equipped with LCDs. Standard Digital Keysets and standard IMX 24-line and 12-line keysets can be converted to display sets by installing the appropriate LCD Unit (see REPLACEMENT PARTS for the part number). Non-AIM 8-line keysets cannot be equipped with displays.

4.13 Each "display" keyset has a liquid crystal display (LCD) with two 16-character lines. The display helps the user to process calls more efficiently and professionally. There are display messages for date and time, numbers dialed, call cost data, reminders, do-not-disturb, forwarding, voice mail processing, incoming calls, station and system status, system alarms, and programming. These displays are indicated throughout the FEATURES section of the manual.

4.14 Executive Digital Keysets have four additional 16-character display lines that are associated with the eight menu selection keys that border them. The menu display changes to reflect the functions of the menu keys. Pressing the key next to the displayed option selects that option. Refer to page 4-41 in FEATURES for information about the available menu options.

Electret Circuitry

4.15 All newer keysets and handsets have been designed using "electret" microphone circuitry, rather than the "dynamic" microphone circuitry used on many previous Inter-Tel keyset models. Electret keysets and handsets are not electrically compatible with dynamic keysets and handsets.

4.16 If a dynamic handset is attached to an electret keyset, the handset transmit levels will be noticeably lower. If an electret handset is attached to a dynamic keyset, the handset will not transmit. (In both cases, neither the keyset nor the handset will be damaged.)

4.17 Electret keysets can be identified by the manufacturer's label on the bottom of the keyset. Electret handsets can be identified by the "E1" embossed in the recess for the wall-mount hook (near the receiver).

Optional Headsets

4.18 A headset may be attached to any keyset by unplugging the handset from the handset jack on the base of the keyset, plugging the headset into the handset jack, and entering a feature code to enable the headset. The SPKR key, which is used to turn the headset on and off, is lit when placing and receiving calls and unlit when the headset is not in use. The keysets are compatible with industry-standard, four-conductor, modular headsets. The headsets can have electret or dynamic microphones, as needed (or carbon-microphone headsets that are connected to the keyset through an externally powered jackset, which makes the headset dynamic-compatible). Refer to pages 3-109 and 3-120 for installation instructions.

Optional Handset Amplifiers

4.19 The typical handset amplifier is an external device that plugs into the keyset (where the handset is normally connected); the handset is then plugged into the amplifier. Receiver voice volume is controlled by turning a thumbwheel (or similar control) located on the amplifier. Such amplifiers are generally equipped with a transformer that requires a 110VAC-outlet. Refer to page 3-120 for installation instructions. AIM keysets do not require handset amplifiers.

Optional Personal Computer Data Port Module (PCDPM) for Digital Keysets

4.20 For off-hook voice announce receive capability, and to allow an optional digital DSS/BLF Unit and/or an optional Modem Data Port Module to be installed, any digital keyset may be equipped with an optional PC Data Port Module (part no. 550.3014). See page 3-109 for instructions on installing the PC Data Port Module.

NOTE: PCDPMs require AC transformers when they are connected to DSS/BLF Units only. PCDPMs do *not* require AC transformers when they are used for off-hook voice announce only or have attached MDPMs. For a diagram of AC transformer requirements, refer to Figure 2-2 on page 2-29.

Optional Modem Data Port Module (MDPM) for Digital Keysets

4.21 Digital keysets equipped with PC Data Port Modules may also be equipped with optional Modem Data Port Modules (part no. 550.3015). The MDPM contains a jack that can be used to connect a data device (such as a personal computer equipped with a modem) to the keyset. Each MDPM is powered by its own AC transformer.

NOTE: MDPMs always require their own separate AC transformers. For a diagram of AC transformer requirements, refer to Figure 2-2 on page 2-29.

4.22 The data device attached to the MDPM must have a direct-connection modem. The modem must be externally powered (or capable of operating on 20mA of loop current) and have an RJ11 CO interface. The data device can be used by the associated keyset(s) to communicate with remote data equipment over voice channels being used for CO or intercom calls. Refer to pages 3-113 and 4-101 for installation and operation instructions.

Optional Data Port Module for IMX 12-Line and 24-Line Keysets

4.23 All IMX 12-line and 24-line keysets may be equipped with optional Data Port Modules (refer to REPLACEMENT PARTS for the part number). The module contains a four-conductor, RJ11 modular jack that can be used to connect *either* a data device (such as a personal computer equipped with a modem) *or* a loud ringing adapter (LRA) and an external signaling device (such as a loud bell, horn, flashing light, etc.) to the keyset. The Data Port Module is a source for 20-26mA of loop current (constant current source). Refer to page 3-121 for instructions on installing the optional Data Port Module.

4.24 Specifications for modem-equipped data device: The data device must have a direct-connection modem. The modem must be externally powered (or capable of operating on 20mA of loop current) and have an RJ11 CO interface. The data device can be used with the keyset to communicate with remote data equipment over voice channels being used for CO or intercom calls. Refer to pages 3-121 and 4-101 for installation and operation instructions.

4.25 Specifications for loud ringing adapter (LRA): An external LRA may be connected to the Data Port Module to provide a relay for controlling external signaling devices. The LRA is connected to the Data Port Module, and the external signaling device is connected to the LRA. See page 3-123 for installation instructions. Each time the keyset rings, the Data Port Module provides 20-26mA of loop current to the LRA. This causes the LRA contacts to close and activates the signaling device. The LRA is not affected by the ring tone or ringer volume of the keyset. The LRA must be capable of operating on 20mA current (approximately 20VDC).

8-Line IMX AIM Keysets On Dual Circuits

4.26 If desired, new 8-line IMX AIM keysets can be installed *two to a circuit* using the new "dual-circuit" version Keyset Card (KSC-D). (To install 8-line AIM keysets *one to a circuit*, either the KSC or the KSC-D can be used.) There are jumper straps on the back of the 8-line AIM keyset to select the baud rate (2400 baud for two to a circuit; 1200 baud for one to a circuit) and to select the circuit position (A or B), depending on how the keyset's circuit will be designated in database programming.

4.27 Each 8-line AIM keyset is shipped with a standard (six-foot, three-pair) "flat" line cord for connecting the keyset to its corresponding modular jack assembly. For most installations, this flat line cord is more than adequate. However, when 8-line AIM keyset are installed

two to a circuit, low-level crosstalk between the two stations sharing the circuit may occur in certain situations. This is because the wires in a flat line cord are parallel to each other for long distances, thereby providing a susceptibility to audio bleedover. The level of crosstalk is dependent on the voice volume of the users, the length of the line cord, and the station cable loop length.

4.28 To eliminate this low-level crosstalk, if necessary, replace the flat line cord with a twisted-pair line cord that has the following characteristics:

- Telco orientation (rather than data)
- 26-gauge, stranded

- 6 to 8 twists per foot
- Equipped with connectors designed specifically for round, twisted-pair line cord

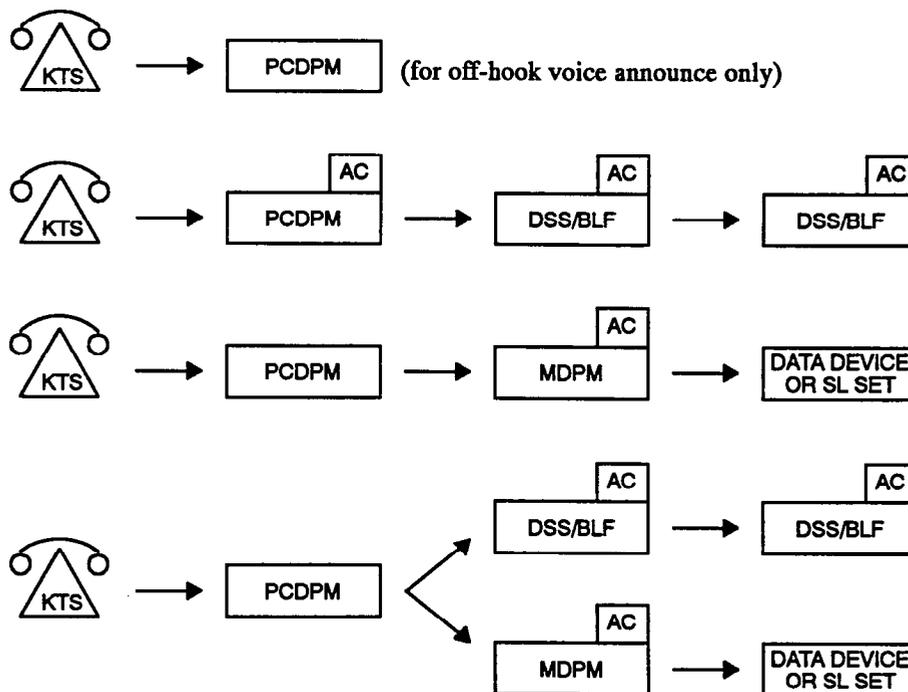
4.29 Charcoal and grey twisted-pair line cords of various lengths can be purchased from a local supply house or directly from a cable distributor, such as:

AmericanSources
Interstate Business Park #806
Fredericksburg, VA 22405
Phone: (703) 899-3777, FAX: (703) 371-4350

Pt. No.: LCM650xL (Grey), LCM660xL (Charcoal)
(where x = length in feet; e.g., LCM65025L is a 25 ft. grey cord)

FIGURE 2-2. DIGITAL AC TRANSFORMER REQUIREMENTS

AC = AC transformer required



NOTE: Digital DSS/BLF Units and MDPMs always require their own separate AC transformers. PCDPMs require AC transformers when they are connected to DSS/BLF Units only. PCDPMs do not require AC transformers when they are used for off-hook voice announce only or have attached MDPMs.

C. GMX-416/832 KEYSETS

4.30 A maximum of 208 keysets (416 on expanded systems) can be connected to the GMX-416/832 System. Refer to page 3-124 for GMX-416/832 keyset installation instructions. The following analog models are available:

- Inter-Tel/DVK 24-Line Keysets (standard and display)
- Inter-Tel/DVK 12-Line Keysets (standard and display)
- Inter-Tel/DVK 8-Line Keysets (standard and display)
- GMX 24-Line Keysets (standard and display)
- GMX 12-Line Keysets (non-display only)
- GX 24-Line Keysets (standard and display)

NOTE: For more information on the GX and GMX keysets, refer to appendixes A and B in the back of this manual.

4.31 For illustrations of the Inter-Tel/DVK keysets, refer to the drawings beginning on page 2-41. The feature keys, speed-dial keys, call keys, and station programmable keys shown in the drawings are as they appear when the system is in the default configuration.

4.32 The Inter-Tel/DVK 24-line keyset dimensions are:

Height	3.8 in. (9.7 cm.)
Width	9.2 in. (16.5 cm.)
Length	9.5 in. (24.1 cm.)
Weight	2.8 lb. (1.3 kg.)

4.33 The Inter-Tel/DVK 12-line keyset and 8-line keyset dimensions are:

Height	3.8 in. (9.7 cm.)
Width	7.0 in. (17.8 cm.)
Length	9.5 in. (24.1 cm.)
Weight	2.5 lb. (1.1 kg.)

4.34 All Inter-Tel/DVK keysets have the following design features in their default configuration:

- 12-key pushbutton keypad
- A variety of feature keys (some of which may be designated as user programmable)
- IC/CO speed-dial (SD) keys with light-emitting diode (LED) indicators
- Four call keys with LED indicators for incoming call access and indication

- Integrated speakerphone
- Ring and voice volume controls (using the VOL UP and VOL DN keys)
- Slide-out directory card
- Self-test feature (for testing keyset functions)
- Hearing aid-compatible (HAC) handset
- Reversible baseplate for wall mounting

Integrated Speakerphone

4.35 A built-in, integrated speakerphone is standard in all keysets. The integrated speakerphone allows users to place and receive outside calls and intercom calls without lifting the handset. Once a call is connected, the keyset user may speak handsfree over the speakerphone or lift the handset to speak privately. When using the handset, the user may switch to the speakerphone by pressing the SPKR key and replacing the handset. If enabled, pages and/or background music may be broadcast over the speaker when the phone is not being used.

Liquid Crystal Display (LCD)

4.36 Each "display" keyset has a liquid crystal display (LCD) with two 16-character lines. The display helps the user to process calls more efficiently and professionally. There are display messages for date and time, numbers dialed, call cost data, reminders, do-not-disturb, forwarding, voice mail processing, incoming calls, station and system status, system alarms, and programming. These displays are indicated throughout the FEATURES section of the manual.

4.37 All standard Inter-Tel/DVK keysets can be converted to display sets by installing an LCD Unit. The 24-line keysets use the *large* LCD Kit (part no. 828.1166). The 12-line and 8-line keysets use the *small* LCD Kit (part no. 828.1165).

Electret Circuitry

4.38 All newer keysets and handsets have been designed using "electret" microphone circuitry, rather than the "dynamic" microphone circuitry used on many previous Inter-Tel keyset models. Electret keysets and handsets are not electrically compatible with dynamic keysets and handsets.

4.39 If a dynamic handset is attached to an electret keyset, the handset transmit levels will be noticeably lower. If an electret handset is attached to a dynamic keyset, the handset will not transmit. (In both cases, neither the keyset nor the handset will be damaged.)

4.40 Electret keysets can be identified by the manufacturer's label on the bottom of the keyset. Electret

handsets can be identified by the "E1" embossed in the recess for the wall-mount hook (near the receiver).

Optional Headsets

4.41 A headset may be attached to any keyset by unplugging the handset from the handset jack on the base of the keyset, plugging the headset into the handset jack, and entering a feature code to enable the headset. The SPKR key, which is used to turn the headset on and off, is lit when placing and receiving calls and unlit when the headset is not in use. The keysets are compatible with industry-standard, four-conductor, modular headsets that have dynamic microphones, or carbon-microphone headsets that are connected to the keyset through an externally powered jackset (which makes the headset dynamic-compatible). Refer to page 3-129 for installation instructions.

Optional Data Port Module

4.42 All Inter-Tel/DVK keysets may be equipped with optional Data Port Modules (refer to REPLACEMENT PARTS for the part number). The module contains a four-conductor, RJ11 modular jack that can be used to connect *either* a data device (such as a personal computer equipped with a modem) *or* a loud ringing adapter (LRA) and an external signaling device (such as a loud

bell, horn, flashing light, etc.) to the keyset. The Data Port Module is a source for 20-26mA of loop current (constant current source). Refer to page 3-130 for instructions on installing the optional Data Port Module.

4.43 Specifications for modem-equipped data device: The data device must have a direct-connection modem. The modem must be externally powered (or capable of operating on 20mA of loop current) and have an RJ11 CO interface. The data device can be used with the keyset to communicate with remote data equipment over voice channels being used for CO or intercom calls. Refer to pages 3-130 and 4-101 for installation and operation instructions.

4.44 Specifications for loud ringing adapter (LRA): An external LRA may be connected to the Data Port Module to provide a relay for controlling external signaling devices. The LRA is connected to the Data Port Module, and the external signaling device is connected to the LRA. Refer to page 3-132 for installation instructions. Each time the keyset rings, the Data Port Module provides 20-26mA of loop current to the LRA. This causes the LRA contacts to close and activates the signaling device. The LRA is not affected by the ring tone or the ringer volume of the keyset. The LRA must be capable of operating on 20mA current (approximately 20VDC).

D. IMX 416/832 DSS/BLF UNITS

4.45 The IMX 416/832 System can have as many as 50 keyset circuits equipped with Direct Station Selection/Busy Lamp Field (DSS/BLF) Units. For example, there could be a maximum of 50 digital keysets (i.e., DKSC circuits) equipped with up to four digital DSS/BLF Units each. Or, there could be a maximum of 50 KSC or KSC-D circuits equipped with one analog DSS/BLF Unit each. Or, there could be any combination of the two using up to 50 keyset circuits.

4.46 Each unit provides one-key access to 60 numbers. The numbers can be station extension numbers, hunt group pilot numbers, system feature codes, or system speed-dial numbers.

4.47 Digital DSS/BLF Units are physically attached to and programmed to be used with specific digital keysets. The units are connected in series to the PC Data Port Module (PCDPM) on the back of the corresponding keyset. Unlike analog units, digital DSS/BLF Units do *not* require station cabling separate from the keyset's cabling; instead, they are powered by their own AC transformer. If desired, all units can be connected to keysets installed on the same Digital Keyset Cards. (Refer to page 3-133 for digital DSS/BLF Unit installation instructions.)

NOTE: Digital DSS/BLF Units always require their own separate AC transformers. For a diagram of AC transformer requirements, refer to Figure 2-2 on page 2-29.

4.48 Analog DSS/BLF Units are programmed to be used with specific analog keysets, but are not physically attached to the keysets. The units can be distributed among several keysets or, if desired, they can be assigned to one keyset. Each unit requires a KSC or KSC-D circuit that is separate from the keyset's circuit. If 50 station circuits are used for analog DSS/BLF Units, 50 fewer analog keysets and/or Attendant Computer

Consoles can be installed. Up to four analog units can be installed on a single Keyset Card. (Refer to page 3-135 for IMX DSS/BLF Unit installation instructions.)

4.49 For illustrations of the DSS/BLF Units (and other station instruments), refer to the drawings beginning on page 2-41.

4.50 Digital DSS/BLF Unit dimensions are:

Height	3.0 in.	(7.6 cm.)
Width	7.5 in.	(19.1 cm.)
Length	9.0 in.	(22.9 cm.)
Weight	1.7 lb.	(0.8 kg.)

4.51 IMX DSS/BLF Unit dimensions are:

Height	5.5 in.	(14.0 cm.)
Width	9.0 in.	(22.9 cm.)
Length	9.6 in.	(24.1 cm.)
Weight	2.0 lb.	(0.9 kg.)

4.52 As stated earlier, each DSS/BLF Unit provides one-key access to up to 60 numbers. These numbers can be station extension numbers, hunt group pilot numbers, or system feature codes, or system speed-dial numbers. The layout of the keys and the numbers they access are assigned using one of up to eight key maps (12 in expanded systems) in database programming.

4.53 Together, the lamps in the keys create a busy lamp field that indicates the status of each station or hunt group assigned to the keys. The LED indicator in the key is solidly lit when the associated station is busy, flashes slowly when the station is in do-not-disturb, flashes fast when the station has a call ringing in, or flutters continuously if the station is causing a STATION OFF-HOOK system alarm. If assigned to a hunt group, the LED indicator is solidly lit when all stations in the hunt group are unavailable (busy, forwarded, in do-not-disturb, or removed from the hunt group) and it flashes fast when a call is camped on to a hunt group.

E. GMX-416/832 DSS/BLF UNITS

4.54 There can be a maximum of 50 Direct Station Selection/Busy Lamp Field (DSS/BLF) Units installed on the GMX-416/832 System, including any of the following:

- Inter-Tel/DVK DSS/BLF Units — single or tandem
- GMX DSS/BLF Units — single only
- GX DSS/BLF Units — single or tandem

NOTE: For more information on the GMX and GX station instruments, refer to appendixes A and B in the back of the manual.

4.55 A DSS/BLF Unit consists of either a single unit or two units connected together to form a tandem unit. Each single unit provides one-key access to 60 numbers, while tandem units provide access to 120 numbers. The numbers can be station extension numbers, hunt group pilot numbers, system feature codes, or system speed-dial numbers.

4.56 The 50 single/tandem units can be distributed among several keysets or, if desired, they can be assigned to one keyset. (Refer to page 3-136 for DSS/BLF Unit installation instructions.)

4.57 DSS/BLF Units are programmed to be used with specific keysets, but are not physically attached to the keysets. Each unit requires a KSC-D circuit that is separate from the keyset's circuit. If 50 station circuits are used for DSS/BLF Units, 50 fewer keysets and/or Attendant Computer Consoles can be installed. Up to four units can be installed on a single Keyset Card.

4.58 For an illustration of the DSS/BLF Unit (and other Inter-Tel/DVK station instruments), refer to the drawings beginning on page 2-41. DSS/BLF Unit dimensions are:

Height	3.8 in. (9.7 cm.)
Width	7.0 in. (17.8 cm.)
Length	9.5 in. (24.1 cm.)
Weight	2.5 lb. (1.1 kg.)

4.59 As stated earlier, each single DSS/BLF Unit provides one-key access to up to 60 numbers. These numbers can be station extension numbers, hunt group pilot numbers, or system feature codes, or system speed-dial numbers. The layout of the keys and the numbers they access are assigned using one of up to eight key maps

(12 in expanded systems) in database programming. The intercom number/key assignments are programmed in two lists, DSS 1 and DSS 2. Single DSS/BLF Units can be assigned with either list. Tandem Inter-Tel/DVK units are assigned with the DSS 1 list, then an internal strap is set to identify the key arrangement each individual unit will use.

4.60 Together, the lamps in the keys create a busy lamp field that indicates the status of each station or hunt group assigned to the keys. The LED indicator in the key is solidly lit when the associated station is busy, flashes slowly when the station is in do-not-disturb, flashes fast when the station has a call ringing in, or flutters continuously if the station is causing a STATION OFF-HOOK system alarm. If assigned to a hunt group, the LED indicator is solidly lit when all stations in the hunt group are unavailable (busy, forwarded, in do-not-disturb, or removed from the hunt group) and it flashes fast when a call is camped on to a hunt group.

F. ATTENDANT COMPUTER CONSOLES

4.61 The Attendant Computer Console is an IBM-compatible personal computer that is connected to an available KSC or KSC-D circuit (they cannot be connected to DKSC circuits). The computer contains a proprietary circuit card and special software. It is primarily designed for use by attendants of larger 416/832 Systems — those systems with so many station users that it would make using DSS/BLF Units somewhat awkward. However, due to its enhanced functionality, including electronic text messaging and directory dialing, the Attendant Computer Console is also an attractive option for smaller 416/832 Systems as well.

4.62 Attendant Computer Console design features include:

- IBM XT-, AT-, or 386-compatible processing unit
- CGA, EGA, or VGA monitor and Monitor Interface Card
- 122-key custom keyboard
- Headset operation
- Specially designed circuit card and interface software

NOTE: For additional information on the Attendant Computer Console, along with detailed installation and programming instructions, refer to the manual included with the console.

G. SINGLE-LINE SETS

4.63 Up to 400 single-line sets (816 on expanded systems) may be installed on the 416/832 System. The models available are:

- Enhanced Single-Line Sets (ESLSs) — available on IMX 416/832 Systems only
- Single-Line Instruments (SLIs)
- Industry-standard, single-line DTMF sets

4.64 For illustrations of the ESLS and SLI (and other station instruments), refer to the drawings beginning on page 2-41. The feature keys shown in the drawings are as they appear when the system is in the default configuration.

4.65 The dimensions of the ESLS are:

Height	4.5 in.	(11.4 cm.)
Width	6.5 in.	(16.5 cm.)
Length	9.5 in.	(24.1 cm.)
Weight	2.2 lb.	(1.0 kg.)

4.66 The dimensions of the SLI are:

Height	3.5 in.	(8.8 cm.)
Width	7.5 in.	(18.8 cm.)
Length	9.0 in.	(22.5 cm.)
Weight	2.0 lb.	(0.9 kg.)

4.67 ESLS design features include:

- Nine user-programmable feature keys and a non-programmable timed hookflash (FLASH) key
- A neon light for message waiting indication
- A ring volume thumbwheel control
- Hearing aid-compatible (HAC) handset (may be equipped with a handset amplifier as described on page 2-28)

- Reversible baseplate and cradle hook for wall mounting
- A ringer that can be set for AC or DC by moving a jumper strap located on the control board
- Selectable ring pitch jumper strap (HI or LO) on the control board

4.68 SLI design features include:

- Four user-programmable feature keys and a non-programmable timed hookflash (FLASH) key
- A ring volume thumbwheel control
- Hearing aid-compatible (HAC) handset (may be equipped with a handset amplifier as described on page 2-28)
- Reversible baseplate for wall mounting
- A ringer that can be set for AC or DC by moving a jumper strap located on the control board

4.69 Single-line set users access some station features simply by lifting the handset and pressing a feature key (or entering a feature code). Other features are accessed using a combination of a hookflash (FLASH key) and a feature key or code. Refer to the FEATURES section of this manual for details.

4.70 When single-line sets are connected to Single-Line Cards (SLCs), they must be equipped with AC ringers (ESLSs and SLIs have internal jumper straps that can be moved to set the ringer for AC or DC). When connected to Inward Dialing Cards (IDCs), single-line sets may have AC ringers by setting the IDC circuit for AC ringing, or they may have DC ringers by setting the circuit for DC ringing. (Refer to page 3-138 for single-line set installation instructions.)

NOTE: IDCs do not support message waiting applications. If single-line sets with message waiting lamps are installed on IDCs, the lamps will not function.

H. OFF-PREMISES EXTENSIONS (OPXs)

4.71 An OPX is an AC ringer-equipped ESLS, SLI, or single-line DTMF set that is placed in a remote location and connected to the system through a telephone company OPX circuit or a customer-provided circuit.

4.72 Off-premises stations are connected to Inward Dialing Cards (up to eight circuits on a card) or to T1 Cards (up to 24 circuits on a card). If necessary, the receive gain and/or the transmit gain for each circuit can be adjusted in database programming (see page 5-30 for details).

NOTE: If connecting OPXs, Inward Dialing Cards or T1 Cards must be used. FCC regulations prohibit connecting OPXs to Single-Line Cards.

4.73 The OPX circuits provided by the telephone company are identified with Facility Interface Codes (FIC): Class A, OL13A; Class B, OL13B; or Class C, OL13C. The service order code is 9.0F (fully protected private circuit). If the impedance does not exceed a loop measurement of 800 ohms (loop of 15,600 feet using 24AWG wire), a customer-provided circuit between the remote location and the system may be used.

4.74 The 800-ohm loop limitation is usually suitable for accessing on-premises stations from off-premises stations. However, for applications where one off-premises station will be calling another through the station card, the impedance between the two off-premises stations (both circuits added together) must be less than 800 ohms (loop measurement). In this situation, a Class A or B FIC circuit is preferable.

4.75 When an IDC circuit is designated for OPX use in database programming (see page 5-171), its voice volume levels are increased approximately 3dB over normal single-line set voice volume levels. This is an attempt to compensate for any loss in the external OPX circuit. However, in certain off-premises applications, the voice volume levels may still be unacceptable. This degradation in voice volume is due to the natural voice frequency range limitations of the telephone company or customer-provided circuit. To increase the frequency range, installation of a two-wire, negative impedance repeater unit is recommended. Such units typically provide from 0-15 decibels of voice volume gain and allow regulation of the gain in each direction when simulta-

neous voice transmission occurs. The switching sensitivity on the unit should also be adjustable.

4.76 The repeater unit is installed at the MDF between the station block and the cabling to the off-premises station. (Refer to page 3-31 for OPX installation instructions.) When ordering a repeater unit, consult with the supplier for ordering the proper mounting shelf and power supply for the unit. Additional information on operating and adjusting the repeater unit is generally included with the product.

I. PLAYBACK DEVICES

4.77 A playback device is an answering machine that answers the call, plays a message, and then disconnects from the call. Playback devices are installed like single-line sets, using three-pair twisted cable and six-conductor modular jacks (or, if desired, one-pair twisted cable and four-conductor modular jacks). The device must be capable of the following functions: detect ringing, provide ring trip, and automatically disconnect when the announcement is completed.

4.78 Because most playback devices respond to AC ring signals, they are attached to SLC circuits or IDC circuits that are set for AC ringing. If the playback device responds to DC ring signals, an Inward Dialing Card circuit that is set for DC ringing must be used. (Refer to page 3-138 for playback device installation instructions.)

NOTE: For optimal performance, it is recommended automated attendant playback devices be installed on IDC circuits rather than SLC circuits.

4.79 Hunt groups can have two special stations that help process calls: announcement stations and overflow stations. (See FEATURES, page 4-17.) These stations can be equipped with station instruments or playback devices. Automated attendant stations can also be equipped with playback devices.

4.80 The playback device is programmed as a regular single-line station and is assigned an extension number. If the device is sensitive to camp-on tones and disconnects calls, the programmer can disallow the camp-on tone for that station circuit (refer to PROGRAMMING, page 5-30).

5. ADDITIONAL SYSTEM EQUIPMENT

A. PROGRAMMING KEYBOARD

5.1 The programming keyboard must be an IBM AT-compatible keyboard equipped with a standard *male* 5-pin DIN connector (an XT-compatible keyboard cannot be used, unless it is equipped with an XT/AT selector switch). The keyboard is connected to the peripheral connector panel on the back of the equipment cabinet, which is in turn connected to the PC Motherboard in the computer complex.

B. PROGRAMMING MONITOR

5.2 The programming monitor can be any standard monochrome monitor equipped with a *male* 9-pin subminiature "D" connector. The monitor is connected to the peripheral connector panel on the back of the equipment cabinet, which is in turn connected to the monochrome Monitor Card in the computer complex.

C. UTILITY SHELF

5.3 An optional utility shelf that attaches to the outside of the main equipment cabinet is available. For convenience, items such as the programming monitor and keyboard can be placed on the shelf. The shelf is easily installed on either the left or right side of the cabinet by sliding it into place over the existing pins. (Refer to REPLACEMENT PARTS for the part number.)

D. SMDR/SMDA OUTPUT DEVICE REQUIREMENTS

5.4 The optional output devices for the Station Message Detail Recording (SMDR) and Station Message Detail Accounting (SMDA) features must have the characteristics described in the following paragraphs. The output devices are connected to the peripheral connector panel on the back of the equipment cabinet, which in turn is connected to the Pro68/Pro68E Card in the computer complex.

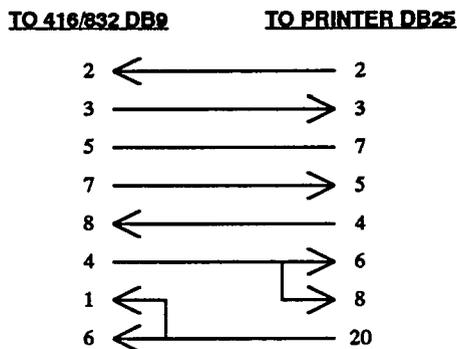
5.5 If the output device will be connected to the SERIAL 1 port on the 416/832 System, one end of the cable between the two must have an RS-232-C-compatible, *female* 9-pin subminiature "D" connector. The other end of the cable must be compatible with the output device. Consult the owner's guide for the device to verify that the pin functions are the same as those shown in the fol-

lowing chart. If necessary, rewire the connector on the device to match the requirements.

SIGNAL NAME	FUNCTION	PIN
Data Carrier Detect (DCD)	Signal to 416/832	1
Receive Data (RXD)	Data to 416/832	2
Transmit Data (TXD)	Data from 416/832	3
Data Terminal Ready (DTR)	Signal from 416/832 (always true*)	4
Signal Ground	Reference Ground	5
Data Set Ready (DSR)	Signal to 416/832	6
Request To Send (RTS)	Signal from 416/832 (always true*)	7
Clear To Send (CTS)	Signal to 416/832	8
Ring Indicator	Signal to 416/832	9

*True = steady signal >+5V

5.6 The following cable can be created to connect the DB9 (SERIAL 1) port on the peripheral connector panel to the DB25 port found on many output devices.

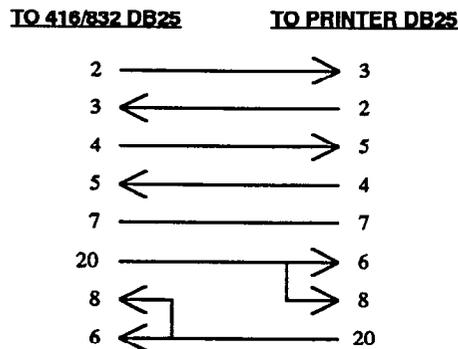


5.7 If the output device will be connected to the SERIAL 2 port on the 416/832 System, one end of the cable between the two must have an RS-232-C-compatible, *female* 25-pin subminiature "D" connector. The other end of the cable must be compatible with the output device. Consult the owner's guide for the device to verify that the pin functions are the same as those shown below. If necessary, rewire the connector on the device to match the requirements.

SIGNAL NAME	FUNCTION	PIN
Transmit Data (TXD)	Data from 416/832	2
Receive Data (RXD)	Data to 416/832	3
Request To Send (RTS)	Signal from 416/832 (always true*)	4
Clear To Send (CTS)	Signal to 416/832	5
Data Set Ready (DSR)	Signal to 416/832	6
Signal Ground	Reference Ground	7
Data Carrier Detect (DCD)	Signal to 416/832	8
Data Terminal Ready (DTR)	Signal from 416/832 (always true*)	20
Ring Indicator	Signal to 416/832	22

*True = steady signal >+5V

5.8 The following cable can be created to connect the DB25 (SERIAL 2) port on the peripheral connector panel to the DB25 port found on many output devices.



5.9 When the system is in the default configuration, the 416/832 output device ports (SERIAL 1 and SERIAL 2) are enabled for "software" handshaking. Most output devices are designed for software handshaking, which is the use of "X-ON" and "X-OFF" characters to indicate readiness to send or receive data. Refer to the device's operating manual to determine if it uses X-ON/X-OFF characters.

5.10 If the device does not support X-ON/X-OFF characters, hardware handshaking may be enabled (see PROGRAMMING, page 5-170). When enabled for hardware handshaking, signals are sent over the connector pins to indicate readiness to send or receive data. The 416/832 DB9 port (SERIAL 1) will send a logic true (>+5V) on pin 4 (Data Terminal Ready) and pin 7 (Request To Send) when it is ready to receive data. In addition, the 416/832 DB9 port will monitor pin 6 (Data Set Ready), pin 8 (Clear To Send), or both (depending on how the 416/832 System is programmed) and will only send data if it receives a logic true (>+5V) over the programmed pin(s). If the 416/832 DB9 port receives a log-

ic false (<-5V) to indicate that the buffer on the attached device is full, it will not send data.

5.11 The 416/832 DB25 port (SERIAL 2) will send a logic true (>+5V) on pin 20 (Data Terminal Ready) and pin 4 (Request To Send) when it is ready to receive data. In addition, the 416/832 DB25 port will monitor pin 6 (Data Set Ready), pin 5 (Clear To Send), or both (depending on how the 416/832 System is programmed) and will only send data if it receives a logic true (>+5V) over the programmed pin(s). If the 416/832 DB25 port receives a logic false (<-5V) to indicate that the buffer on the attached device is full, it will not send data.

5.12 To meet Part 15 of FCC Regulations, all RS-232-C cables must be equipped with ferrite beads. Two ferrite "split" beads (two half beads) are installed on each cable just below where the cable connects to the system. The beads help to reduce electromagnetic interference (EMI) and radio frequency interference (RFI).

NOTE: Each ferrite split bead, which is actually half of a full bead, is ordered individually (see REPLACEMENT PARTS for the part number). Two split beads are required to form one complete bead.

5.13 The SMDR/SMDA output devices must communicate at 110, 300, 600, 1200, 2400, 4800, 9600, or 19,200 baud. System baud rates are set independently in database programming. Other specifications include:

- The data format must be 8 bit standard ASCII.
- Parity is off (ignored).
- Communication is full duplex.
- There is one start bit and one stop bit.

5.14 The output devices, whether used for SMDR or SMDA, must be able to print reports with a width of 80 characters. The devices must not have cables longer than 50 feet (15 meters).

E. SYSTEM BATTERY BACK-UP

5.15 To provide back-up power in the event of an AC power failure or brownout condition, the 416/832 System power supply(s) can have optional battery back-up using a customer-provided uninterruptible power supply (UPS) unit or standby power supply (SPS) unit.

5.16 For the main equipment cabinet only, it is recommended that a power supply unit with the following characteristics be installed:

- Sine wave output
- Transfer time of less than 20 milliseconds
- Output rating of 1600 Watts (minimum needed for a fully populated, non-expanded system; for smaller system requirements, see paragraph 5.22)
- External or internal batteries
- Low voltage cutoff circuit of 105VAC (minimum)

5.17 If an expansion cabinet is installed, it is recommended that a power supply unit with the following characteristics be installed:

- Sine wave output
- Transfer time of less than 20 milliseconds
- Output rating of 2760 Watts (minimum needed for a fully populated, expanded system; for smaller system requirements, see paragraph 5.22)
- External or internal batteries
- Low voltage cutoff circuit of 105VAC (minimum)

NOTE: Even if the power supply unit has the specifications listed above, it cannot be guaranteed that it will work properly with the 416/832 System. Contact Customer Support for a listing of approved UPS/SPS power supplies and installation instructions.

5.18 Batteries connected in series form a "string." The voltage of the string is equal to the sum of the individual battery voltages. For example, five 6V batteries connected in series form a 30V battery pack. If desired, connect two strings in parallel to double the amp/hour rating, which results in longer discharge rates; the voltage level remains the same as a single string.

5.19 Batteries must be fully charged when installed. Charge each individually using a constant-voltage, current-limited charger with less than three percent ripple.

The charge voltage per cell must be set according to the manufacturer's specifications. Be careful not to damage the batteries by overcharging them. For example, new Globe brand batteries require 25 days of float voltage or 25-30 discharge cycles to attain full capacity. Initial capacity might only be 80 percent of rated capacity.

5.20 All batteries should be of the same age and AH rating. Some manufacturers date batteries by stamping them with a date code. For example, Globe stamps their batteries with a code such as 410-B, where 4 = the last digit of year, 10 = the month, and B = the type of electrolyte. If a battery in a string needs to be replaced, the age of the string will determine if a fresh battery can be added. If the string is two to three years old, adding a fresh battery will reduce the life of the entire string. This is because a fresh battery will be overcharged, while the older batteries are undercharged.

5.21 Batteries may give off explosive and/or corrosive gases. To reduce the effects of this gas, place the batteries (or battery compartment) in a well-ventilated room and coat the terminals with an anti-corrosive agent. Avoid storing batteries; they will self-discharge and their capacity decreases with age. If you must store batteries, recharge them every six months. Recharge time may vary depending on the charger's current limit and the battery's state of charge.

F. ADDITIONAL INFORMATION

5.22 If necessary, contact Inter-Tel Customer Support for additional information on the optional equipment listed below:

- OPX Repeaters
- LRAs and External Signaling Devices
- Standby Power (system battery back-up)
- Multi-Port Voice Mail
- Facsimile Machine
- Doorbox
- Lightning and AC Surge Protection
- Multiple External Paging Zones and Talkback Speakers
- Headsets
- Playback Devices
- Power Failure Transfer

FIGURE 2-3. EQUIPMENT CABINET (FRONT VIEW)

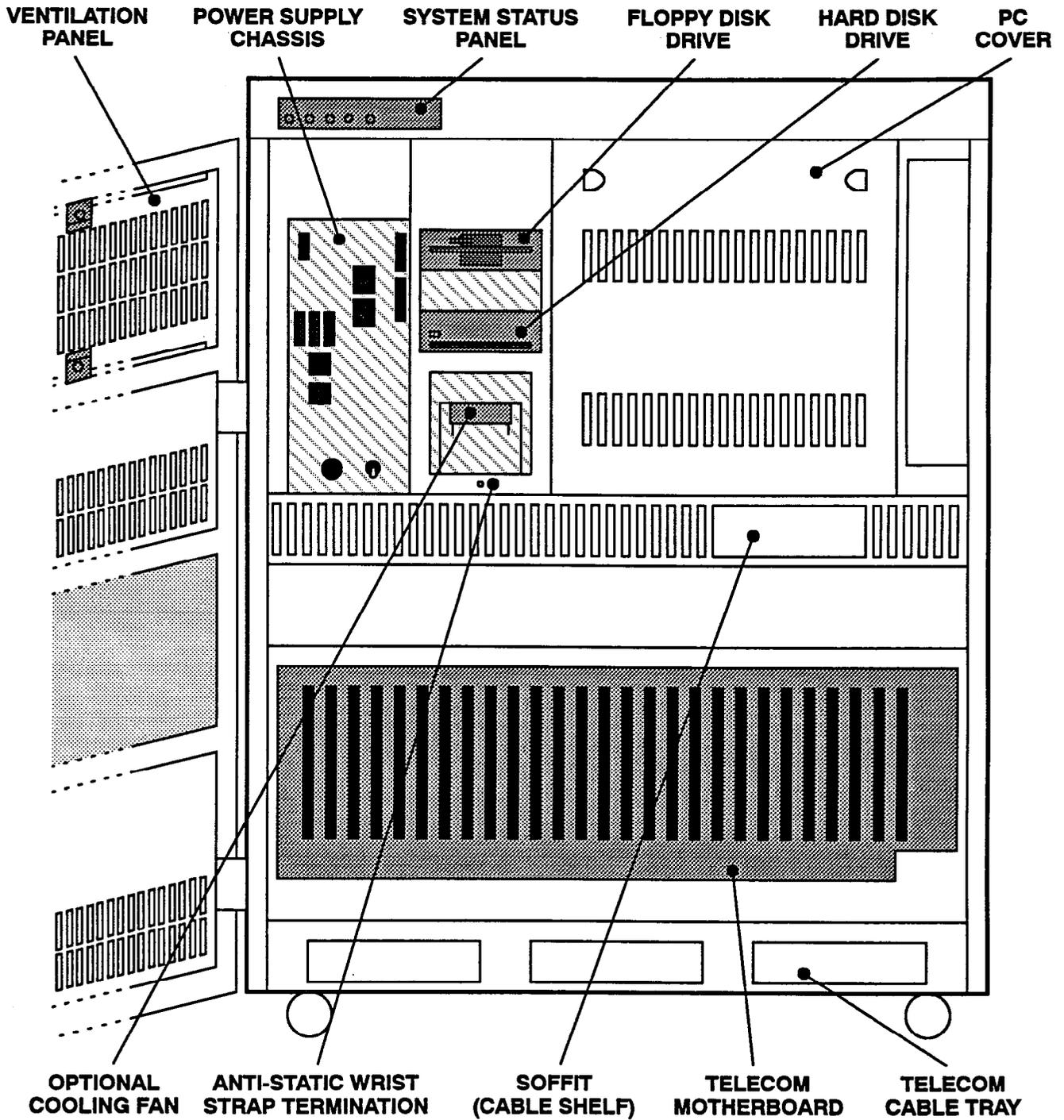


FIGURE 2-4. EQUIPMENT CABINET (BACK VIEW)

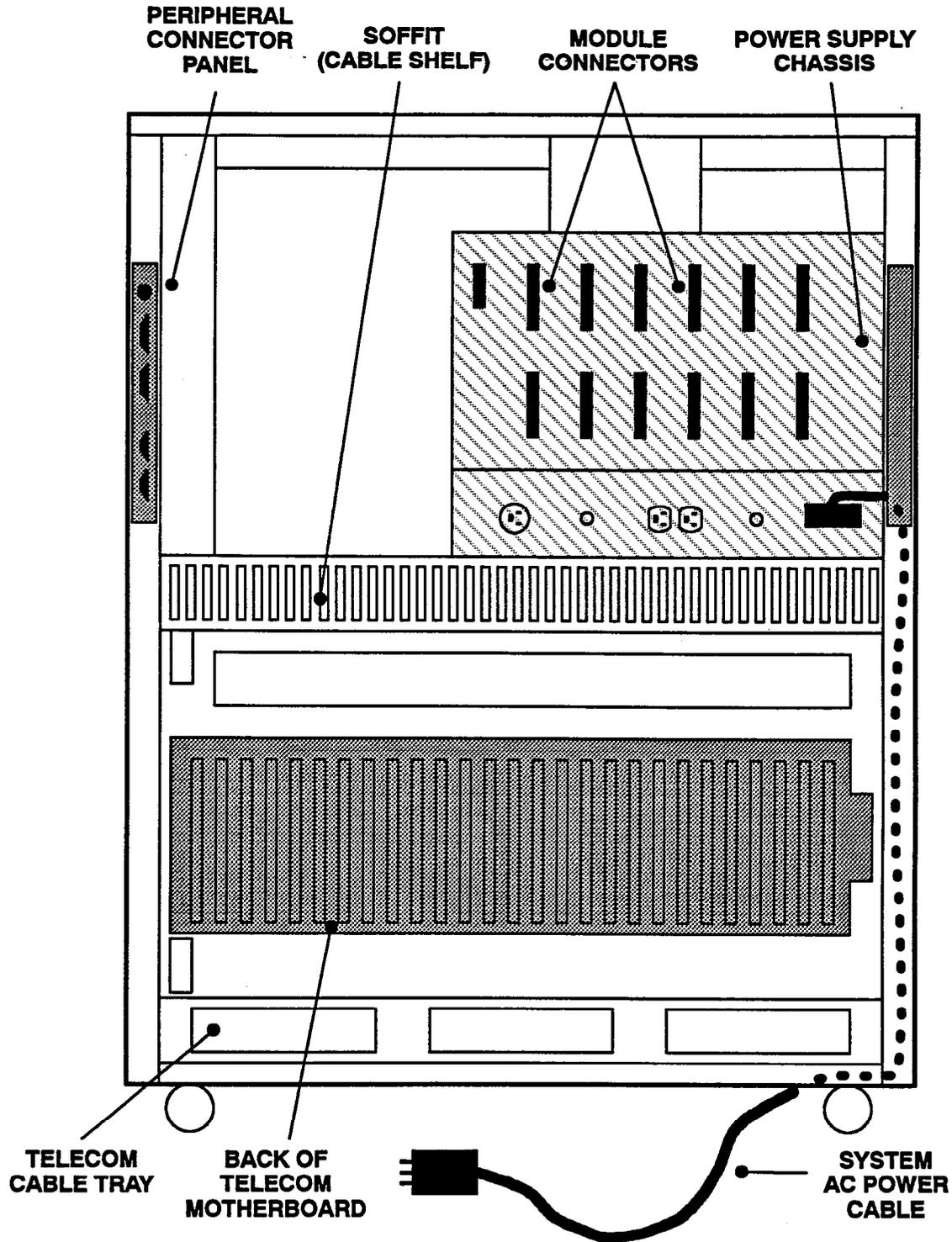
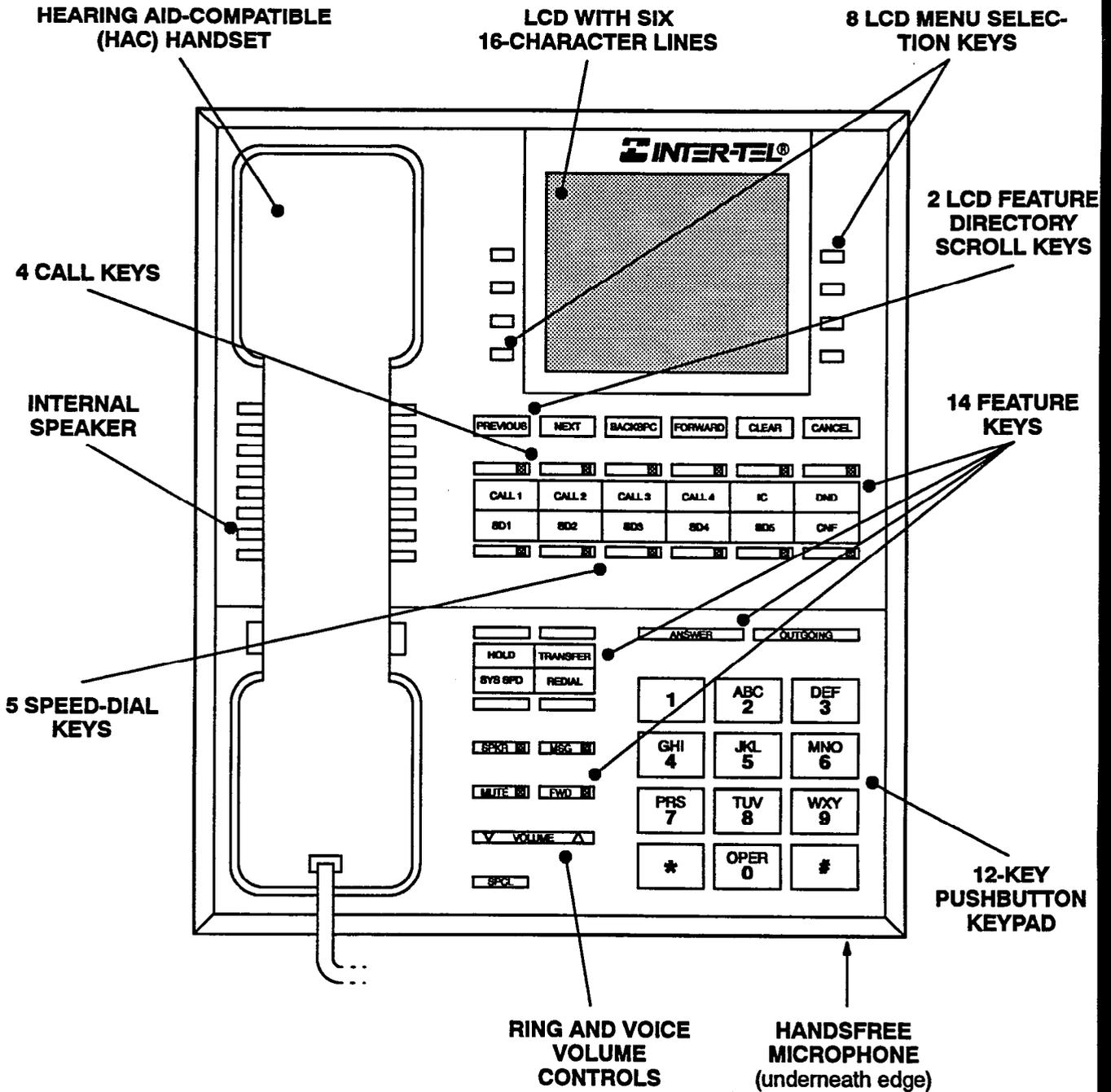
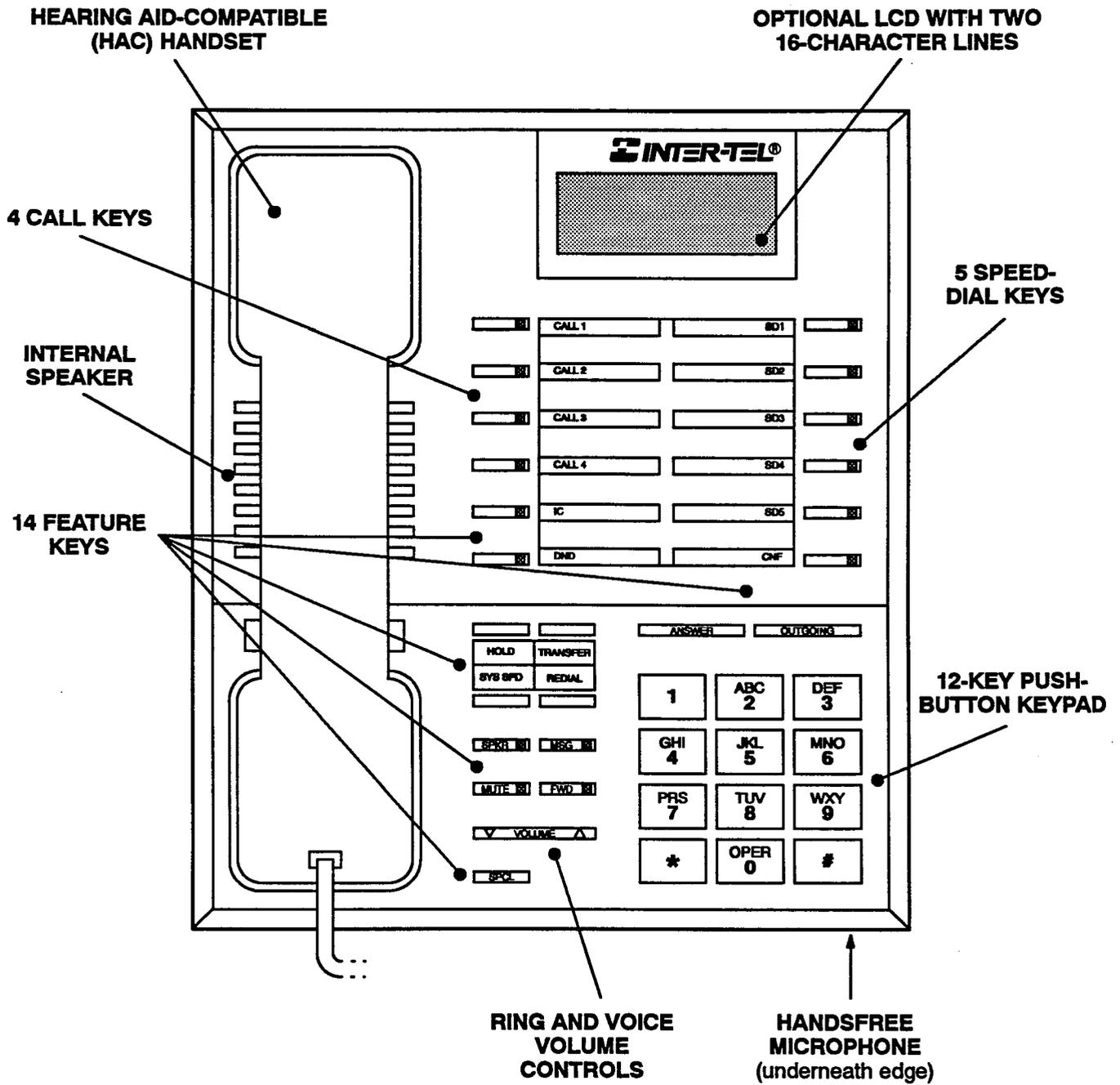


FIGURE 2-5. EXECUTIVE DIGITAL KEYSSET (also called Executive Digital Terminal)



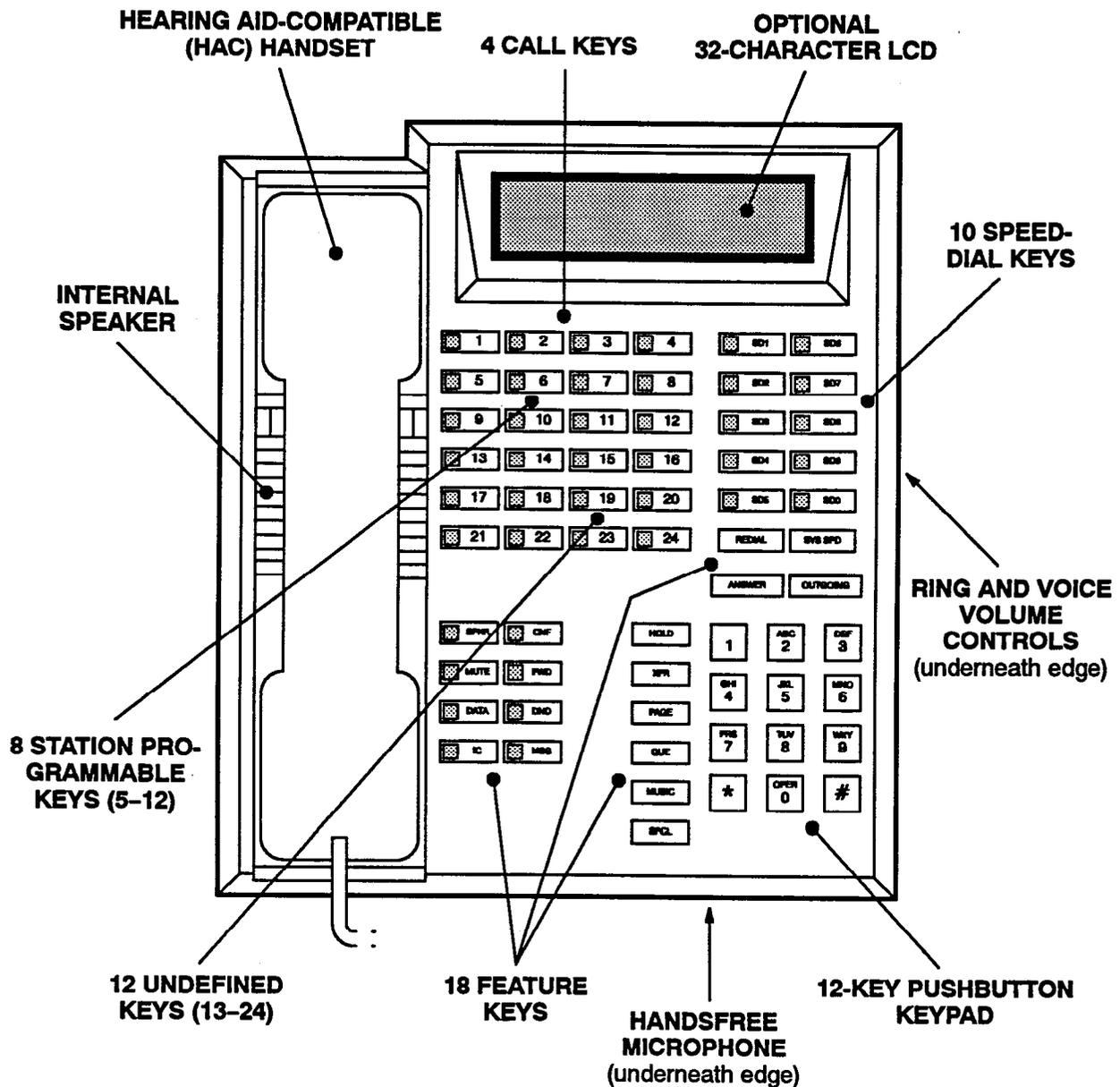
NOTE: The keys are shown as they appear in the default key map configuration.

FIGURE 2-6. STANDARD DIGITAL KEYSET (also called Standard Digital Terminal)



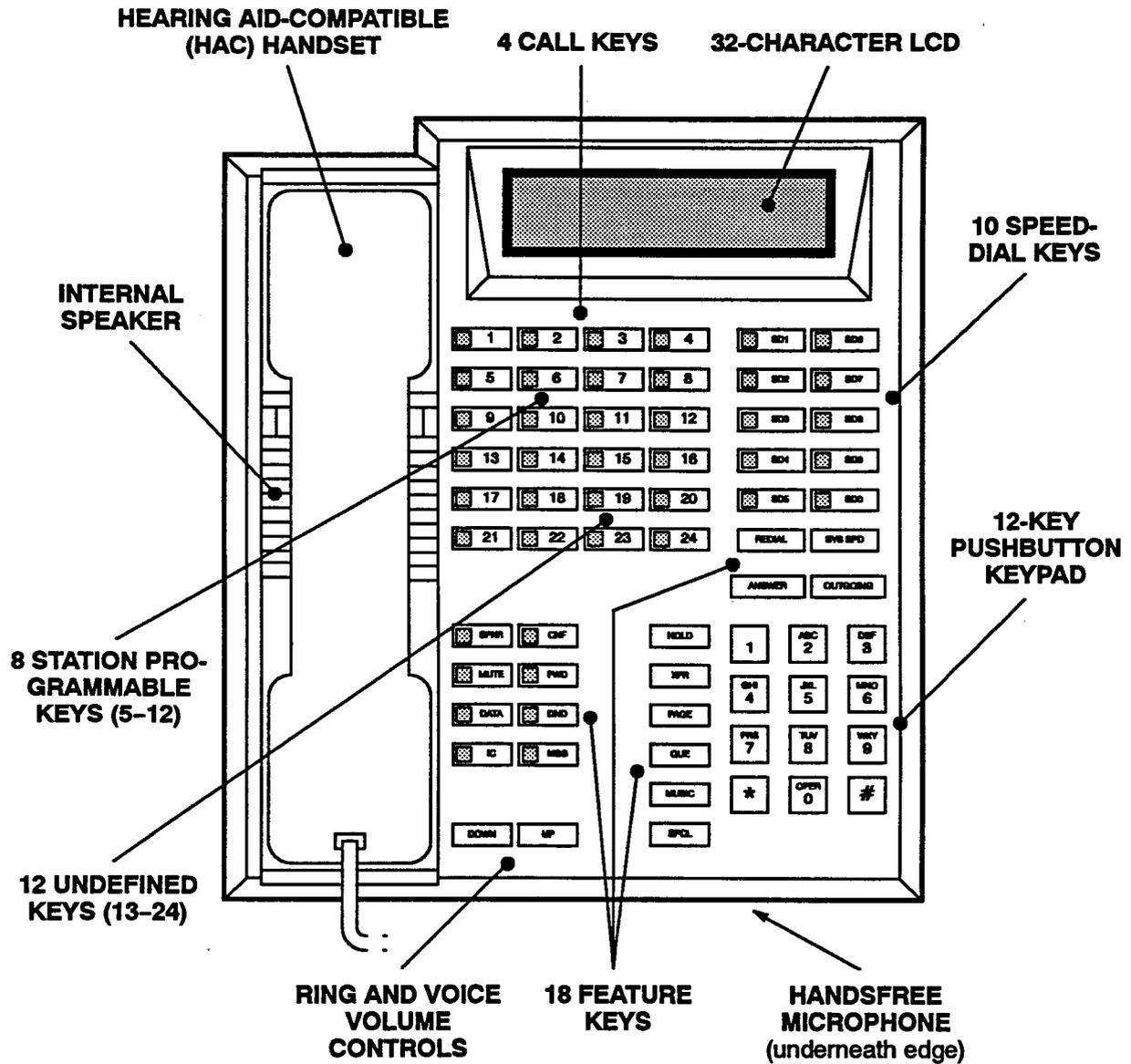
NOTE: The keys are shown as they appear in the default key map configuration.

FIGURE 2-7. IMX 24-LINE KEYS



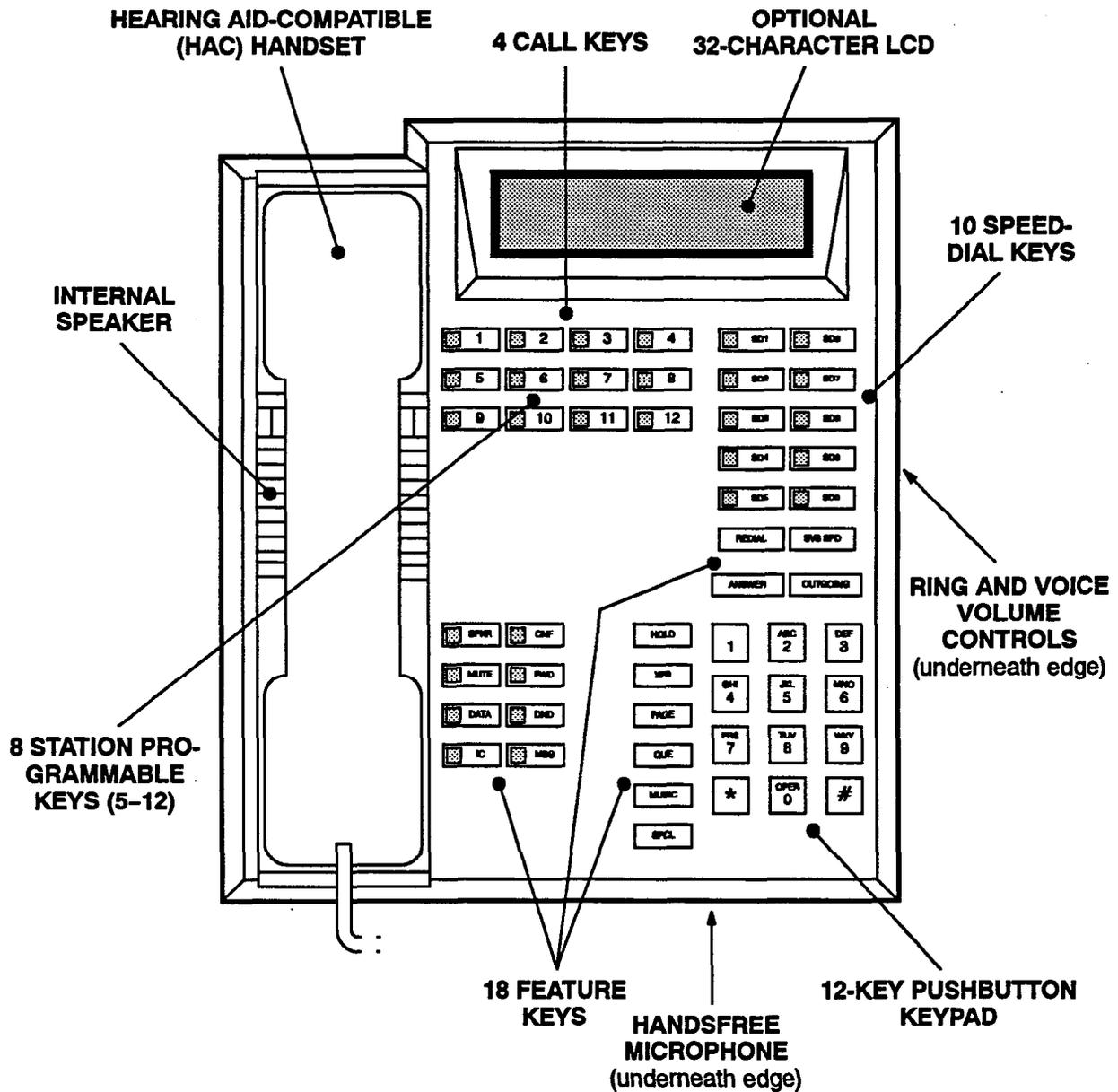
NOTE: The keys are shown as they appear in the default key map configuration.

FIGURE 2-8. IMX 24-LINE AIM KEYS



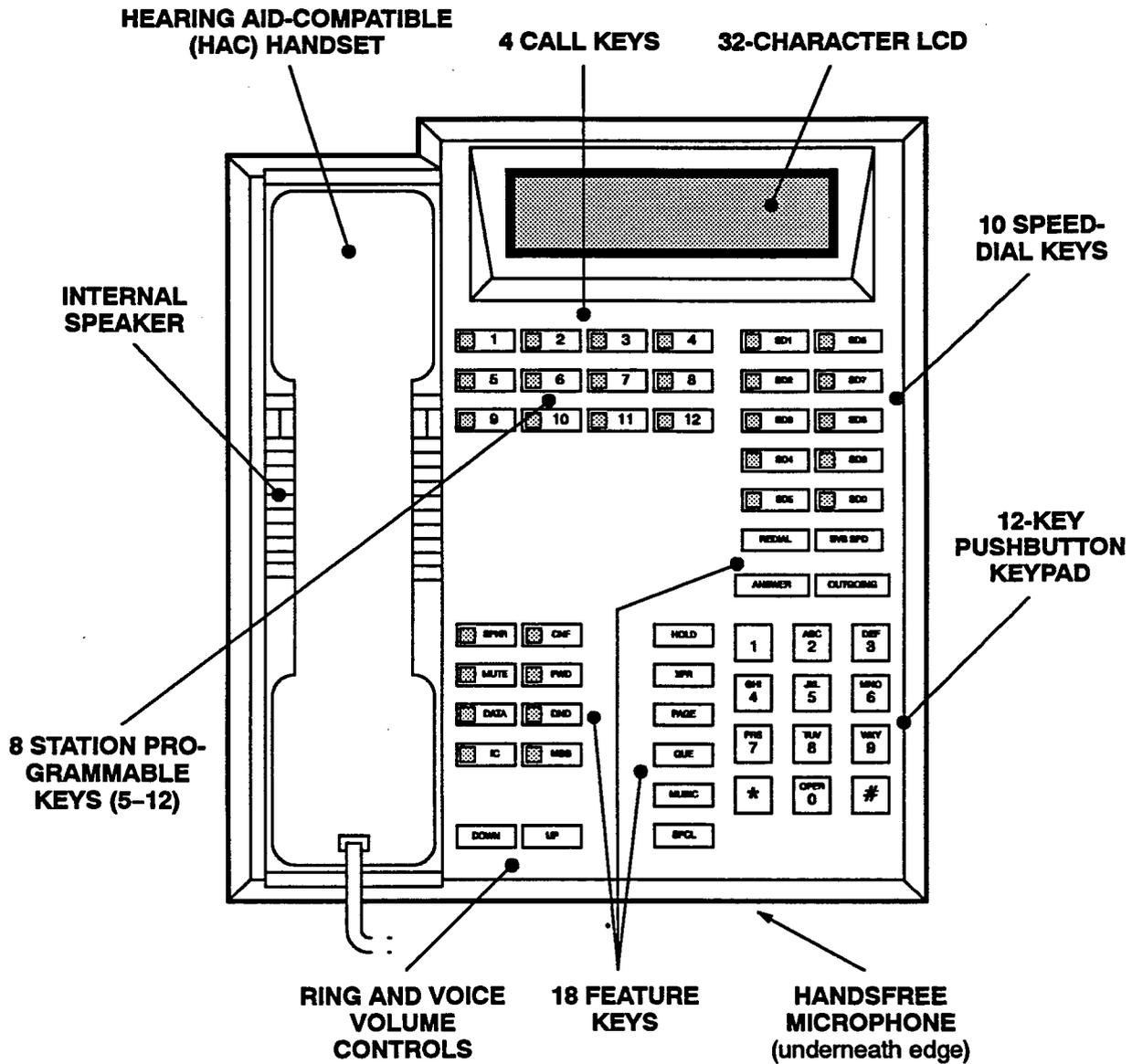
NOTE: The keys are shown as they appear in the default key map configuration.

FIGURE 2-9. IMX 12-LINE KEYS



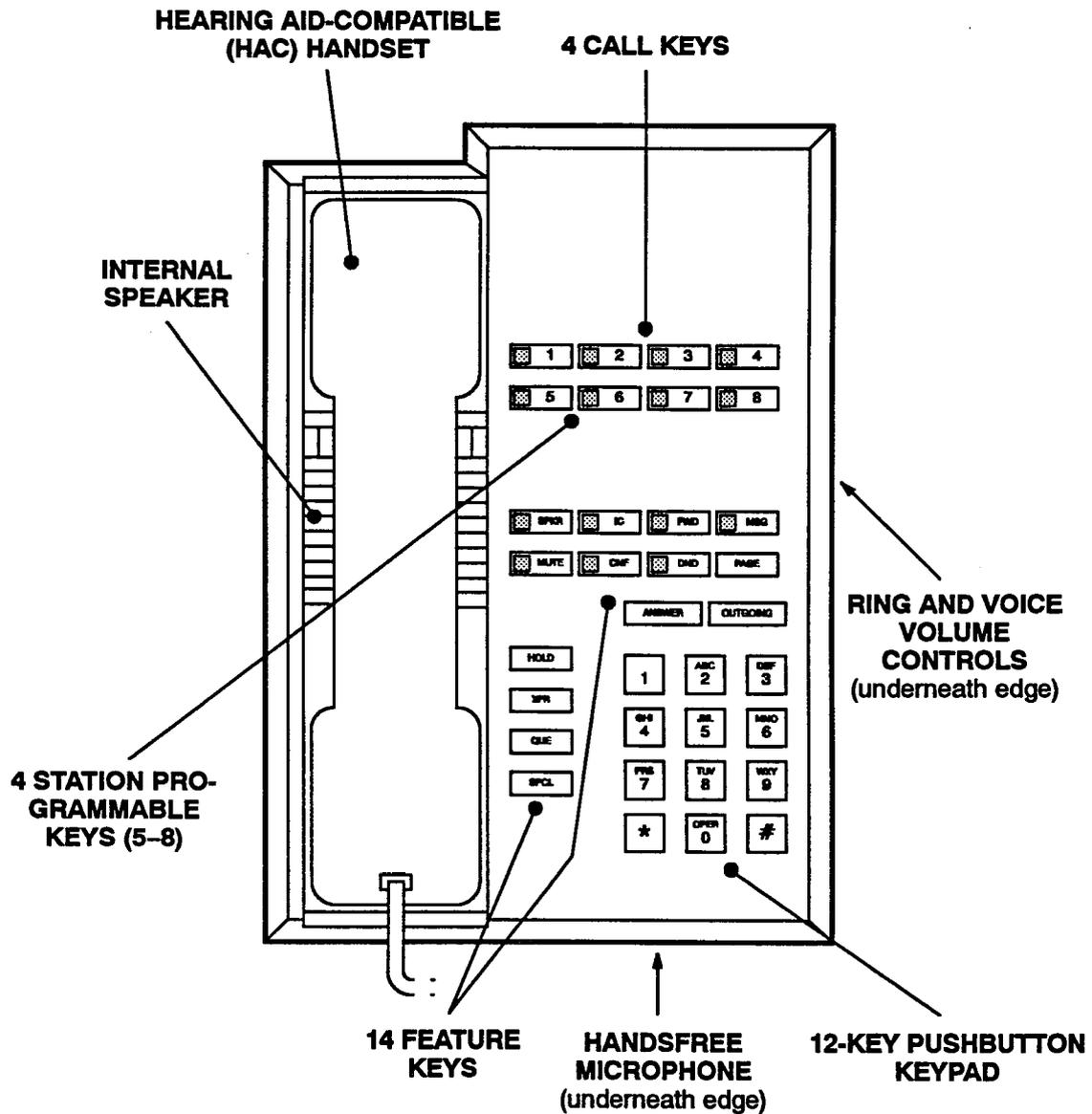
NOTE: The keys are shown as they appear in the default key map configuration.

FIGURE 2-10. IMX 12-LINE AIM KEYS



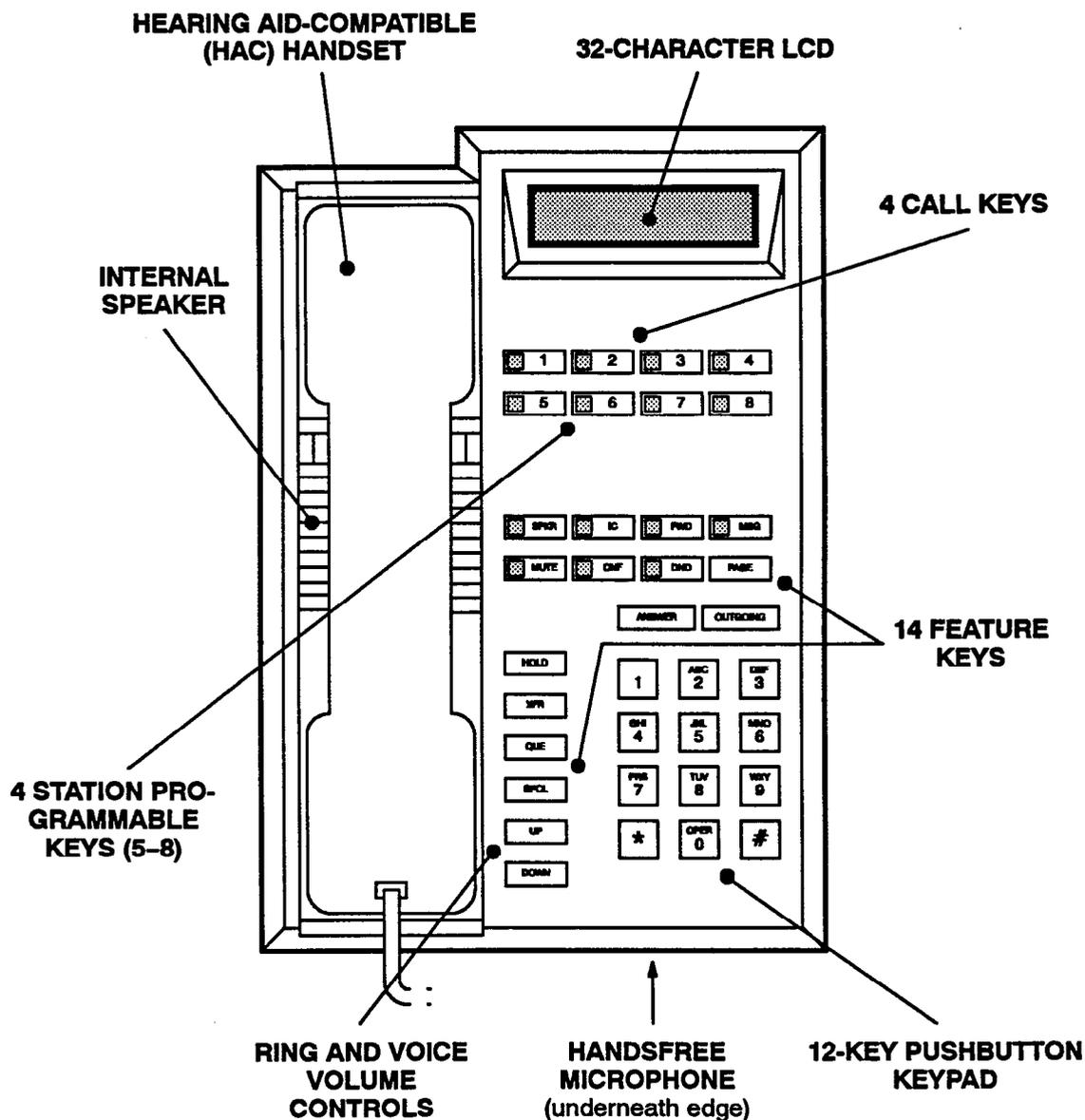
NOTE: The keys are shown as they appear in the default key map configuration.

FIGURE 2-11. IMX 8-LINE KEYS



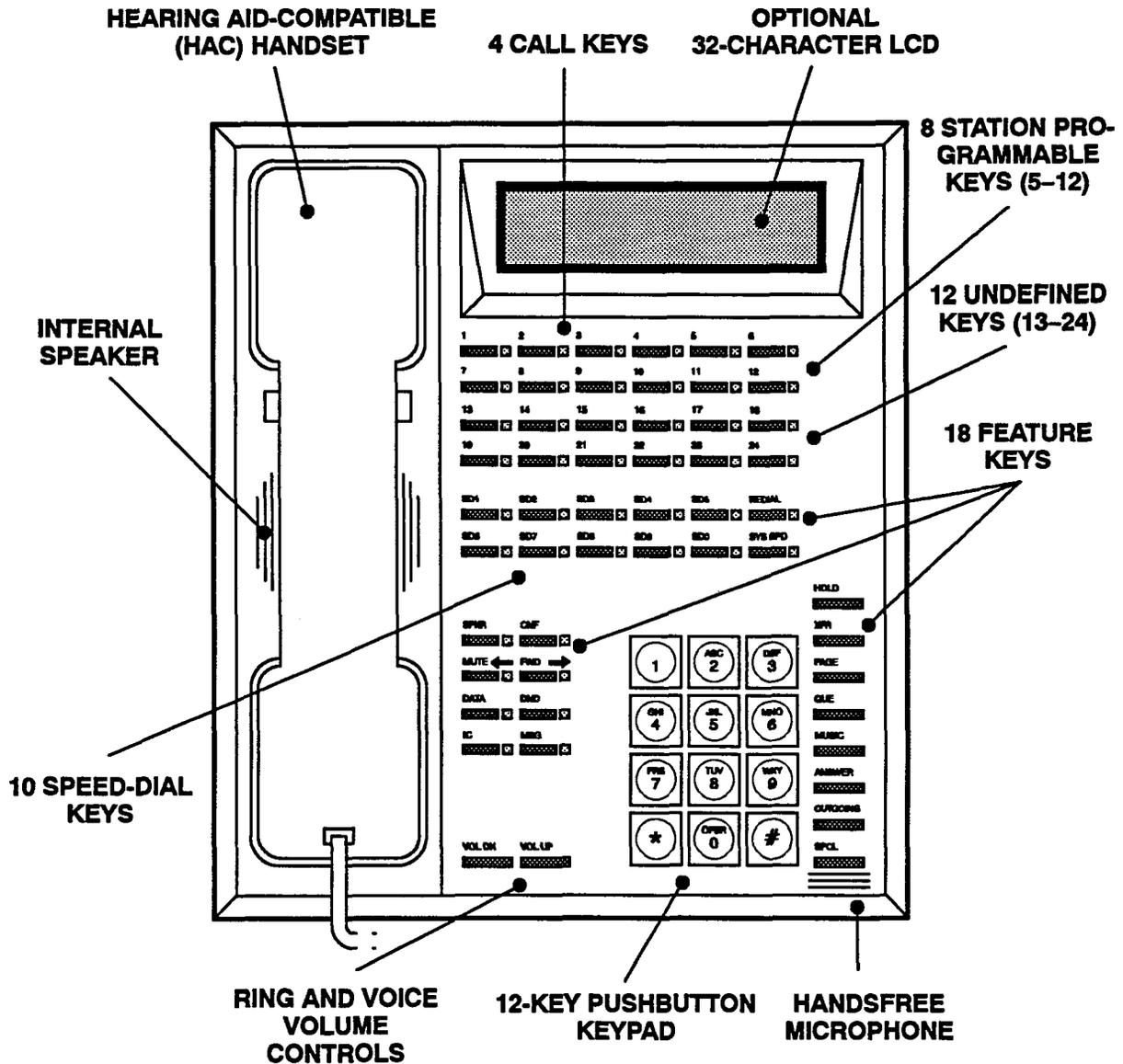
NOTE: The keys are shown as they appear in the default key map configuration.

FIGURE 2-12. IMX 8-LINE AIM KEYS



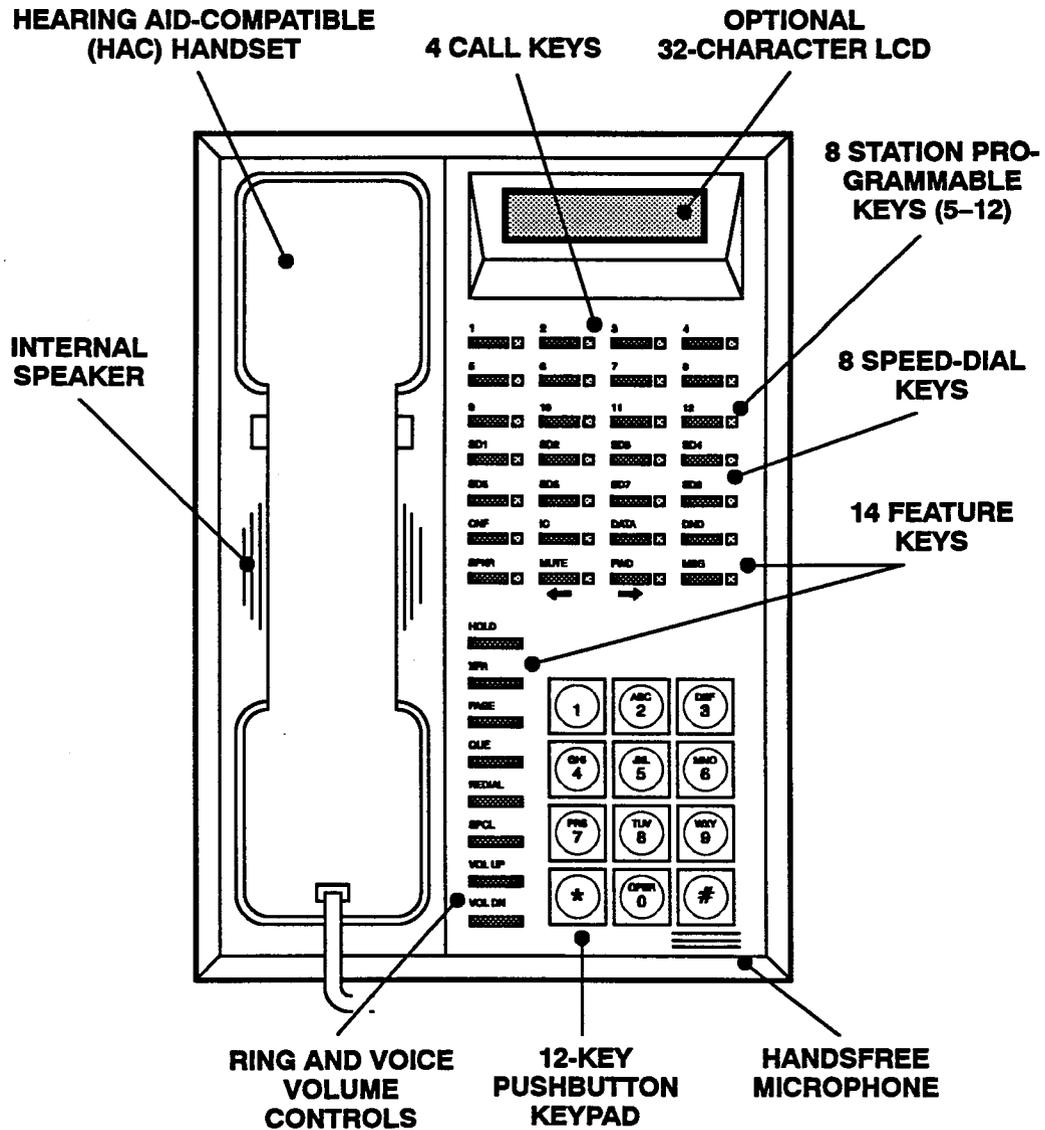
NOTE: The keys are shown as they appear in the default key map configuration.

FIGURE 2-13. INTER-TEL/DVK 24-LINE KEYS



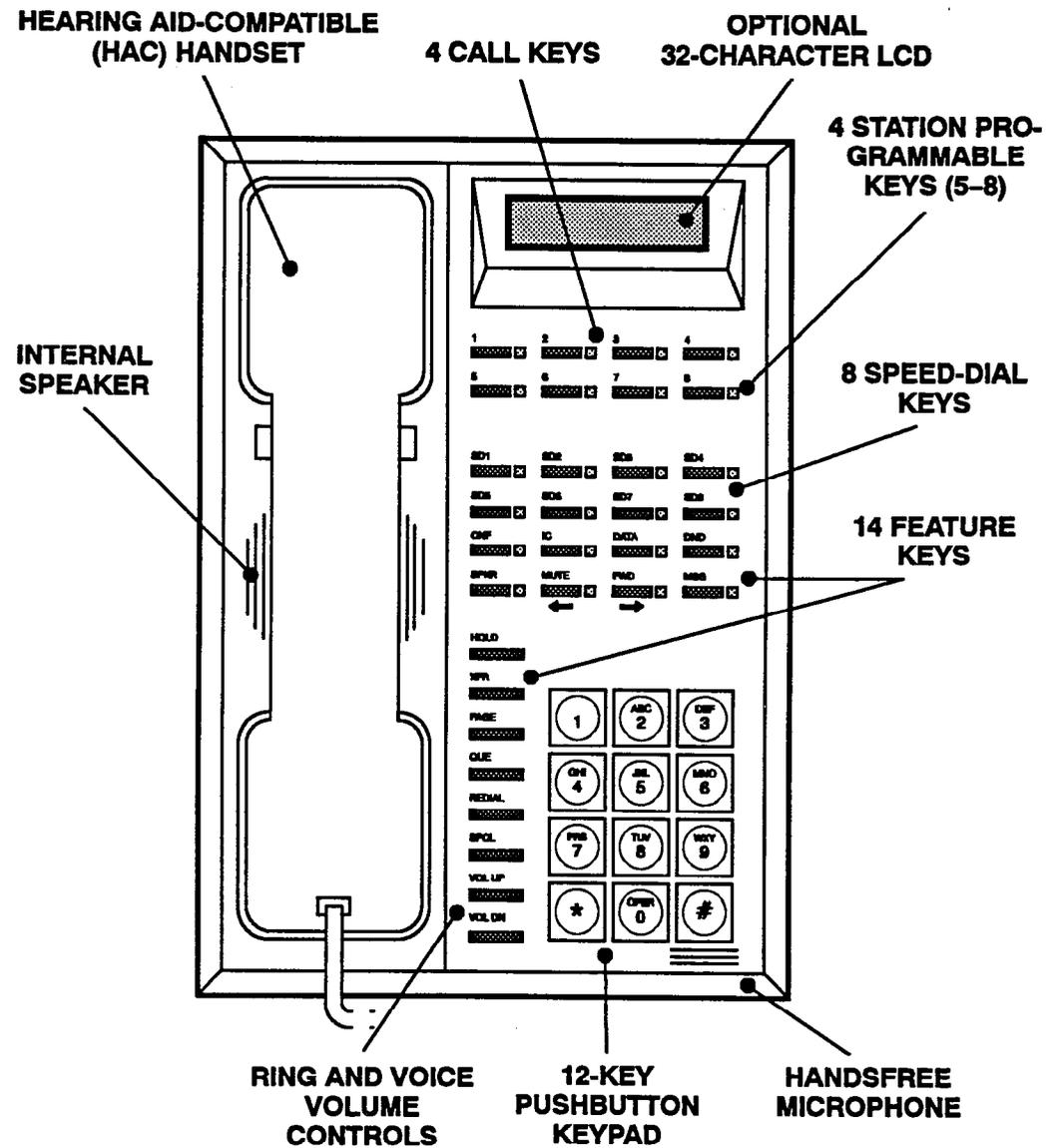
NOTE: The keys are shown as they appear in the default key map configuration.

FIGURE 2-14. INTER-TEL/DVK 12-LINE KEYS



NOTE: The keys are shown as they appear in the default key map configuration.

FIGURE 2-15. INTER-TEL/DVK 8-LINE KEYS



NOTE: The keys are shown as they appear in the default key map configuration.

**FIGURE 2-16. DIGITAL DIRECT STATION SELECTION/BUSY LAMP
FIELD (DSS/BLF) UNIT**

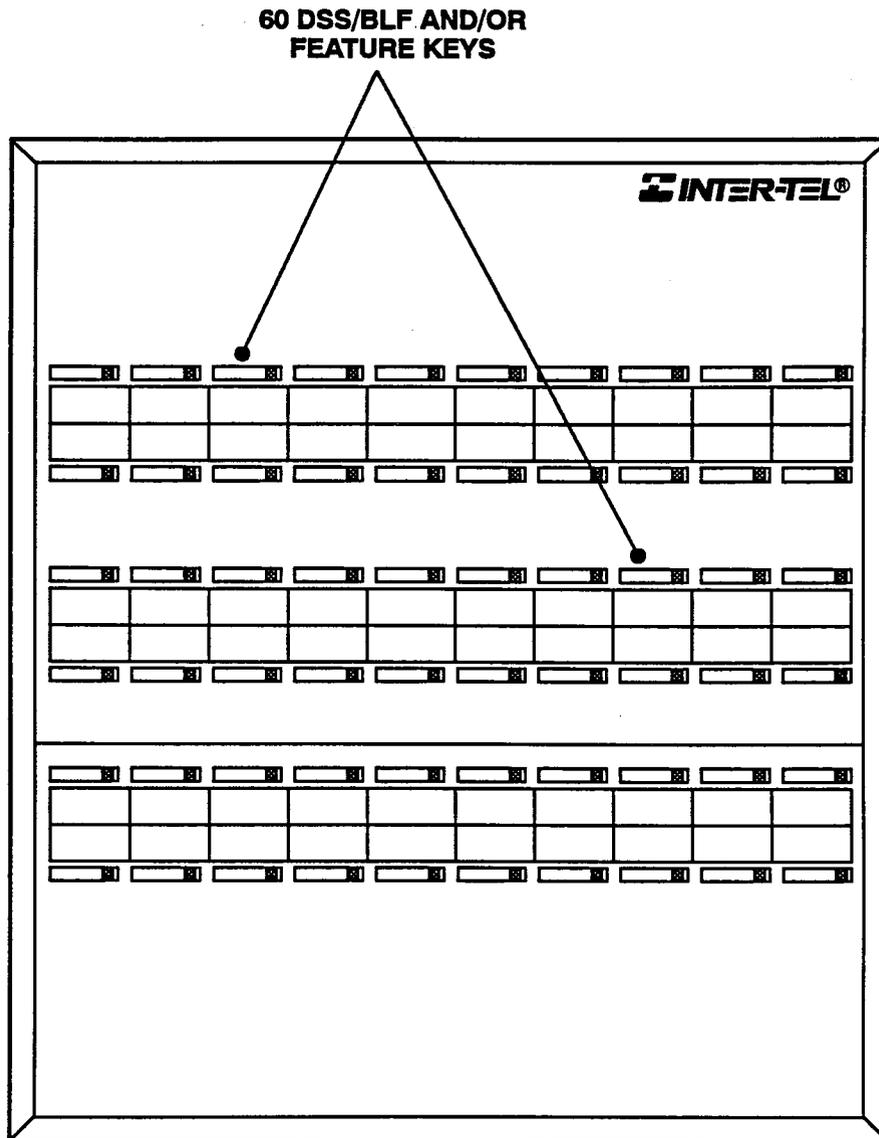


FIGURE 2-17. IMX DSS/BLF UNIT

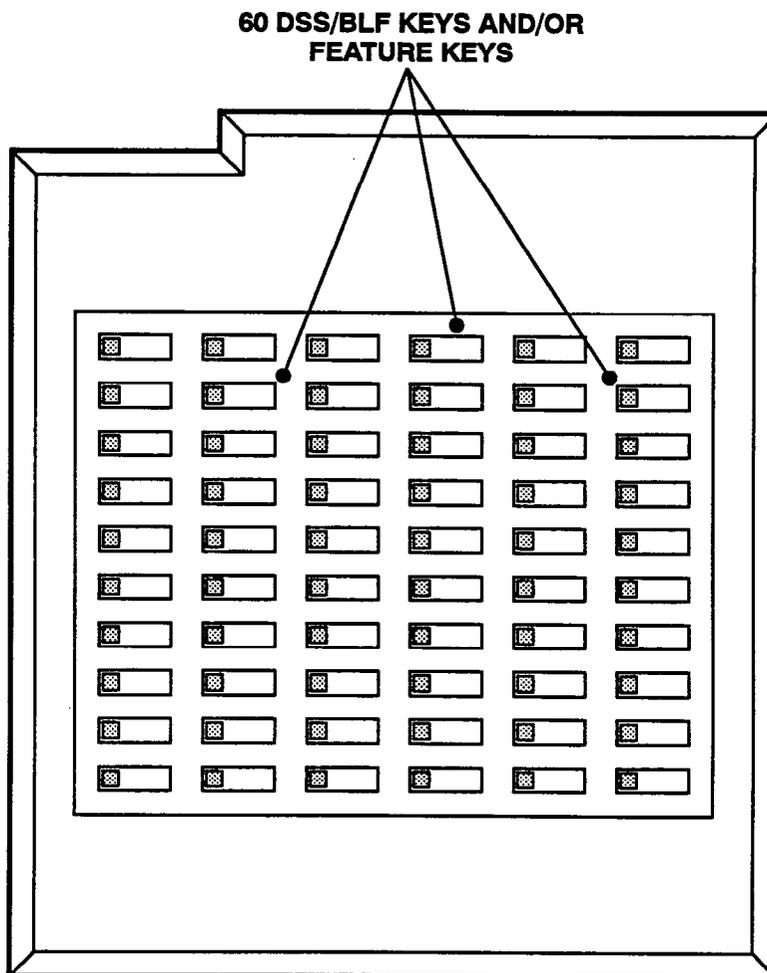


FIGURE 2-18. INTER-TEL/DVK DSS/BLF UNIT

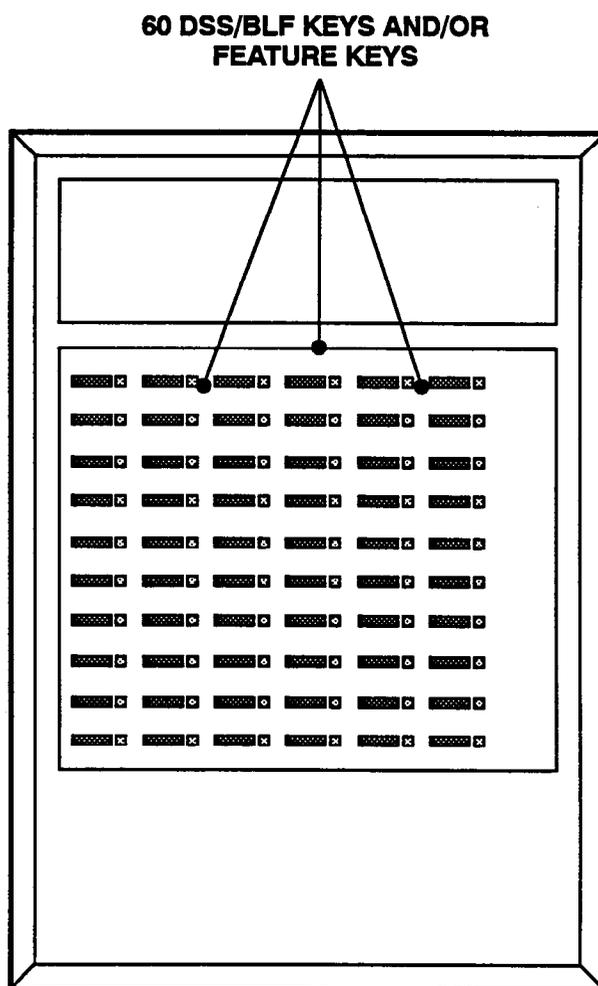
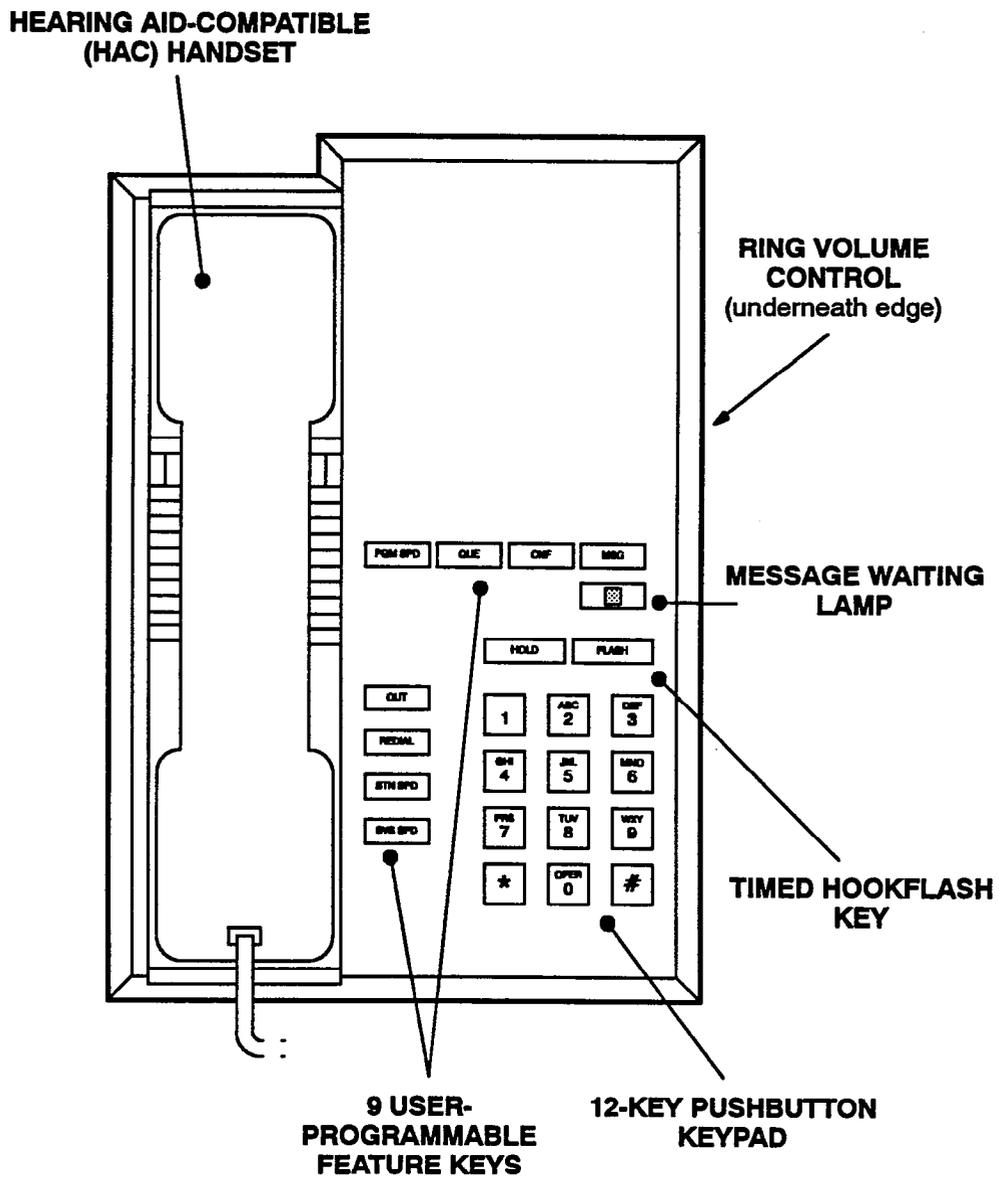
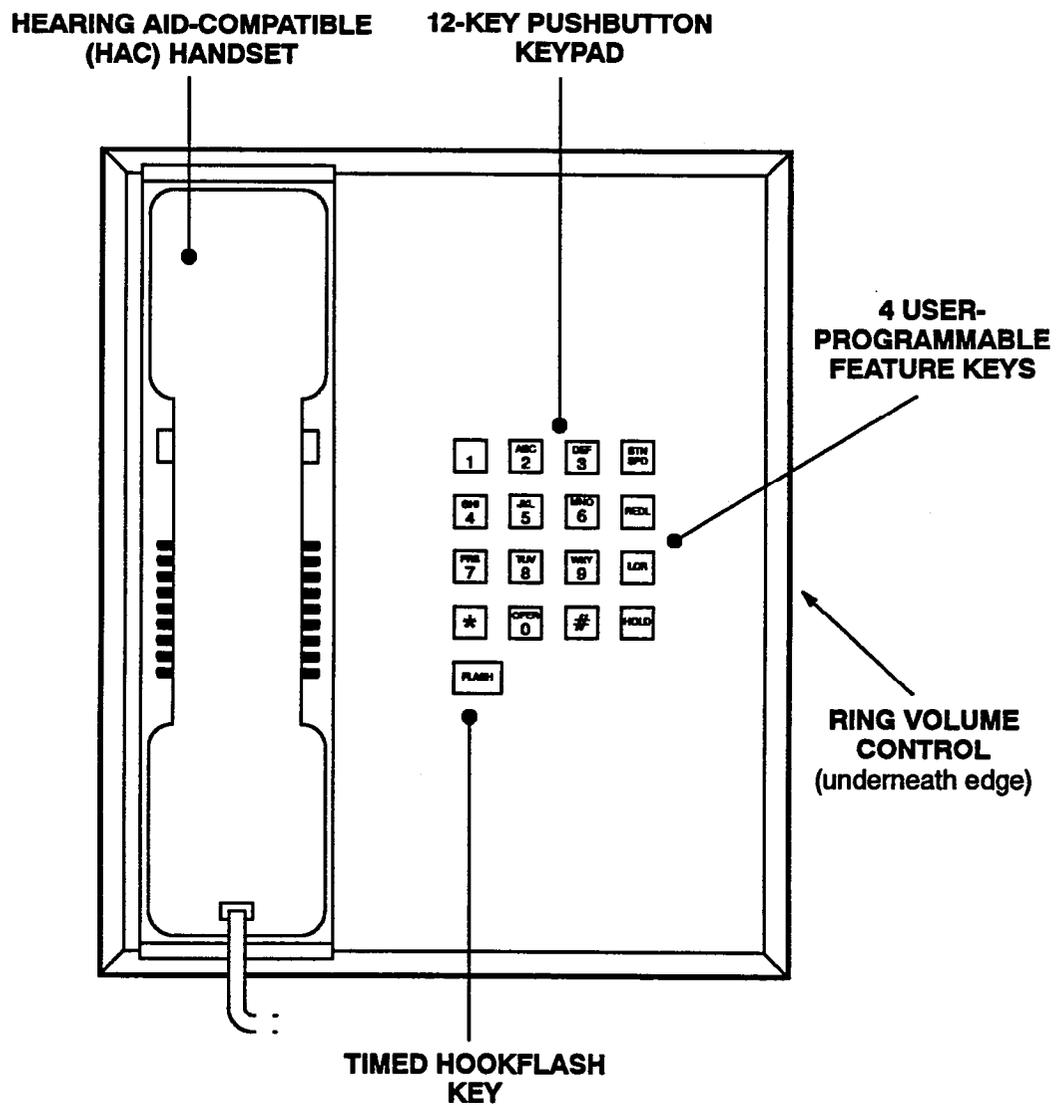


FIGURE 2-19. ENHANCED SINGLE-LINE SET (ESLS)



NOTE: The keys are shown as they appear in the default key map configuration.

FIGURE 2-20. SINGLE-LINE INSTRUMENT (SLI)



NOTE: The keys are shown as they appear in the default key map configuration.

INSTALLATION

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1. INTRODUCTION

1.1 This section describes the recommended procedures for installing the 416/832 System hardware. Refer to SPECIFICATIONS for hardware descriptions.

2. SYSTEM INSTALLATION OUTLINE

2.1 System installation is performed in the following order. Detailed instructions and figures for each step are located throughout the INSTALLATION section.

- (1) Plan the installation, including the equipment cabinet and main distribution frame (MDF) location, station locations, cable runs, and optional equipment.
- (2) Run cables to the keysets, analog Direct Station Selection/Busy Lamp Field (DSS/BLF) Units, Attendant Computer Consoles, single-line sets, and playback devices. Run wiring to any optional equipment, such as power failure transfer equipment, external paging equipment, general signaling devices, music sources, etc.
- (3) Terminate the station cables on modular jack assemblies at the station locations.
- (4) Mount the MDF backboard and assemble the terminal blocks on the backboard. If any T1 spans are to be installed, terminate them on eight-conductor modular jack assemblies at the MDF.

NOTE: The T1 span is typically connected to the standard RJ48C modular jack provided on the T1 Card. However, in certain situations (e.g., when using an external CSU equipped with a DB15 connector), it may be more convenient to use the card's optional DB15 connector instead. Refer to page 3-21 for more information.
- (5) Connect the trunks, station cables, and telecommunication card cables to the corresponding terminal blocks (or, for T1, modular jack assemblies).
- (6) Perform the station loop resistance test for each station cable.

- (7) Assemble the main equipment cabinet and, if needed, the expansion cabinet.
- (8) Install the system power supply modules in the main power supply chassis and, if needed, in the expansion power supply chassis.
- (9) Install the computer cards and computer drives in the main equipment cabinet.
- (10) Install the telecommunication cards in the main equipment cabinet and, if needed, in the expansion cabinet. Then connect the cards to the cables (or line cords) that run from the MDF blocks (or MDF modular jack assemblies).
- (11) Install the station instruments and any optional station equipment, such as headsets, handset amplifiers, and Data Port Modules.
- (12) Install any optional system equipment, such as output device(s) for station message detail recording (SMDR) and station message detail accounting (SMDA), external paging network, external music source(s), voice mail, etc.
- (13) Ensure that all equipment is working properly.
- (14) Refer to the PROGRAMMING section of this manual to configure and program the system.

NOTICE

This *IMX/GMX 416/832 Installation and Field Maintenance Manual* instructs certified field technicians on the proper installation practices for the 416/832 System. This manual does *not* provide step-by-step instructions for premises wiring practices as dictated by the National Electrical Code, which includes, but is not limited to, cable layouts, cable installation, AC power installation, proper AC grounding, eliminating or preventing external interferences (including, but not limited to, RFI, EMI, lightning, AC power disturbances, static discharge), and other telephony practices standard within the industry. Cable installers, electricians, and field technicians are expected to be properly trained and, if applicable, licensed in their trade practices. *Official 416/832 certification is required for technical assistance.*

3. PRE-INSTALLATION CHECKLIST

3.1 To make installation easier, use the checklist on the following pages when preparing to install the system. (Hardware specifications are included in the SPECIFICATIONS section.)

A. ESTABLISH SUITABLE ENVIRONMENTAL CONDITIONS FOR THE SYSTEM

- Locate the equipment cabinet within 5 feet (1.5 meters) of an isolated, dedicated, 105-125VAC, 57-63Hz, 30A, single-phase commercial power source. Also, since the power supply AC power cable is terminated on a NEMA L5-30 twist-lock plug, a compatible AC receptacle (L5-30R) is needed.

NOTE: This *must* be an isolated, dedicated AC circuit for proper operation. All three wires (power, neutral, and ground) must be run separately from the outlet to the breaker panel without being bonded to any other wire or circuit. *DO NOT* plug any other equipment into this outlet. To maintain the protection provided by the isolated, dedicated circuit, the length of the AC power cord limits the distance between the power supply and the outlet; *DO NOT* use an extension cord. Also, to protect the system from AC voltage surges, a surge/spike protector is supplied with the system (refer to page 2-11 for specifications).

- Select the equipment cabinet location to minimize cable run length. Station instruments connected to the system must not exceed the limits (using 24AWG wire) listed in the table on page 3-30. The ohm values are loop measurements; feet (meter) values are the maximum one-way measurements from the equipment cabinet.
- Do not expose the equipment cabinet location to direct sunlight, high humidity, heat, dust, or strong magnetic fields (such as those generated by heavy motors and large copy machines).
- The MDF requires at least a 4 × 8-foot (1.2 × 2.4-meter), 3/4-inch plywood backboard. (Depending on the number of stations and trunks, a larger backboard may be necessary.) This will allow room

to mount the terminal blocks, modular jack assemblies, and optional peripheral equipment.

- For cooling purposes, provide ample air space around the equipment cabinet assembly (minimum one foot on all sides). Other than the programming monitor and keyboard, do not place or store items on top of the equipment cabinet.
- The SMDR/SMDA output device(s) must not have cables longer than 50 feet (15 meters).
- Locate the equipment in a climate-controlled room with the following environmental conditions:

REQUIREMENTS	IN OPERATION	IN STORAGE
Temperature — Equipment Cabinet	32° to 104° F 0° to 40° C	-40° to 185° F -40° to 85° C
Temperature — Station Instruments	32° to 113° F 0° to 45° C	-40° to 185° F -40° to 85° C
Relative Humidity (Non-Condensing)	5% to 95%	5% to 95%
Altitude	Up to 10,000 ft. (3,048 m.)	Up to 40,000 ft. (12,192 m.)

NOTE: It is recommended that the maximum operating temperature (as listed above) *never* be exceeded. Therefore, when installing the equipment cabinet, expansion cabinet, and station instruments, allow a sufficient margin for error in case of air conditioning failure, routine maintenance, plant shut-down, etc. As a general rule, if conditions are suitable for office personnel, they are also suitable for all equipment and station instrument operation. A properly controlled environment will help to extend the operating life of the equipment.

From UL 1459, a product safety specification governing telephone equipment:

- Never install telephone wiring during a lightning storm.
- Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations.
- Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.
- Use caution when installing or modifying telephone lines.

B. ASSEMBLE THE NECESSARY TOOLS AND SUPPLIES

- Industry-standard, three-pair (six-conductor) twisted cable to run from the MDF to all station instruments, including: keysets, analog DSS/BLF Units, Attendant Computer Consoles, ESLs, SLIs, single-line DTMF sets, and playback devices. (For exceptions, see the NOTE on page 3-7.)
- Six-conductor modular jack assemblies for all station instruments. (For exceptions, see the NOTE on page 3-7.)
- A high-impedance digital multimeter to check the power supply and ensure correct wiring of the modular jack assemblies. Multimeter accuracy must be $\pm 0.5\%$ or better.
- Standard terminal blocks (66M1-50 type) and bridging clips for constructing the MDF.
- Industry-standard, 25-pair cable for connecting the MDF terminal blocks to the telecommunication cards in the equipment cabinet and, if installed, the expansion cabinet.
- Industry-standard, cross-connect wire may be needed for certain applications.
- 50-pin female amphenol-type connectors (with recommended non-conducting, plastic covers) and a connecting machine.
- Ferrite beads for all station, trunk, and RS-232-C cables. (Refer to SPECIFICATIONS, page 2-4.)
- Gas discharge tubes with silicon avalanche suppressors for lightning protection on the CO, DID, OPX, and E&M trunks.
- Grounding terminal and 10AWG wire for grounding the equipment cabinet.
- Standard telephone hand tools and the mounting hardware for the MDF backboard, trunk and station blocks, modular jack assemblies, etc.
- Programming monitor and keyboard for customizing the database (refer to page 2-36 for specifications).

3.2 If any T1 spans are to be installed: Depending on the type of T1 termination used by the telephone company (telco) and how close it is to the MDF, the following tools and supplies are also needed.

NOTE: The T1 span is typically connected to the standard RJ48C modular jack provided on the T1 Card. However, in certain situations (e.g., when using an external CSU equipped with a DB15 connector), it may be

more convenient to use the card's optional DB15 connector instead. Refer to page 3-21 for more information.

For T1 spans terminated on RJ48C jacks near the MDF:

- Four-pair, non-reversing, mod-to-mod line cords (one for each T1 span installed).

For T1 spans terminated on RJ48C jacks away from the MDF (see Figure 3-9 on page 3-19):

- Eight-conductor modular jack assemblies (two for each T1 span installed).
- Four-pair, non-reversing, mod-to-mod line cords (two for each T1 span installed).
- T1 cable — enough to extend from each telco RJ48C jack to the MDF (see page 2-25 for cable specifications).

For T1 spans terminated on an RJ-type block (see Figure 3-11 on page 3-20):

- Eight-conductor modular jack assemblies (one for each T1 span installed).
- Four-pair, non-reversing, mod-to-mod line cords (one for each T1 span installed).
- T1 cable — enough to extend from each telco termination to the MDF (see page 2-25 for cable specifications).

C. PLAN STATION LOCATIONS AND TYPES OF STATION INSTRUMENTS

NOTE: For information on the GX and GMX station instruments, refer to appendixes A and B in the back of this manual.

- Prepare a cable identification plan using station *circuit* numbers; do not use extension numbers (see page 3-7 for details).
- **Keysets:** The IMX 416/832 System has the capacity for up to 400 keysets (800 on expanded systems) if using the new digital keysets. The GMX-416/832 System has the capacity for up to 208 keysets (416 on expanded systems). Refer to page 2-26 in SPECIFICATIONS for a listing of the available keyset models and for more information on maximum station capacities. Excluding non-display only models, all keysets can be converted to display keysets by installing optional Liquid Crystal Display (LCD) Units (see REPLACEMENT PARTS for part number).

NOTE: The main equipment cabinet has 26 slots for station and trunk cards. The expansion cabinet, if in-

stalled, also has 26 slots. *The actual number of stations and trunks available depends on the number and type of cards, station instruments, and power supply modules installed.*

- **DSS/BLF Units:** Up to 50 keyset circuits can be equipped with DSS/BLF Units. Digital units are powered by their own AC transformers and do not require a DKSC circuit that is separate from the keyset's circuit. Each analog unit requires one KSC or KSC-D circuit and its own cabling. As many as four analog units can be installed on a single KSC.
- **Attendant Computer Consoles:** If desired, up to 192 Attendant Computer Consoles (384 on expanded systems) can be installed on the system. The consoles are connected to KSC or KSC-D circuits.

NOTE: For additional information on the Attendant Computer Console, along with detailed installation and programming instructions, refer to the manual included with the console.

- **Single-Line Sets:** Up to 400 single-line sets (816 on expanded systems) can be installed on the system. They can be Enhanced Single-Line Sets (ESLs), Single-Line Instruments (SLIs), or industry-standard, single-line DTMF sets.
- **Playback Devices:** Playback devices can be used in place of single-line stations. They are especially useful as hunt group overflow/announcement stations and automated attendant stations. (Refer to page 2-35 for specifications.)

D. ASSEMBLE THE OPTIONAL EQUIPMENT

- Headsets for keyset stations and handset amplifiers for keyset or single-line set stations.
- Digital keyset Personal Computer Data Port Modules (PCDPMs) for using Off-Hook Voice Announce (OHVA) features, and for installing a digital DSS/BLF Unit and/or an optional Modem Data Port Module.
- Digital keyset Modem Data Port Modules (MDPMs) for connecting modem-equipped data devices or single-line sets.

- Analog keyset Data Port Modules for hooking up either modem-equipped data terminals or loud ringing adapters and external signaling devices.
- SMDR/SMDA output device(s) must not have cables longer than 50 feet (15 meters). (See page 2-36 for specifications.)
- System battery back-up — uninterruptable power supply or standby power supply. (Refer to page 2-38 for specifications.)
- OPX repeater(s) for amplifying voice volume levels, if necessary. (See page 2-35 for specifications.)
- Up to two external music sources.
- External paging speakers and amplifier(s). (Refer to the NOTE and CAUTION on page 2-7.)
- General signaling devices.
- Power failure transfer equipment (customer-provided PFT relay card, card mounting case, and external power source).
- Electronic equipment (alarms, lights, etc.) to connect to the night transfer relay and/or the T1 alarm relays.
- For stand-alone/remote system programming, an IBM AT-compatible personal computer with a *minimum*: 6MB available memory on the hard disk drive, 5¼-inch double sided/high density (1.2MB) floppy disk drive, 640k RAM (with minimum 512k available), MS-DOS 3.3 (or 5.0, 6.0, or 6.2), 300 (or 1200 or 2400) baud modem, and monochrome or color monitor (CGA is not recommended). A programming mouse is optional.
- Doorbox equipment. (Refer to page 2-38.)
- Voice mail equipment. (Refer to page 2-38.)
- Facsimile (FAX) machine. (Refer to page 2-38.)
- Talkback speakers and external control unit. (Refer to page 2-38.)

4. STATION CABLING

4.1 Floor plans should be developed to aid in proper station cabling in a star (home run) configuration from the equipment cabinet. The cables are run from the station locations to the station blocks at the MDF. Refer to page 2-4 for cabling requirements.

4.2 Both ends of each cable should be labeled with the station's circuit number (hardware address). The circuit number (X.Y) designates the card's position in the equipment cabinet (X = 1-26) and the circuit position on the card (Y = 1-16 for DKSCs; Y = 1-8 for KSCs, KSC-Ds, and IDCs; Y = 1-16 for SLCs). For example, circuit number 4.6 identifies the sixth circuit on the card installed in slot number four.

NOTE: When 8-line IMX AIM keysets are installed two to a circuit, the circuit number is separated into two parts (A and B) in database programming (e.g., circuit 4.6A and 4.6B).

4.3 When the system is first powered up, one of three default configurations will be used to assign extension numbers to the station circuits. If configuration number one is used, telecommunication card slots 1-20 are considered KSCs and slots 21-26 are considered LGCs. If configuration number two is used, slots 1-10 are considered KSCs, slots 11-19 are SLCs, and slots 20-26 are LGCs. If configuration number three is used (IMX systems only), slot 1 is a KSC, slots 2-10 are DKSCs, slots 11-19 are SLCs, and slots 20-26 are LGCs. Changes to any of the configurations can be made through database programming. Refer to PROGRAMMING, page 5-171, for more information.

NOTE: Configuration C, which contains Digital Keypad Cards, is available only on IMX systems.

4.4 The system assigns extension number 1000 to station circuit 1.1, extension number 1001 to station circuit 1.2, and so on to match the initial configuration. Circuit 1.1 is equipped as the primary attendant's keyset when the system is in the default configuration. Through database programming, the circuits can be assigned different extension numbers and/or be changed to three-digit extension numbers. Refer to PROGRAMMING, page 5-58, for more information.

NOTE: "B" circuit 8-line IMX AIM keysets do not have extension numbers until they are assigned in database programming.

4.5 Each analog DSS/BLF Unit requires a KSC or KSC-D circuit and cabling that is separate from the keyset's circuit and cabling. If 50 keyset circuits are used for analog DSS/BLF Units, 50 fewer analog keysets and/or

Attendant Computer Consoles can be installed. Up to four units can be installed on a single Keypad Card.

A. RUNNING CABLE

NOTE: It is recommended that three-pair twisted cable and six-conductor modular jacks be used for all station connections. This allows the various types of station instruments to be easily interchanged, if necessary. However, digital keysets, ESLs, SLIs, single-line DTMF sets, and playback devices can be installed using one-pair twisted cable and four-conductor modular jacks. (If three-pair cable is used for wiring digital keysets, single-line sets, and playback devices as recommended, extra terminal blocks and the use of cross-connect wiring techniques are required.)

4.6 From the MDF location, run industry standard, three-pair (six-conductor) twisted (24AWG, level-1 or better) cable to keysets, analog DSS/BLF Units, Attendant Computer Consoles, single-line sets, and playback devices. Follow these guidelines:

- Install proper type cable for the application according to the National Electrical Code and local building codes.
- Avoid cable runs parallel to fluorescent light fixtures or AC lines not in conduit. If these obstacles are unavoidable, run the cables across them at right angles.
- Do not run station cables inside electrical conduit already occupied by AC power cable. (To do so is a violation of the National Electrical Code.)
- Do not run cables near equipment with electric motors or through strong magnetic fields, such as those generated by large copy machines, arc welding equipment, heavy motors, etc.
- Do not place station cables where they can be stepped on or where they can be rolled over by office furniture.
- If using multi-pair (e.g., 25-pair) cable runs to multiple station locations do not include AC-ringing single-line sets, AC-ringing auxiliary equipment, or trunks in a cable being used for analog keysets, Attendant Computer Consoles, or analog DSS/BLF Units. Stations using analog keyset circuits should be routed in separate multi-pair cable runs.
- Do not exceed the loop limit measurements (using 24AWG wire) for the station cable lengths as outlined in the table on page 3-30. The resistance values (in ohms) are loop measurements; the distance values (in feet/meters) are the maximum one-way measurements from the equipment cabinet.

4.7 Since the IMX 416/832 System utilizes digital voice and data transmission between the digital keysets and the equipment cabinet, there are some additional digital keyset-only cabling requirements:

- Do not use shielded cable, and do not use cable smaller than 24AWG.
- Do not parallel cables (i.e., do not "double up on the copper").
- Do not "bridge" or "Y" off the cable to another location.
- Unlike analog keysets, the digital keysets do not need to be routed in separate multi-pair cable runs. For example, if using 25-pair cable runs to multiple station locations, it is acceptable to include single-line sets, auxiliary equipment, and trunks in a cable being used for digital keysets.

B. TERMINATING THE CABLES AT STATION LOCATIONS

Digital Keysets

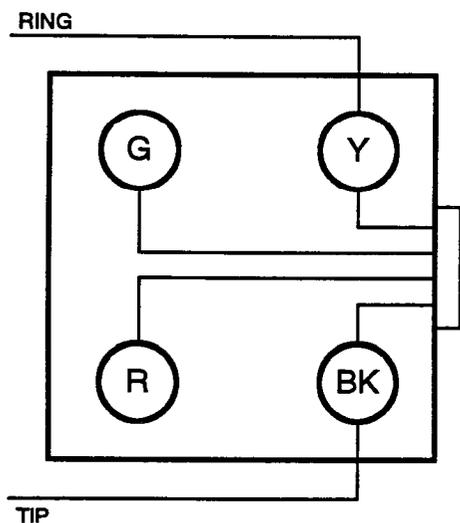
4.8 Terminate the digital keyset station cables on four- or six-conductor modular jack assemblies at the station locations.

4.9 Do not mount the assemblies on the wall at this time; they will be wall mounted later when the station instruments are installed. Refer to Figure 3-1 below for a wiring diagram.

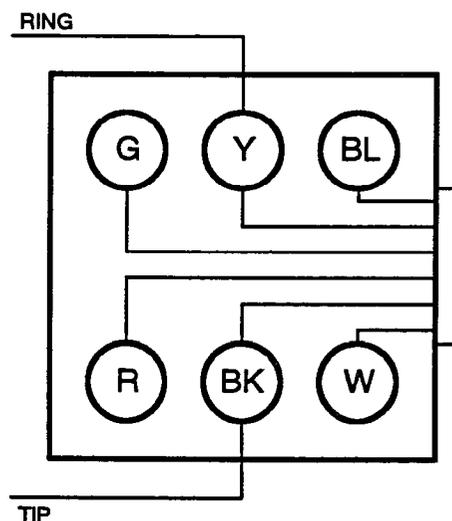
CAUTION

If the tip and ring is reversed when installing a digital keyset, the keyset will not function.

FIGURE 3-1. DIGITAL KEYSET MODULAR JACK ASSEMBLY WIRING



FOR DIGITAL KEYSETS
USING FOUR-CONDUCTOR JACKS



FOR DIGITAL KEYSETS
USING SIX-CONDUCTOR JACKS

Analog Station Instruments

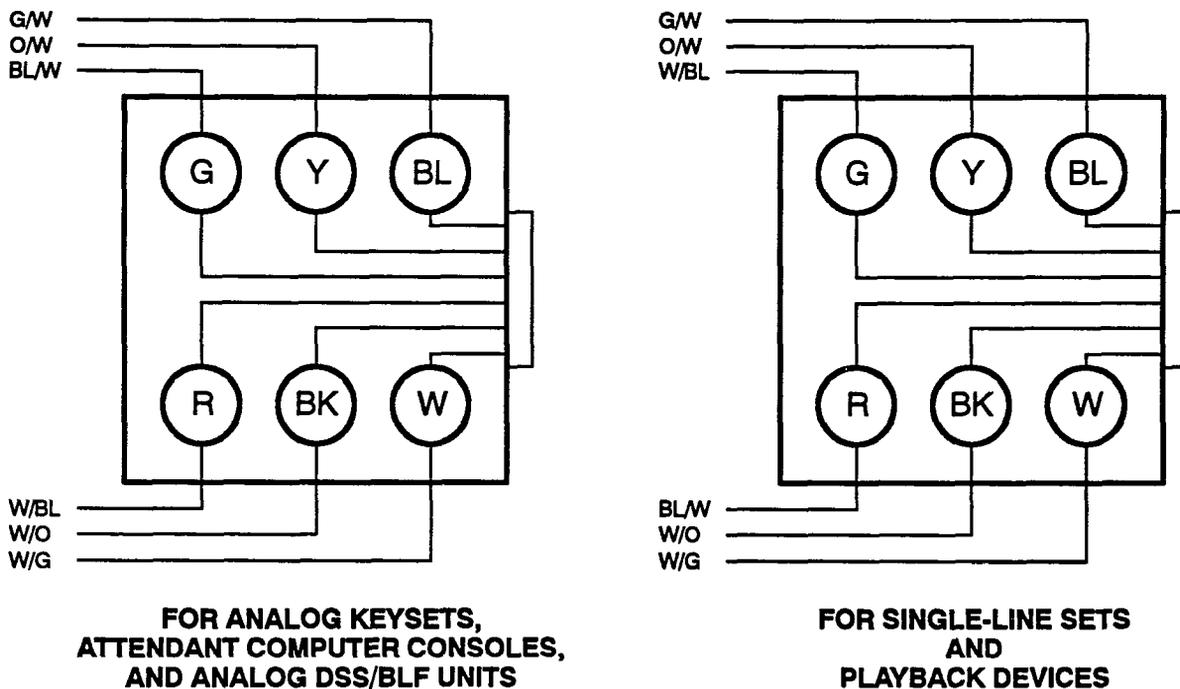
4.10 Terminate the analog keyset, analog DSS/BLF Unit, Attendant Computer Console, single-line set, and playback device station cables on six-conductor modular jack assemblies at the station locations. (For exceptions to this, refer to the NOTE following section A on the previous page.)

4.11 Do not mount the assemblies on the wall at this time; they will be wall mounted later when the station instruments are installed. Refer to Figure 3-2 below for a wiring diagram.

CAUTION

If the power pair (W/BL, BL/W) is reversed, installing a keyset, Attendant Computer Console, or DSS/BLF Unit will open the fuse or associated thermistor on the Keyset Card. If the card has a fuse, this affects operation of all station instruments connected to that card. If tip and ring (W/BL, BL/W) is reversed for DC-ringing single-line sets, the instrument may ring continuously.

FIGURE 3-2. ANALOG STATION MODULAR JACK ASSEMBLY WIRING



NOTE: The W/BL and BL/W conductors for the two types of stations are reversed. If the type of station instrument is changed, the modular jack must be rewired.

5. ASSEMBLING THE MAIN DISTRIBUTION FRAME (MDF) BACKBOARD

5.1 The main distribution frame (MDF) is the point at which the station instruments, trunks, and auxiliary system equipment are connected to terminal blocks (or, in the case of T1 spans and optional T1 equipment, modular jack assemblies are used instead). These terminal blocks (or modular jacks) are then connected to the 416/832 System. It is extremely important that the connections be made carefully and accurately.

NOTE: To simplify the MDF installation instructions, this manual outlines basic one block to one card installation using bridging clips. However, it is quite acceptable, and in some situations more functional, to use additional blocks and then cross connect between them.

5.2 Assemble the MDF as follows:

- (1) Mount at least a 4 × 8-foot (1.2 × 2.4-meter), ¾-inch plywood backboard at the MDF location. (Depending on the number of stations and trunks to be installed, a larger backboard may be necessary.)
- (2) Attach the 66M1-50-type terminal blocks to the plywood backboard. Refer to Figure 3-3 on the next page for a sample MDF block layout and cable assignments. Blocks include:
 - Up to 51 blocks for connecting CO trunks and the 25-pair cables for the Loop/Ground Start Cards (LGCs) and/or the Loop Start Cards (LSCs).
 - Up to 51 blocks for connecting DID trunks and the 25-pair cables for the Inward Dialing Cards (IDCs).

- Up to 51 blocks for connecting E&M trunks and the 25-pair cables for the E&M Cards (EMCs).

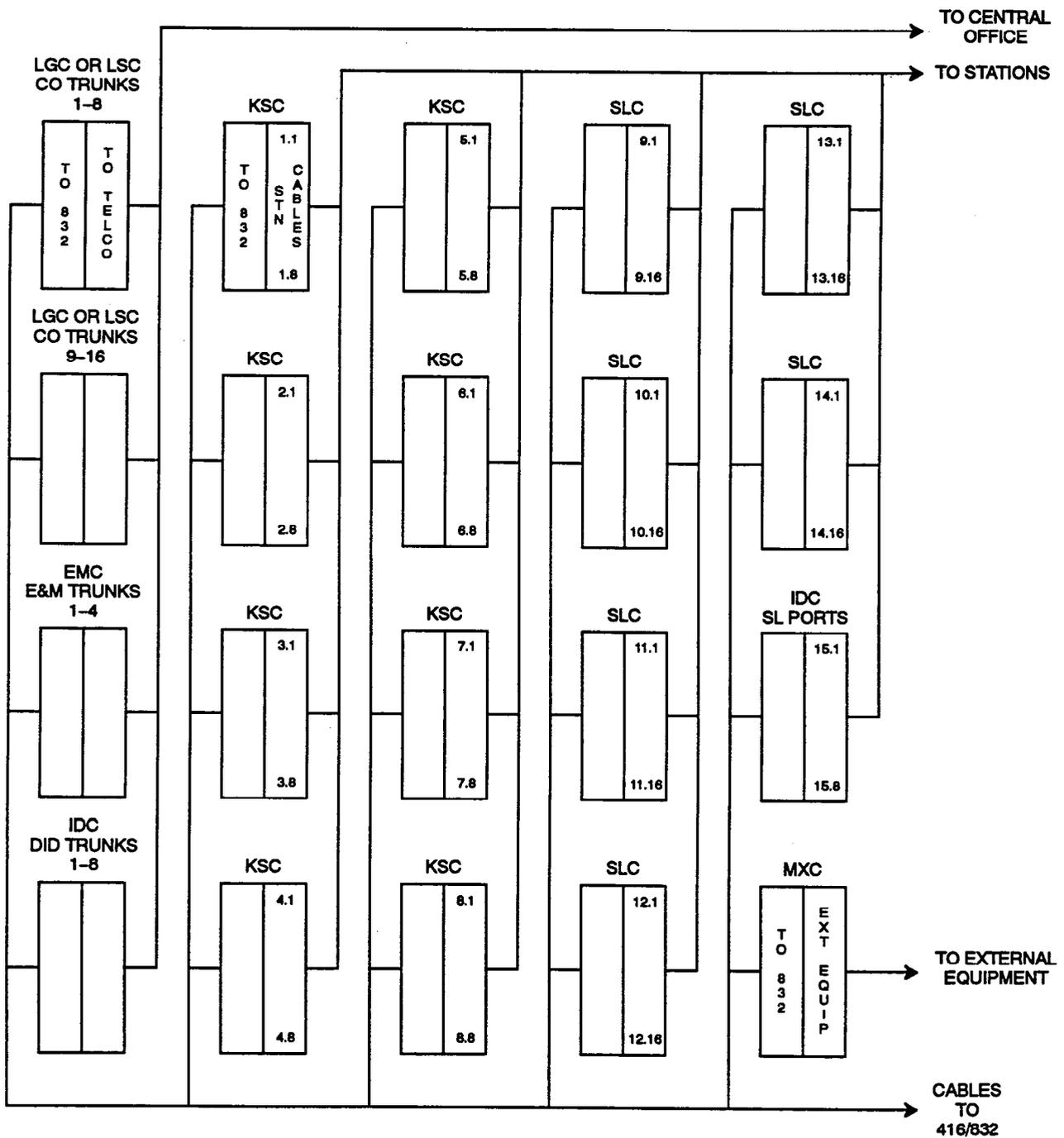
- Up to 52 blocks for connecting station cables and the 25-pair cables for the station cards — Digital Keypad Cards (DKSCs) for digital keysets; Keypad Cards (KSCs or KSC-Ds) for analog keysets, analog DSS/BLF Units, and Attendant Computer Consoles; Single-Line Cards (SLCs) for single-line sets and playback devices; and Inward Dialing Cards (IDCs) for off-premises extensions and/or on-premises single-line sets and playback devices.

NOTE: If, as recommended, three-pair cable is used for wiring single-line sets and playback devices, extra terminal blocks and the use of cross-connect wiring techniques are required.

- One block for connecting the Matrix Card cable and cables for music sources, paging equipment relay control, power failure transfer equipment, night transfer equipment, general signaling devices, etc.
- One block for connecting the Expansion Card cable and cables for night transfer equipment, general signaling devices, etc.

- (3) If any T1 spans or any optional T1 alarm signaling devices are to be installed, attach eight-conductor modular jack assemblies to the MDF as required. (For complete information on installing T1 spans, refer to page 3-18.)

FIGURE 3-3. SAMPLE MDF BLOCK LAYOUT AND CABLE ASSIGNMENTS



A. CONNECTING THE TRUNK CABLES TO THE MDF

CO Trunks

5.3 Connect the CO trunks and Loop/Ground Start Card (LGC) and/or Loop Start Card (LSC) cables as outlined below. Note that step 2 mentions two installation methods. Although the first method is more flexible, the second method can be used to minimize the number of terminal blocks that are used. Refer to Figures 3-5 and 3-6 on the following pages.

- (1) Cross connect the CO trunks from the telephone company RJ-type blocks to the *right* side of the LGC/LSC blocks.

NOTE: For additional lightning protection, see paragraph 5.6 on the next page.

- (2) *Method A:* Using enough 25-pair cable to run from the LGC/LSC blocks to the cards, make the termination cables. Attach a 50-pin female amphenol-type connector to one end of each LGC/LSC cable. Label each connector and cable end with the appropriate slot number (for example, SLOT-21). These connectors will be attached to the cards after they are installed in the equipment cabinet.

Method B: Using enough 25-pair cable to run from the LGC/LSC blocks to the cards, make the special termination cables. Attach up to three 50-pin female amphenol-type connectors to one end of each LGC/LSC cable as shown in Figure 3-6. Connect CO trunks 1-8 to one connector, trunks 9-16 to another connector, trunks 17-24 to a third connector, and so on for each cable. Label each connector with the appropriate slot number (for example, SLOT-21). These connectors will be attached to the cards after they are installed in the equipment cabinet.

- (3) Using standard electrical tape, tape two ferrite split beads around each 25-pair cable just below the amphenol-type connector (as shown in Figure 3-4 on the next page).

NOTE: Ferrite beads must be installed to meet Part 15 of FCC regulations. Refer to REPLACE-MENT PARTS for the part number.

- (4) Terminate the other end of each 25-pair cable on the *left* side of the corresponding LGC/LSC block.
- (5) Install bridging clips to complete the connections.

DID Trunks

5.4 Connect the Direct Inward Dialing (DID) trunks and Inward Dialing Card (IDC) cables as follows. Refer to Figure 3-7 on page 3-16 and Figure 3-19 on page 3-29.

NOTE: Besides DID trunks, IDCs can also be used to install single-line sets, playback devices, and off-premises stations. Any combination using the eight circuits on the card is possible. Refer to pages 3-22 to 3-29 for station installation instructions.

- (1) Cross connect the DID trunks from the telephone company RJ-type blocks to the *right* side of the IDC blocks.

NOTE: For additional lightning protection, see paragraph 5.6 on the next page.

- (2) Using enough 25-pair cable to run from the IDC blocks to the Inward Dialing Cards, make the termination cables. Attach a 50-pin female amphenol-type connector to one end of each IDC cable. Label each connector and cable end with the appropriate slot number (for example, SLOT-26). These connectors will be attached to the Inward Dialing Cards after the telecommunication cards are installed in the equipment cabinet.
- (3) Using standard electrical tape, tape two ferrite split beads around each 25-pair cable just below the amphenol-type connector (as shown in Figure 3-4 on the following page).
- (4) Terminate the other end of each 25-pair cable on the *left* side of the corresponding IDC block.
- (5) Install bridging clips to complete the connections.

E&M Trunks

5.5 Connect E&M trunks and E&M Card (EMC) cables as follows. Refer to Figure 3-8 on page 3-17.

- (1) Cross connect the E&M trunks from the telephone company RJ-type blocks to the *right* side of the EMC blocks.

NOTE: For additional lightning protection, see paragraph 5.6.

- (2) Using enough 25-pair cable to run from the EMC blocks to the E&M Cards, make the termination cables. Attach a 50-pin female amphenol-type connector to one end of each EMC cable. Label each connector and cable end with the appropriate slot number (for example, SLOT-26). These connectors will be attached to the E&M Cards after the telecommunication cards are installed in the equipment cabinet.
- (3) Using standard electrical tape, tape two ferrite split beads around each 25-pair cable just below the amphenol-type connector (as shown in Figure 3-4 below).

- (4) Terminate the other end of each 25-pair cable on the *left* side of the corresponding EMC block.

- (5) Install bridging clips to complete the connections.

Lightning Protection

5.6 For additional lightning protection, install gas discharge tubes with silicon avalanche suppressors to ground (grounding rod or copper, cold water pipe) on each CO, DID, E&M, and OPX trunk. This must be done external to the system. Each gas discharge tube is installed directly between the telephone company RJ-type block and the system's CO/DID/E&M/OPX input. This protection should give energy absorption and filter low-level surge potentials. (For installation instructions and specific recommendations, contact Customer Support.)

5.7 Also, in areas with frequent occurrences of lightning, it is recommended that the cable between the telephone company RJ-type blocks and the gas discharge tubes be at least 75 feet long (the cable may be coiled up if desired).

FIGURE 3-4. EXAMPLE OF FERRITE BEAD INSTALLATION

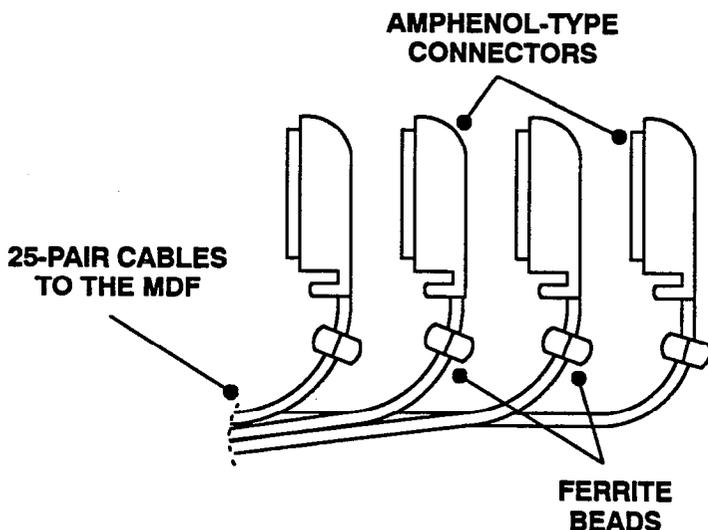


FIGURE 3-5. LGC/LSC BLOCK CABLE TERMINATIONS (METHOD A)

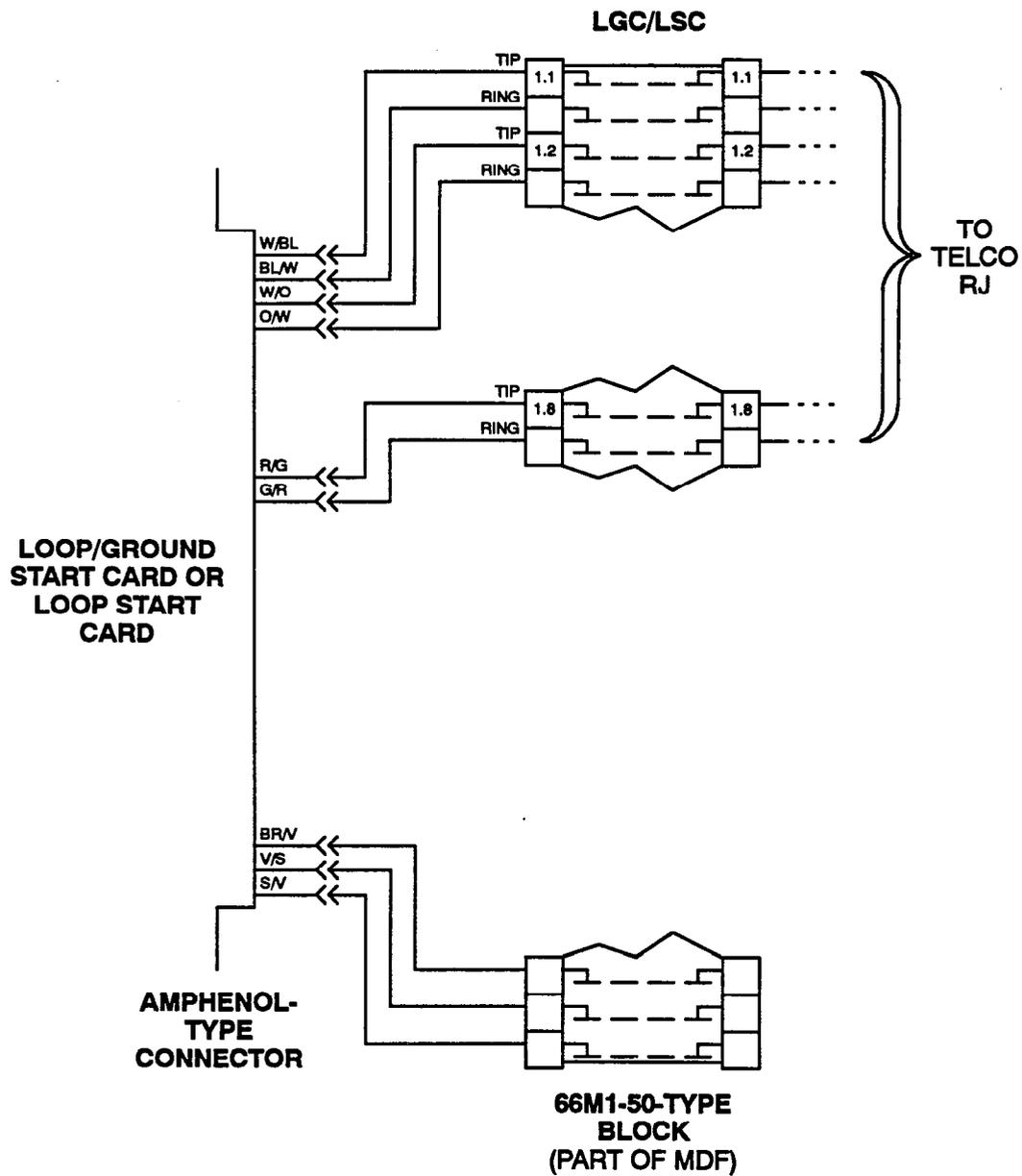


FIGURE 3-6. LGC/LSC BLOCK CABLE TERMINATIONS (METHOD B)

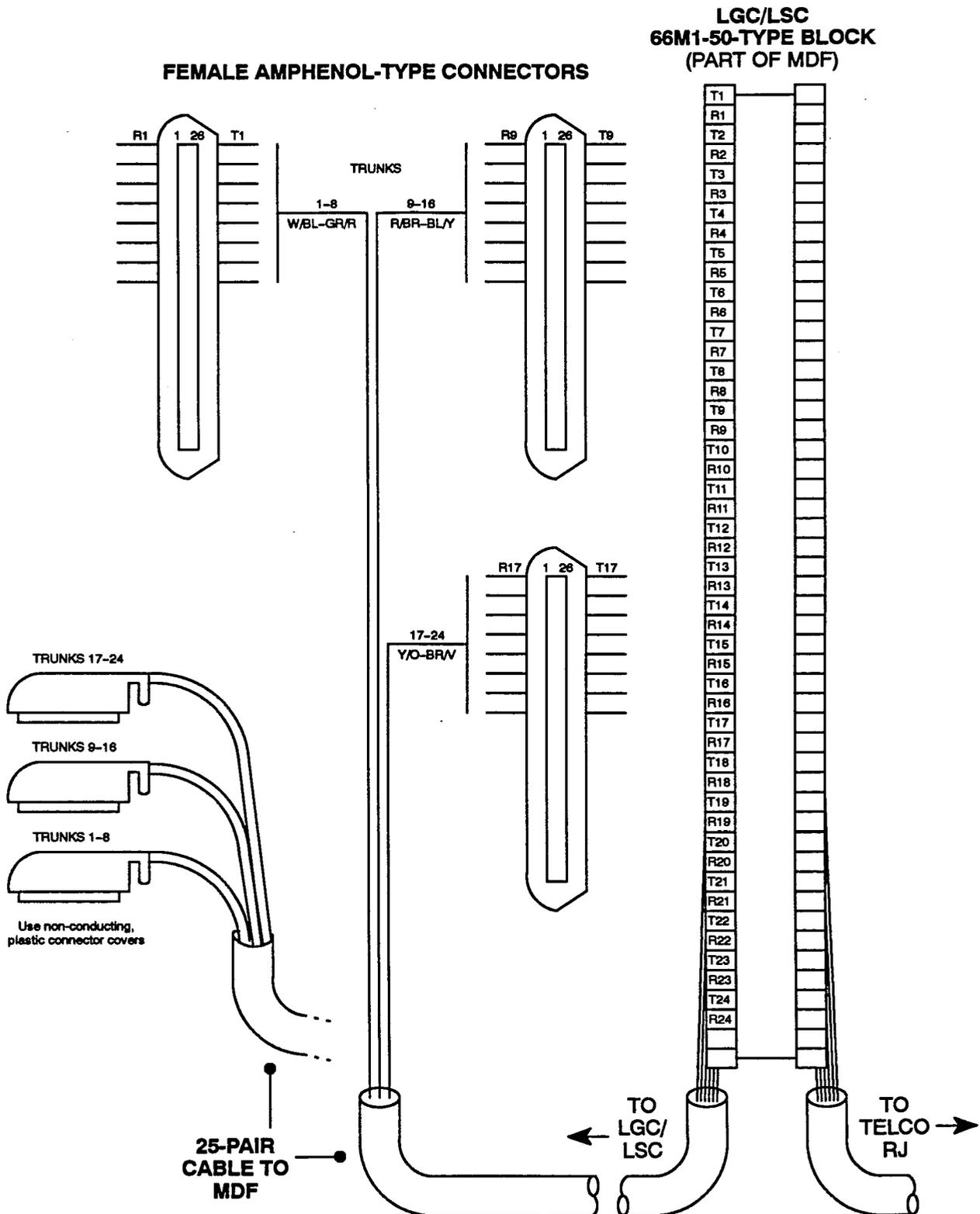
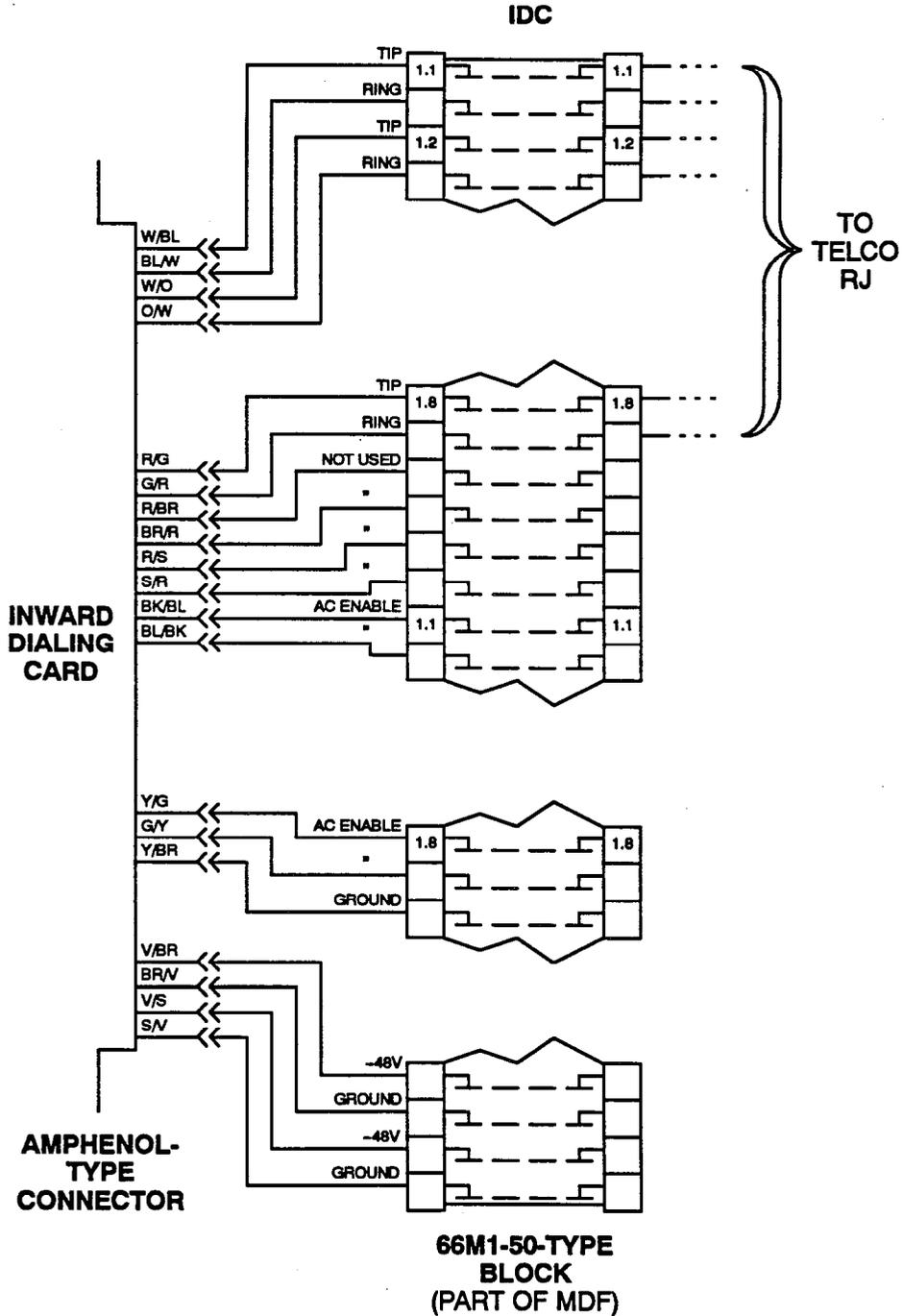
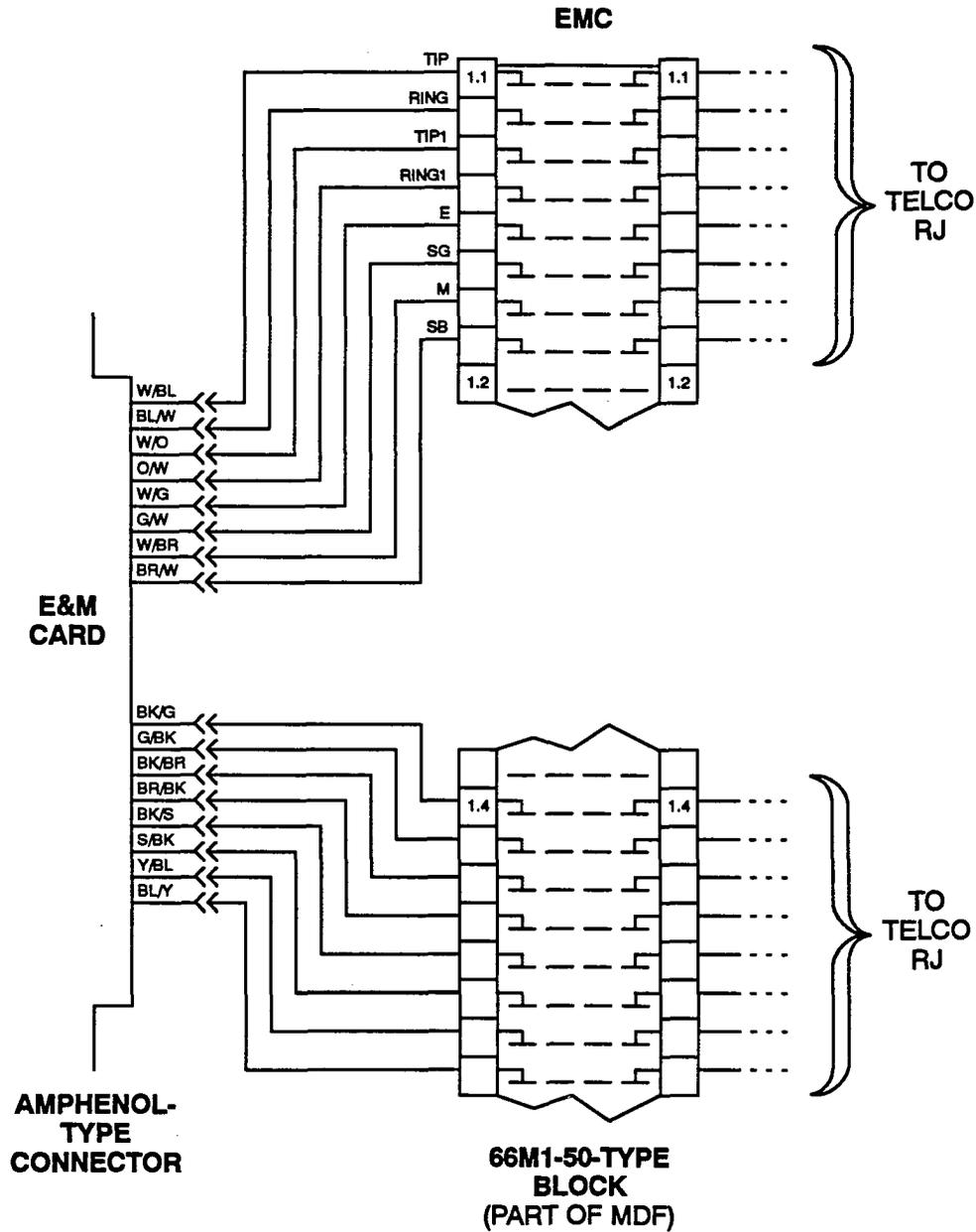


FIGURE 3-7. IDC BLOCK CABLE TERMINATIONS



NOTE: The AC Enable terminations shown above are used only when installing single-lines sets and play-back devices, not DID trunks. For information on their use, refer to pages 3-22 and 3-28.

FIGURE 3-8. EMC BLOCK CABLE TERMINATIONS



NOTE: Depending on the area of the country and/or the specific type of E&M trunk ordered, one or more of the cable pairs shown above may not always be needed. For each E&M trunk to be installed, terminate all cable pairs provided by the telephone company, as shown in the pinout above.

B. CONNECTING T1 SPANS TO THE MDF

5.8 The installation procedure used to connect T1 spans at the MDF is dependent on the type of termination used by the telephone company and how close it is to the MDF. The T1 spans may be terminated on RJ48C modular jacks or on RJ-type terminal blocks.

5.9 Follow one of the three T1 termination methods (A, B, or C) outlined on the following pages.

NOTE: The T1 span is typically connected to the standard RJ48C jack provided on the T1 Card. However, in certain situations (e.g., when using an external CSU equipped with a DB15 connector), it may be more convenient to use the card's optional DB15 connector instead. Refer to page 3-21 for more information.

Method A — T1 Spans Terminated On RJ48C Jacks Near The MDF

5.10 Install T1 spans terminated on RJ48C jacks near the MDF as outlined in below.

Plug one end of a four-pair, non-reversing (straight through), mod-to-mod line cord into each telephone company RJ48C jack. The other end of each line cord will *later* be plugged into the T1 jack on the corresponding T1 Card.

NOTE: Make sure the connectors on the ends of each line cord are properly attached. If any of the wires are cracked or broken, T1 transmission problems can occur.

Method B — T1 Spans Terminated On RJ48C Jacks Away From The MDF

5.11 Install T1 spans terminated on RJ48C jacks away from the MDF as outlined in the following steps. Refer to Figure 3-9 on the next page for a diagram of the complete layout.

- (1) Mount one eight-conductor modular jack assembly next to each telephone company RJ48C jack.
- (2) For each modular jack assembly mounted in step 1, also mount a corresponding eight-conductor modular jack assembly on the MDF backboard.
- (3) To connect the modular jack assemblies mounted in steps 1 and 2:

- a. Run T1 cable between the corresponding modular jack assemblies.

NOTE: If the telephone company termination is more than 2000 feet from the MDF, special T1 cable *must* be used (see page 2-25 for cable specifications). For shorter distances, two lengths of standard two-pair voice-frequency cable (one cable for transmit and one cable for receive) may be used instead.

- b. Wire each end of the cable onto their respective modular jack assemblies. Refer to Figure 3-10 on the next page for a diagram of the wiring.
- (4) At the telephone company termination, plug one end of a four-pair, non-reversing (straight through), mod-to-mod line cord into each RJ48C jack and plug the other end into the corresponding modular jack assembly next to it.
- (5) At the MDF backboard, plug one end of a four-pair, non-reversing (straight through), mod-to-mod line cord into each modular jack assembly. The other end of each line cord will *later* be plugged into the T1 jack on the corresponding T1 Card.

NOTE: Make sure the connectors on the ends of each line cord are properly attached. If any of the wires are cracked or broken, T1 transmission problems can occur.

FIGURE 3-9. T1 SPAN TERMINATIONS FROM RJ48C JACKS

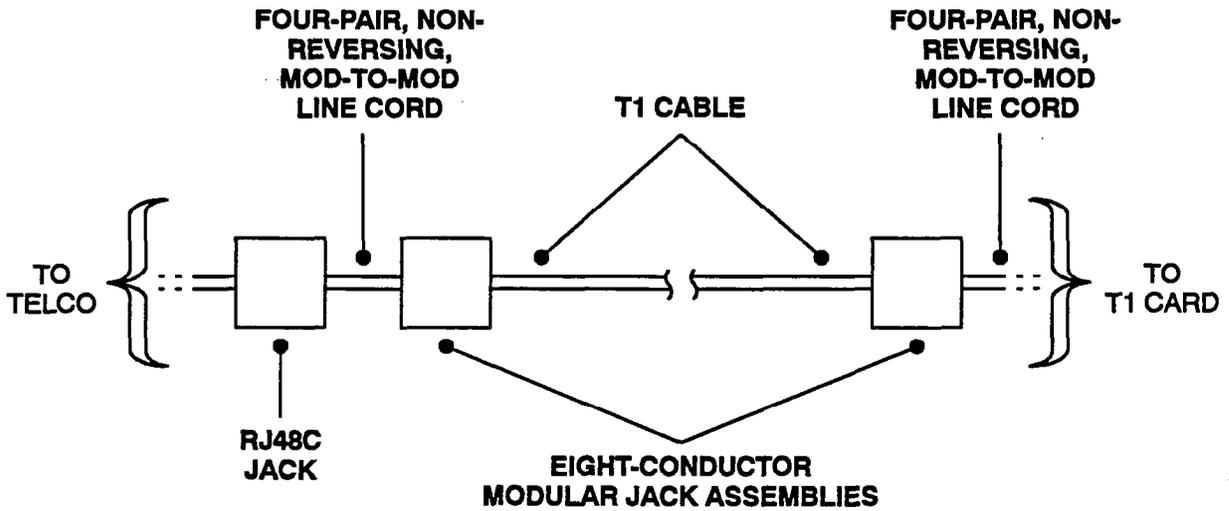
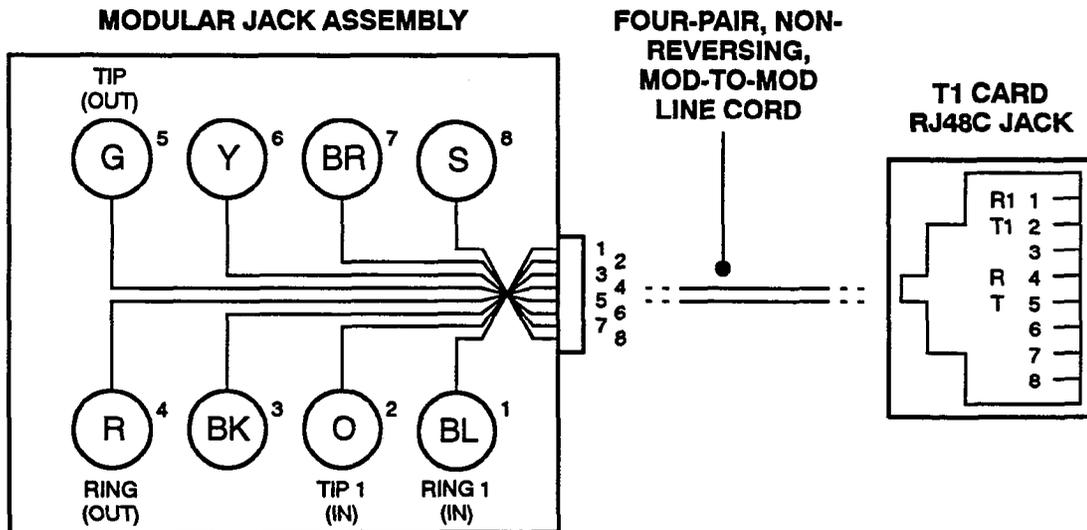


FIGURE 3-10. MODULAR JACK ASSEMBLY WIRING FOR T1 SPANS



NOTE: OUT = transmit to network, IN = receive from network

Method C — T1 Spans Terminated On An RJ-Type Block

5.12 Install T1 spans terminated on an RJ-type block as outlined in the following steps. Refer to Figure 3-11 below for a diagram of the complete layout.

- (1) On the MDF backboard, mount one eight-conductor modular jack assembly for each T1 span termination on the telephone company RJ-type block(s).
- (2) Connect T1 cable between the telephone company terminations and the corresponding modular jack assemblies as follows:

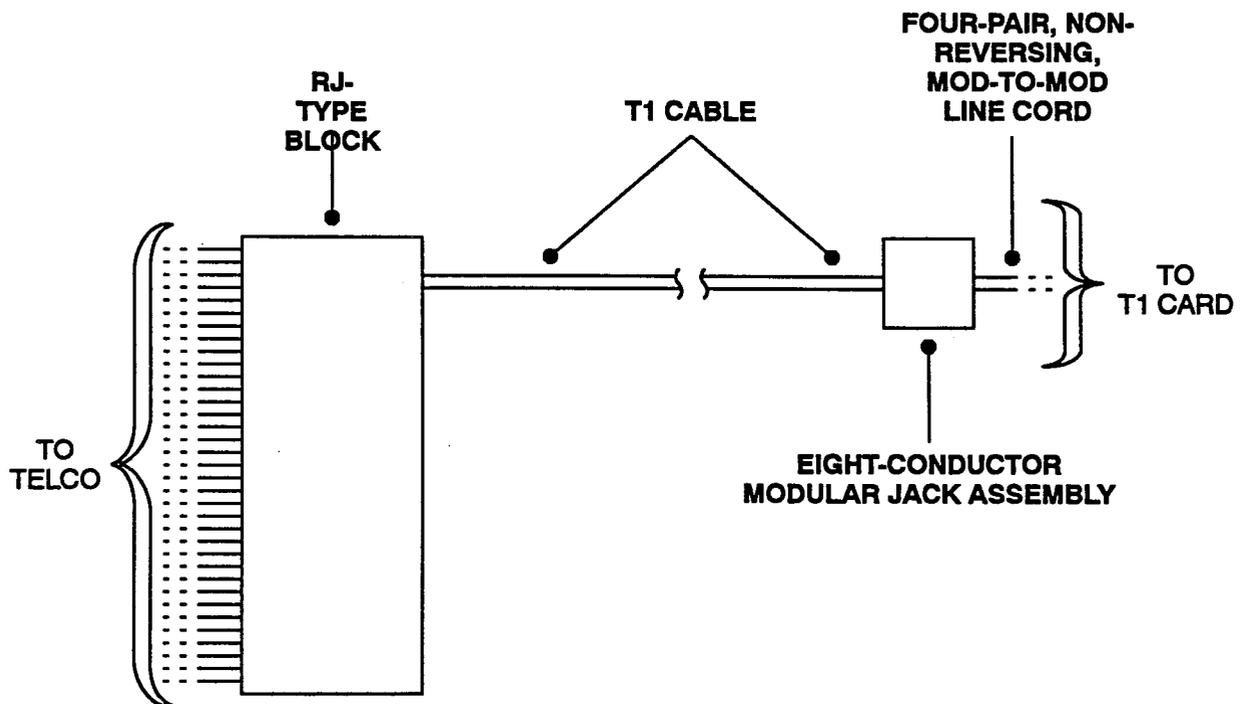
NOTE: If the telephone company termination is more than 2000 feet from the MDF, special T1 cable *must* be used (see page 2-25 for cable specifications). For shorter distances, two lengths of standard two-pair voice-frequency cable (one

cable for transmit and one cable for receive) may be used instead.

- a. Terminate one end of a six-pair cable on each modular jack assembly. Refer to Figure 3-10 on the previous page.
 - b. Terminate the other end of the six-pair cable on the *right* side of the T1 RJ-type terminal block.
- (3) Plug one end of a four-pair, non-reversing (straight through), mod-to-mod line cord into each modular jack assembly (mounted in step 1). The other end of each line cord will *later* be plugged into the T1 jack on the corresponding T1 Card.

NOTE: Make sure the connectors on the ends of each line cord are properly attached. If any of the wires are cracked or broken, T1 transmission problems can occur.

FIGURE 3-11. T1 SPAN TERMINATIONS FROM RJ-TYPE BLOCKS



Using The Optional DB15 Connector In Place Of The RJ48C Jack

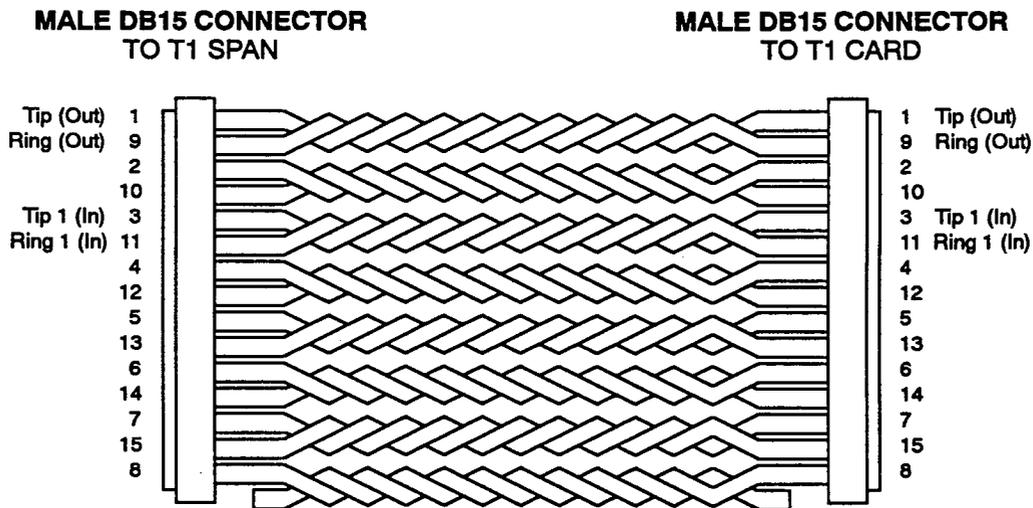
5.13 The three T1 installation methods described on the preceding pages show the T1 span being connected to the RJ48C jack on the T1 Card. However, in certain situations (e.g., when using an external CSU equipped with a DB15 connector), the installer may wish to use the card's optional DB15 connector instead.

5.14 The pin functions of the T1 Card DB15 connector (15-pin subminiature "D" female connector) are as follows:

SIGNAL NAME	FUNCTION	PIN
Tip (Out)	Transmit Data	1
Ring (Out)	Transmit Data	9
Tip 1 (In)	Receive Data	3
Ring 1 (In)	Receive Data	11

5.15 To connect the DB15 connector on the T1 Card to a DB15 connector coming from the T1 span, a flat, 28AWG, twisted-pair ribbon cable with a maximum capacitance of 16pF/ft. may be used for distances of up to 50 feet, as shown in the figure below. For distances longer than 50 feet, use the special high-speed data cable described in paragraph 3.131 on page 2-25.

FIGURE 3-12. USING THE T1 CARD'S OPTIONAL DB15 CONNECTOR



NOTE: OUT = transmit to network, IN = receive from network

C. CONNECTING STATION CABLES TO THE MDF

5.16 Each type of station instrument is connected to a specific station card. Digital keysets are connected to DKSCs. Analog keysets, analog DSS/BLF Units, and Attendant Computer Consoles are connected to KSCs or KSC-Ds. Single-line sets and playback devices are connected to SLCs and/or IDCs.

NOTE: Besides single-line sets, playback devices, and off-premises extensions, IDCs can also be used to install DID trunks. Any combination using the eight circuits on the card is possible. Refer to pages 3-12 to 3-16 for DID trunk installation instructions.

5.17 After the station cables are run, connect them and the 25-pair cables to the station blocks on the MDF as follows:

- (1) Ensure that both ends of each station cable are labeled with the circuit number of the associated station instrument.
- (2) Terminate each station cable on the *right* side of the corresponding station block. Refer to Figures 3-13 through 3-19 on the following pages for station cable terminations.

NOTE: For simplicity, Figures 3-13, 3-17, and 3-18 show digital keysets, single-line sets, and playback devices being installed using one-pair cable and four-conductor modular jacks. Of course, if three-pair cable and six-conductor modular jacks are used instead (as is recom-

mended), extra terminal blocks and the use of cross-connect wiring techniques are required.

- (3) Using enough 25-pair cable to run from each block to each station card in the equipment cabinet, make the termination cables. Attach a 50-pin female amphenol-type connector to one end of each cable. Label each connector and cable end with the appropriate slot number (for example, SLOT-2). These connectors will be attached to the station cards after the telecommunication cards are installed.
- (4) Using standard electrical tape, tape two ferrite split beads around each 25-pair cable just below the amphenol-type connector (as shown in Figure 3-4 on page 3-13).

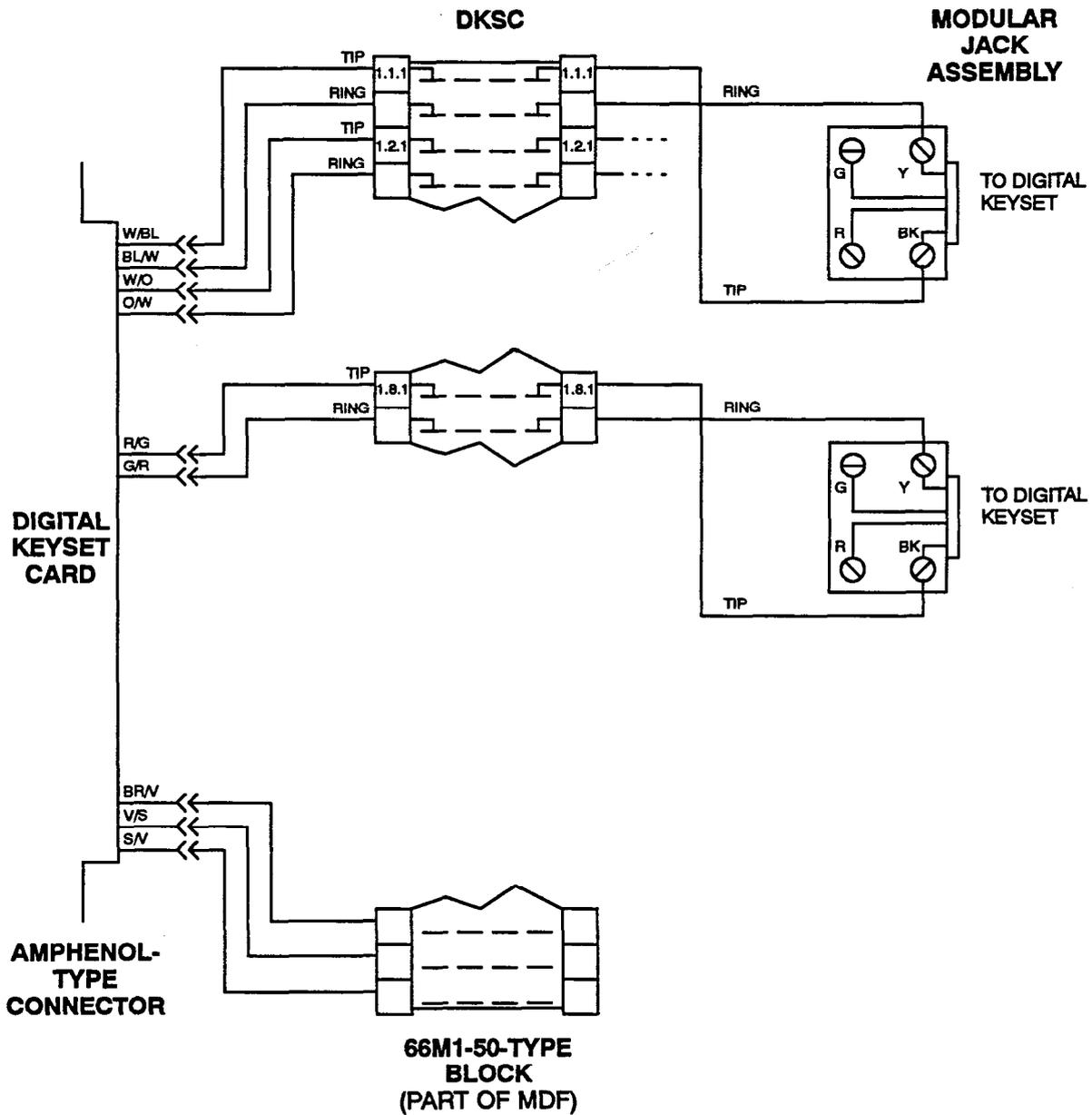
NOTE: Ferrite beads must be installed to meet Part 15 of FCC regulations. Refer to REPLACEMENT PARTS for the part number.

- (5) Terminate the other end of each 25-pair cable on the *left* side of the corresponding station block.

NOTE: If necessary, any of the eight circuits on an IDC can be enabled for AC ringing to be used with off-premises extensions or on-premises AC-ringing equipment. To do this, each circuit can be strapped directly at the IDC terminal block (as shown in Figure 3-18 on page 3-28) or on the card itself (as described on page 3-93).

- (6) **DO NOT** attach bridging clips until the loop resistance tests have been performed (as described on page 3-30).

FIGURE 3-13. DIGITAL KSC BLOCK CABLE TERMINATIONS FOR KEYSETS



NOTE: For simplicity, this figure shows keysets being installed using one-pair cable and four-conductor modular jacks. Of course, if two-pair cable or three-pair cable is used instead, extra terminal blocks and the use of cross-connect wiring techniques are required. Note that tip and ring are connected to the *second pair* of terminals (black and yellow) on the modular jack.

FIGURE 3-14. ANALOG KSC BLOCK CABLE TERMINATIONS

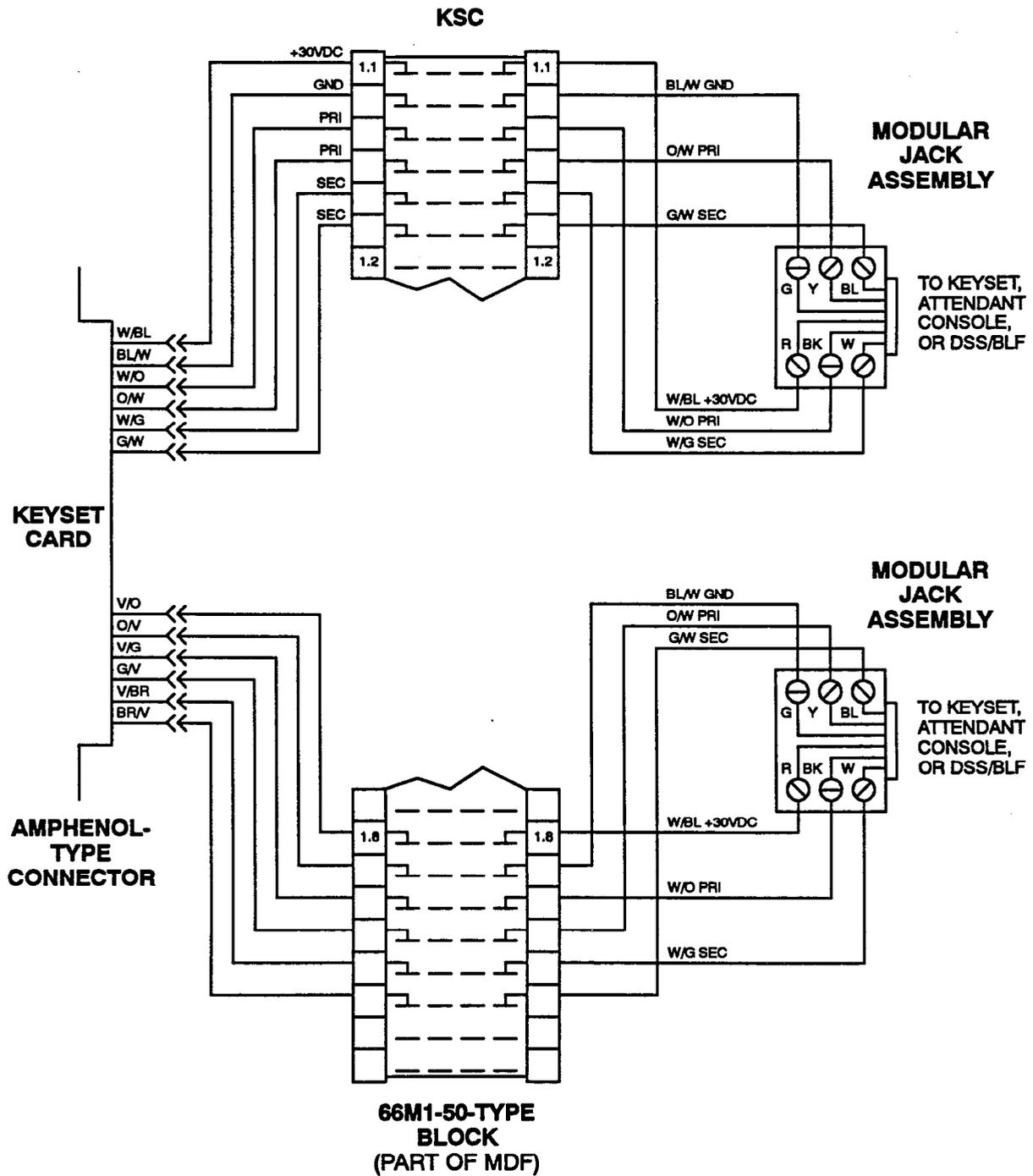
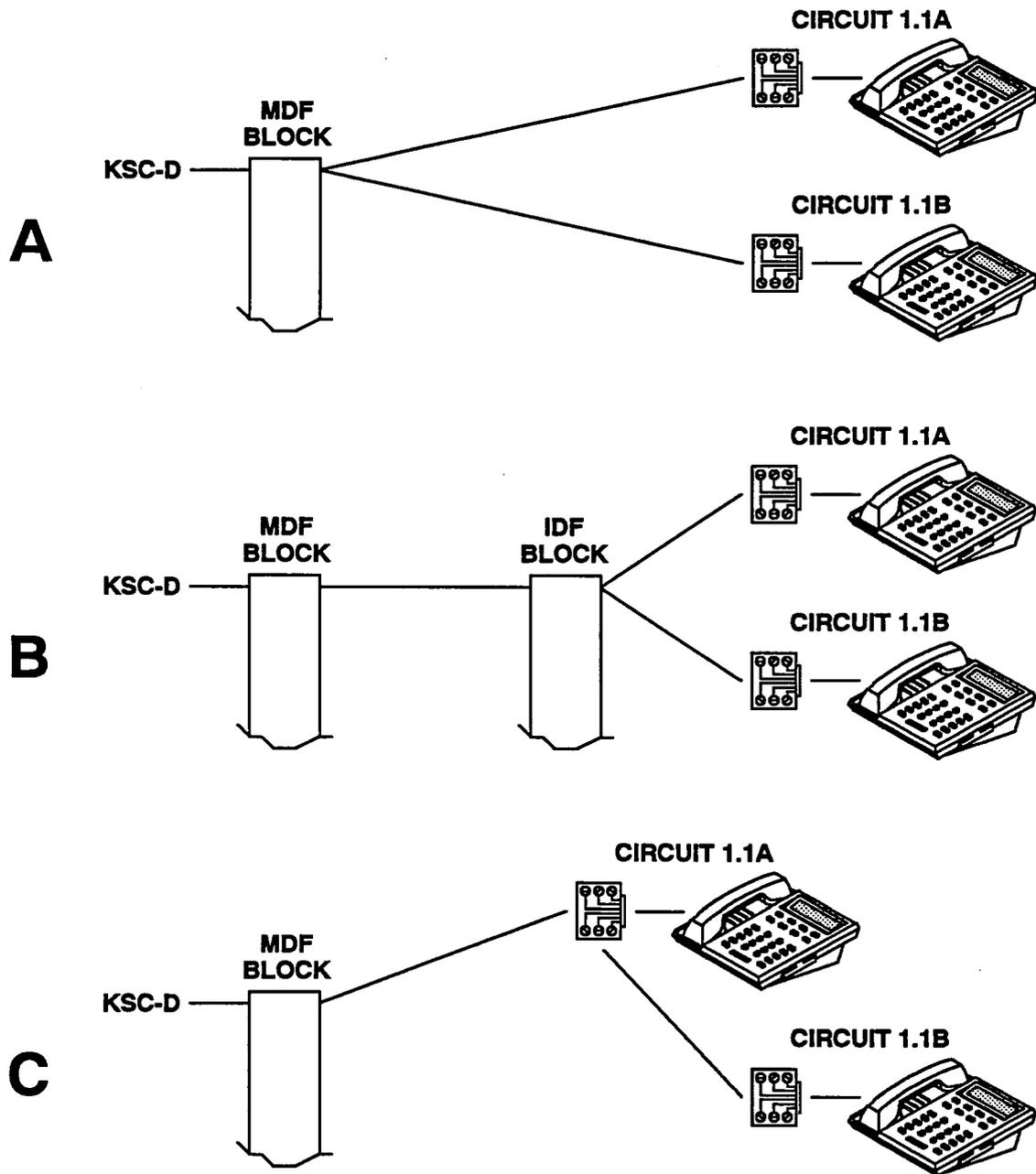
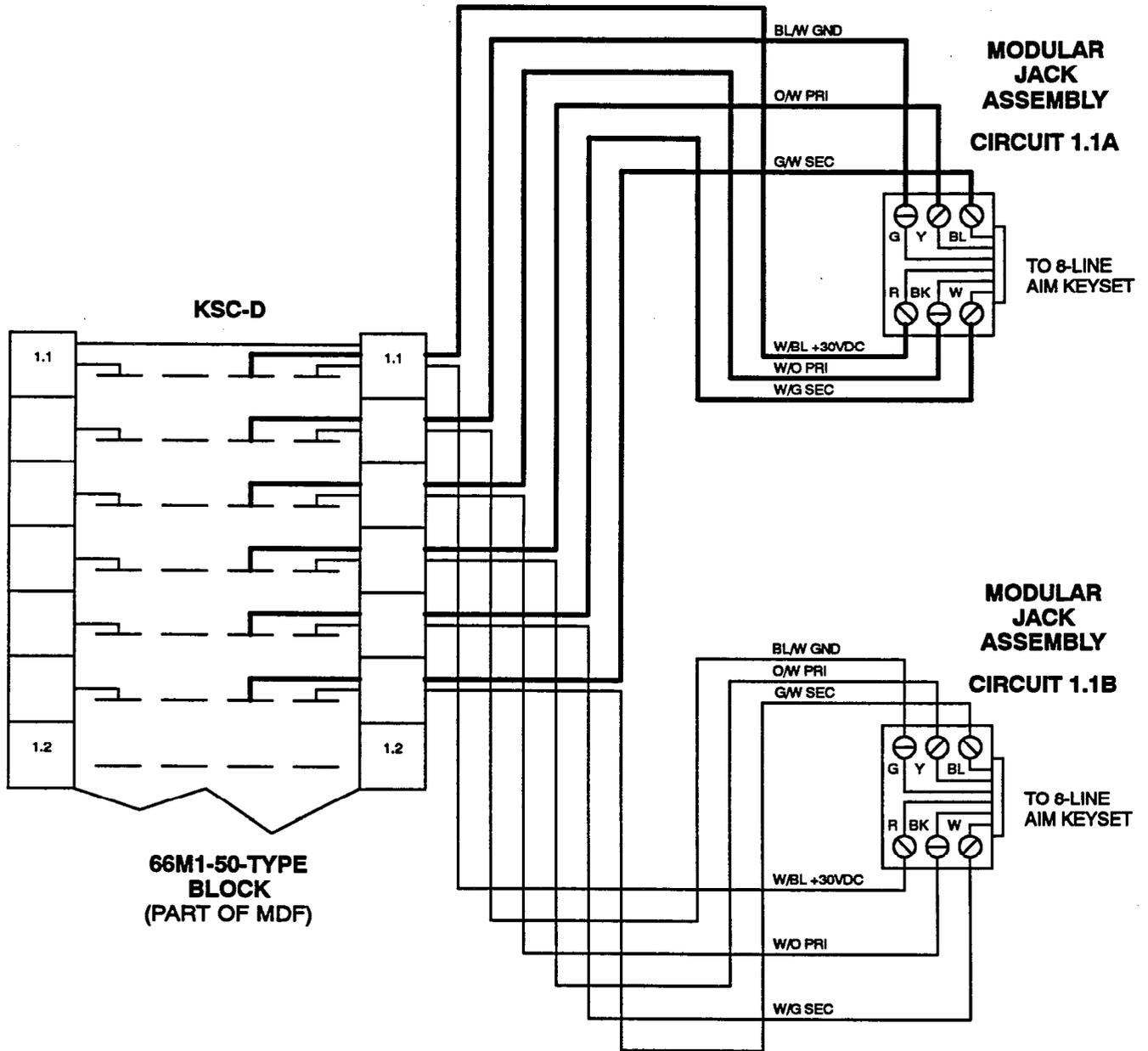


FIGURE 3-15. INSTALLING 8-LINE IMX AIM KEYSETS TWO TO A CIRCUIT



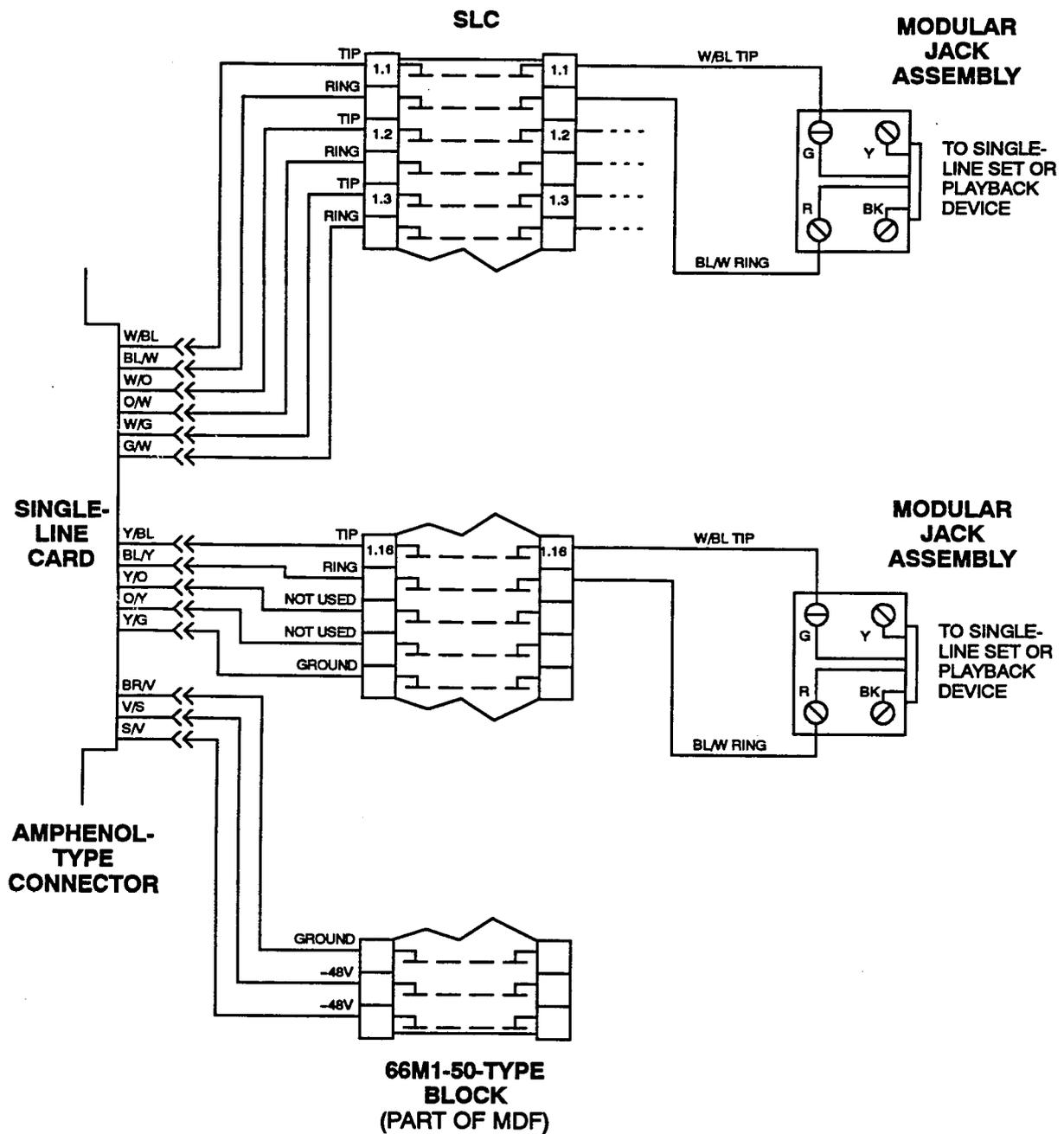
NOTE: This illustration shows three common methods for installing two 8-line IMX AIM keysets on a single KSC-D circuit. For a detailed wiring diagram of method A, refer to the following page.

**FIGURE 3-16. KSC-D BLOCK CABLE TERMINATIONS FOR 8-LINE IMX AIM
KEYSETS INSTALLED TWO TO A CIRCUIT**



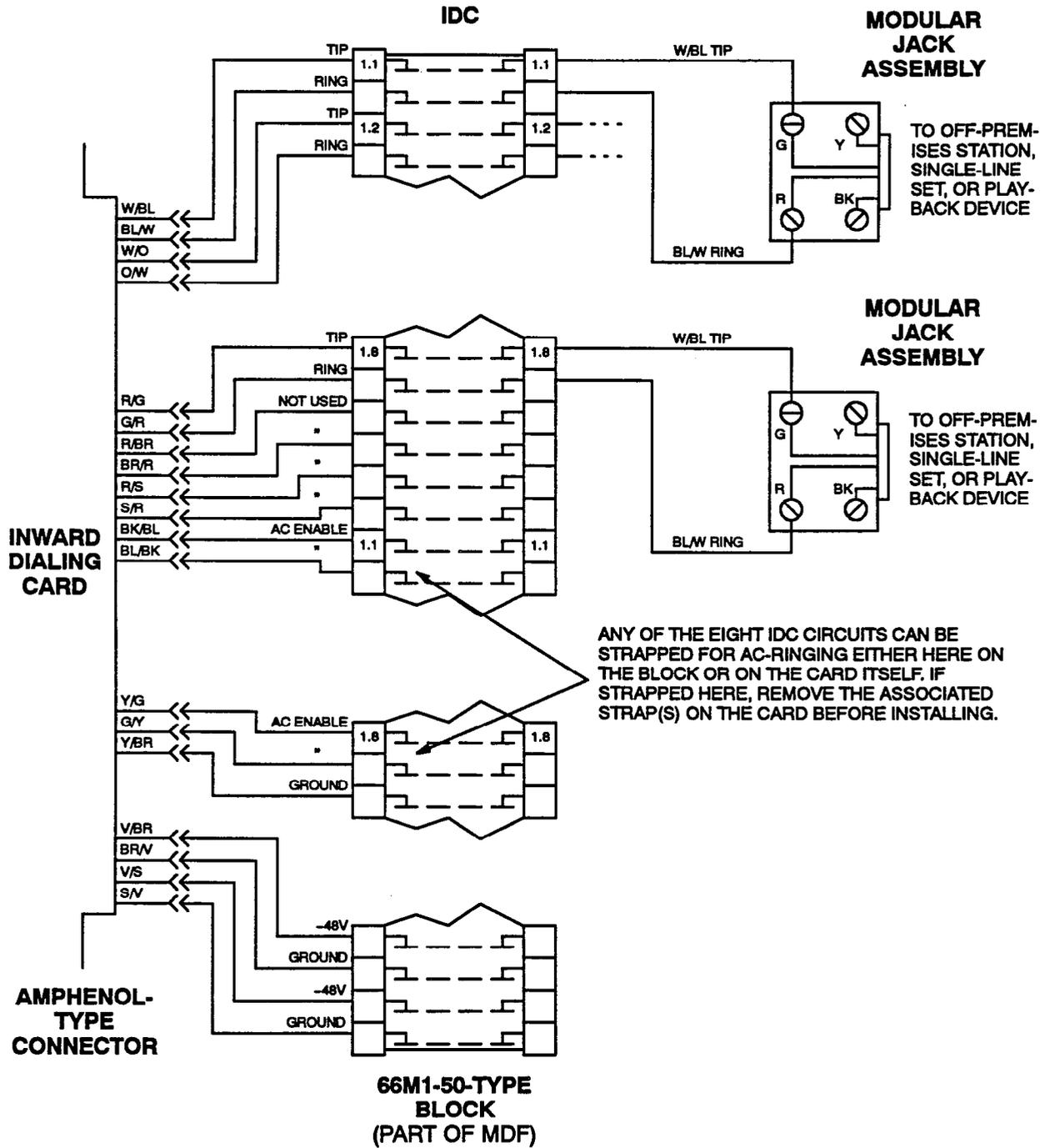
NOTE: This illustration details one common method for wiring two 8-line IMX AIM keysets to a single KSC-D circuit. For a simple illustration of some alternative installation methods, refer to the previous page.

FIGURE 3-17. SLC BLOCK CABLE TERMINATIONS



NOTE: For simplicity, this figure shows single-line sets and playback devices being installed using one-pair cable and four-conductor modular jacks. Of course, if three-pair cable and six-conductor modular jacks are used instead (as is recommended), extra terminal blocks and the use of cross-connect wiring techniques are required.

FIGURE 3-18. IDC BLOCK CABLE TERMINATIONS



NOTE: For simplicity, this figure shows single-line sets and playback devices being installed using one-pair cable and four-conductor modular jacks. Of course, if three-pair cable and six-conductor modular jacks are used instead (as is recommended), extra terminal blocks and the use of cross-connect wiring techniques are required.

FIGURE 3-19. STATION CABLE TERMINATIONS ON THE STATION BLOCK

AMPHENOL	CABLE PAIR	DKSC	KSC or KSC-D	SLC	IDC
26	W - BL	CKT 1 TIP	CKT 1 +30VDC	CKT 1 TIP	CKT 1 TIP
1	BL - W	CKT 1 RING	CKT 1 GND	CKT 1 RING	CKT 1 RING
27	W - O	CKT 2 TIP	CKT 1 PRIMARY PATH	CKT 2 TIP	CKT 2 TIP
2	O - W	CKT 2 RING	CKT 1 PRIMARY PATH	CKT 2 RING	CKT 2 RING
28	W - G	CKT 3 TIP	CKT 1 SECONDARY PATH	CKT 3 TIP	CKT 3 TIP
3	G - W	CKT 3 RING	CKT 1 SECONDARY PATH	CKT 3 RING	CKT 3 RING
29	W - BR	CKT 4 TIP	CKT 2 +30VDC	CKT 4 TIP	CKT 4 TIP
4	BR - W	CKT 4 RING	CKT 2 GND	CKT 4 RING	CKT 4 RING
30	W - S	CKT 5 TIP	CKT 2 PRIMARY PATH	CKT 5 TIP	CKT 5 TIP
5	S - W	CKT 5 RING	CKT 2 PRIMARY PATH	CKT 5 RING	CKT 5 RING
31	R - BL	CKT 6 TIP	CKT 2 SECONDARY PATH	CKT 6 TIP	CKT 6 TIP
6	BL - R	CKT 6 RING	CKT 2 SECONDARY PATH	CKT 6 RING	CKT 6 RING
32	R - O	CKT 7 TIP	CKT 3 +30VDC	CKT 7 TIP	CKT 7 TIP
7	O - R	CKT 7 RING	CKT 3 GND	CKT 7 RING	CKT 7 RING
33	R - G	CKT 8 TIP	CKT 3 PRIMARY PATH	CKT 8 TIP	CKT 8 TIP
8	G - R	CKT 8 RING	CKT 3 PRIMARY PATH	CKT 8 RING	CKT 8 RING
34	R - BR	CKT 9 TIP	CKT 3 SECONDARY PATH	CKT 9 TIP	NOT USED
9	BR - R	CKT 9 RING	CKT 3 SECONDARY PATH	CKT 9 RING	NOT USED
35	R - S	CKT 10 TIP	CKT 4 +30VDC	CKT 10 TIP	NOT USED
10	S - R	CKT 10 RING	CKT 4 GND	CKT 10 RING	NOT USED
36	BK - BL	CKT 11 TIP	CKT 4 PRIMARY PATH	CKT 11 TIP	CKT 1 AC ENABLE
11	BL - BK	CKT 11 RING	CKT 4 PRIMARY PATH	CKT 11 RING	CKT 1 AC ENABLE
37	BK - O	CKT 12 TIP	CKT 4 SECONDARY PATH	CKT 12 TIP	CKT 2 AC ENABLE
12	O - BK	CKT 12 RING	CKT 4 SECONDARY PATH	CKT 12 RING	CKT 2 AC ENABLE
38	BK - G	CKT 13 TIP	CKT 5 +30VDC	CKT 13 TIP	CKT 3 AC ENABLE
13	G - BK	CKT 13 RING	CKT 5 GND	CKT 13 RING	CKT 3 AC ENABLE
39	BK - BR	CKT 14 TIP	CKT 5 PRIMARY PATH	CKT 14 TIP	CKT 4 AC ENABLE
14	BR - BK	CKT 14 RING	CKT 5 PRIMARY PATH	CKT 14 RING	CKT 4 AC ENABLE
40	BK - S	CKT 15 TIP	CKT 5 SECONDARY PATH	CKT 15 TIP	CKT 5 AC ENABLE
15	S - BK	CKT 15 RING	CKT 5 SECONDARY PATH	CKT 15 RING	CKT 5 AC ENABLE
41	Y - BL	CKT 16 TIP	CKT 6 +30VDC	CKT 16 TIP	CKT 6 AC ENABLE
16	BL - Y	CKT 16 RING	CKT 6 GND	CKT 16 RING	CKT 6 AC ENABLE
42	Y - O	NOT USED	CKT 6 PRIMARY PATH	NOT USED	CKT 7 AC ENABLE
17	O - Y	NOT USED	CKT 6 PRIMARY PATH	NOT USED	CKT 7 AC ENABLE
43	Y - G	NOT USED	CKT 6 SECONDARY PATH	GROUND	CKT 8 AC ENABLE
18	G - Y	NOT USED	CKT 6 SECONDARY PATH	GROUND	CKT 8 AC ENABLE
44	Y - BR	NOT USED	CKT 7 +30VDC	GROUND	GROUND
19	BR - Y	NOT USED	CKT 7 GND	GROUND	GROUND
45	Y - S	NOT USED	CKT 7 PRIMARY PATH	GROUND	GROUND
20	S - Y	NOT USED	CKT 7 PRIMARY PATH	GROUND	GROUND
46	V - BL	NOT USED	CKT 7 SECONDARY PATH	GROUND	GROUND
21	BL - V	NOT USED	CKT 7 SECONDARY PATH	GROUND	GROUND
47	V - O	NOT USED	CKT 8 +30VDC	GROUND	GROUND
22	O - V	NOT USED	CKT 8 GND	GROUND	GROUND
48	V - G	NOT USED	CKT 8 PRIMARY PATH	GROUND	GROUND
23	G - V	NOT USED	CKT 8 PRIMARY PATH	GROUND	GROUND
49	V - BR	NOT USED	CKT 8 SECONDARY PATH	GROUND	-48
24	BR - V	NOT USED	CKT 8 SECONDARY PATH	GROUND	GROUND
50	V - S	NOT USED	NOT USED	-48V	-48V
25	S - V	NOT USED	NOT USED	-48V	GROUND

D. STATION LOOP RESISTANCE TEST

5.18 Perform the loop resistance test for each station cable individually.

- (1) Ensure that bridging clips have not been installed on the station blocks and that the station instrument is not connected to the modular jack assembly.
- (2) Place a short across the RED and GREEN wires on the modular jack assembly.
- (3) At the MDF, measure the resistance across the WHITE/BLUE and BLUE/WHITE wires on the *right* (station) side of the station block. The read-

ing should not exceed the limits (for 24AWG wire) listed in the chart below (ohm values are the loop measurements; feet/meter values are the maximum one-way measurements from the equipment cabinet).

NOTE: Excessive and/or improperly made connections increase the resistance of a cable, which reduces the allowable cable run length.

- (4) Remove the short after the test is complete.
- (5) Repeat this test for each station cable.
- (6) Install bridging clips on the station blocks to complete the cable connections.

TYPE OF INSTRUMENT	LOOP LIMITS
Digital Keysets (both Standard and Executive, display and non-display)	103 ohms/2000 ft. (609 m.)
Digital Keysets with attached PC and Modem Data Port Modules	103 ohms/2000 ft. (609 m.)
From Modem Data Port Modules to single-line sets	195 ohms/3800 ft. (1158 m.)
IMX 12-Line and 24-Line Keysets (standard and display)	65 ohms/1260 ft. (384 m.)
IMX 12-Line and 24-Line Keysets with Data Port Modules	50 ohms/970 ft. (295 m.)
IMX 12-Line and 24-Line AIM Keysets	82 ohms/1590 ft. (484 m.)
IMX 12-Line and 24-Line AIM Keysets with Data Port Modules	66 ohms/1280 ft. (390 m.)
IMX 8-Line Keysets	75 ohms/1460 ft. (445 m.)
IMX 8-Line AIM Keysets (when installed one to a circuit)	103 ohms/2000 ft. (609 m.)
IMX 8-Line AIM Keysets (when installed two to a circuit)*	77 ohms/1500 ft. (457 m.)*
Inter-Tel/DVK Keysets (standard and display)	82 ohms/1590 ft. (484 m.)
Inter-Tel/DVK Keysets with Data Port Modules	66 ohms/1280 ft. (390 m.)
IMX and Inter-Tel/DVK DSS/BLF Units	65 ohms/1260 ft. (384 m.)
ESLs (AC or DC)	800 ohms/15560 ft. (4742 m.)
SLs (AC or DC)	800 ohms/15560 ft. (4742 m.)
Playback Devices (AC or DC)	800 ohms/15560 ft. (4742 m.)
Industry-Standard, Single-Line DTMF Sets (AC or DC)	800 ohms/15560 ft. (4742 m.)

* The actual loop limits for 8-line AIM keysets installed two to a circuit varies according to the type of installation method used, as shown in Figure 3-15 on page 3-25. If method A is used (separate cabling), the loop limit for each keyset (as measured from the equipment cabinet to the station location) must not exceed 77 ohms/1500 ft. (457 m.). If methods B or C are used (shared cabling), the loop limit for each keyset is reduced to 51 ohms/1000 ft. (305 m.). Also note that if shielded cable is used for any type of non-digital keyset installation, the actual loop limit *may* be reduced by as much as 20% because the foil wrapped around the wires in the cable acts as a capacitor. Do not use shielded cable for digital keyset installations. Longer loop lengths can be achieved by using heavier gauge cable, such as 22AWG. (For additional station cabling requirements, refer to page 3-7.)

**E. CONNECTING OPTIONAL
OFF-PREMISES EXTENSIONS (OPXs)**

5.19 Off-premises extensions are remote ESLs, SLIs, or single-line DTMF sets that are connected to the 416/832 System through telephone company OPX circuits (or customer-provided circuits). At the MDF, the circuits are connected to Inward Dialing Cards (IDCs).

NOTE: IDCs do not support message waiting applications. If single-line sets with message waiting lamps are installed on IDCs, the lamps will not function.

5.20 Off-premises station instruments must be AC ringer-equipped. The IDC's onboard high-voltage ringing adapter (HVRA) provides isolation from the telephone company OPX circuits as required by FCC regulations.

5.21 Each IDC can support up to eight off-premises extensions. The individual IDC circuits used for the OPXs must be strapped for AC ringing. They can be strapped directly at the IDC terminal block (as shown in Figure 3-18 on page 3-28) or on the card itself (as described on page 3-93). (On premises, IDC circuits can be used for installing AC or DC voice mail units, digital attendants, etc.)

5.22 In certain off-premises applications, voice volume levels may not be acceptable. This degradation in voice volume is due to the natural voice frequency range limitations of the telephone company or customer-provided circuit. To increase the voice frequency range, installation of a 2-wire, negative impedance repeater unit is recommended. (Refer to page 2-35 for specifications.)

5.23 The repeater unit is installed at the MDF between the IDC terminal block and the cabling to the off-premises single-line station. For proper installation with the 416/832 System, the following are connected to the appropriate "pins" on the repeater unit (refer to the manufacturer's instructions for proper pin locations): -Battery (-24 to -56VDC), Ground, System Tip, System Ring, OPX Tip, and OPX Ring. For complete installation instructions, contact Customer Support. Informa-

tion on operating and adjusting the repeater unit is included with the product.

5.24 Install the off-premises extensions as follows (refer to Figure 3-18 on page 3-28):

- (1) At the MDF, terminate each telephone company OPX circuit (or customer-provided circuit) on the *right* side of the appropriate IDC terminal block.
- (2) Install bridging clips on the IDC block(s) to complete the connection.
- (3) At the off-premises location, terminate each telephone company OPX circuit or customer-provided circuit on the appropriate single-line set modular jack assembly.

**F. CONNECTING THE MATRIX CARD
(MXC) TO THE MDF**

5.25 The MXC is terminated at the MDF so that it can be connected to a variety of optional equipment, including: music sources, power failure transfer equipment, signaling devices, night transfer equipment, etc. Connect the MXC to the MDF as follows:

- (1) Using enough 25-pair cable to run from the MXC terminal block to the Matrix Card in the equipment cabinet, make a termination cable. Attach a 50-pin female amphenol-type connector to the Matrix Card end of the cable. Label the connector "MXC." This connector will be attached to the Matrix Card after the telecommunication cards are installed in the equipment cabinet.
- (2) Terminate the other end of the cable on the *left* side of the MXC block.
- (3) Terminate the desired optional equipment on the *right* side of the MXC block as shown in Figure 3-20 on the following two pages.
- (4) Install bridging clips on the MXC block to complete the installation.

FIGURE 3-20. MATRIX CARD (MXC) CABLE TERMINATIONS

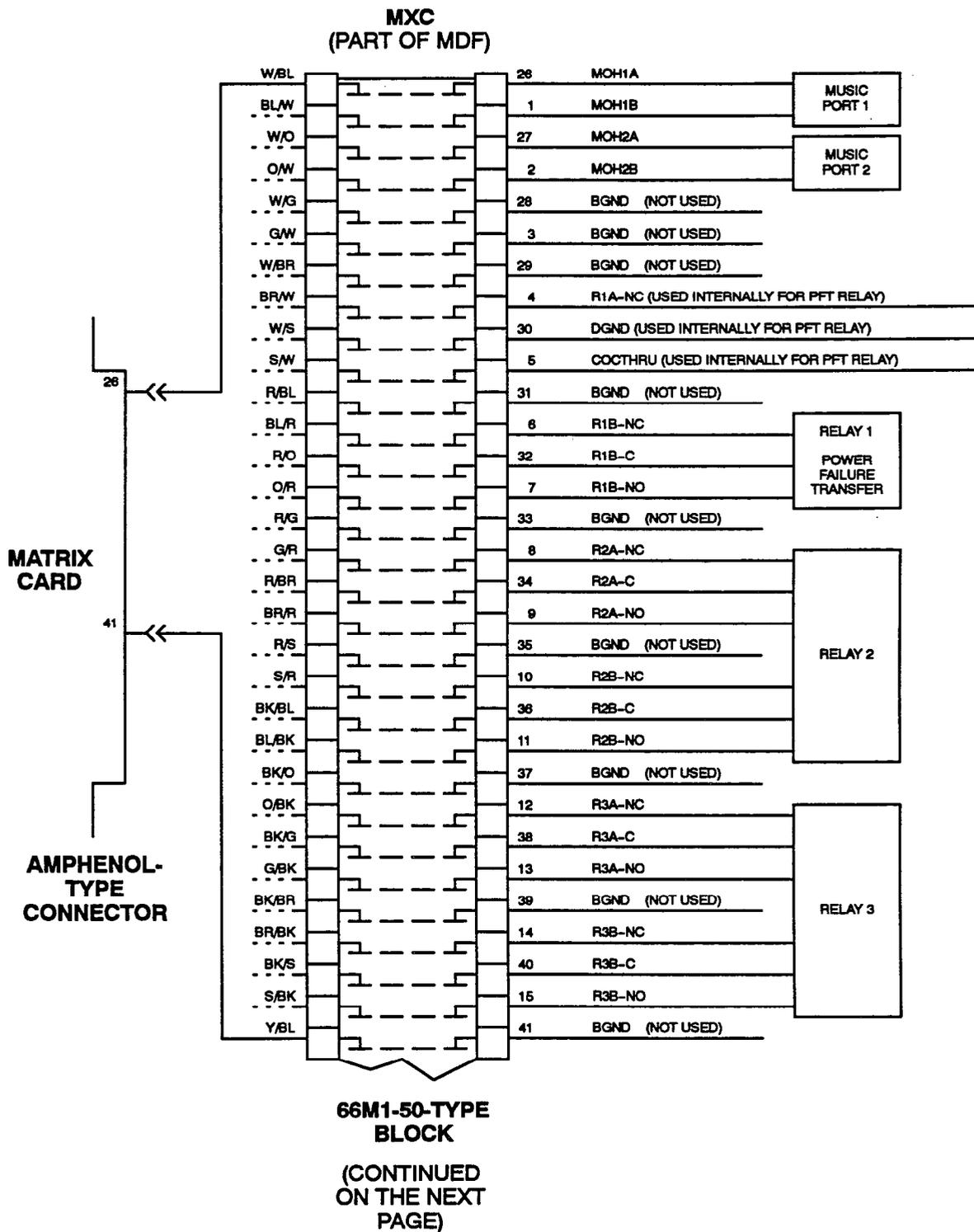
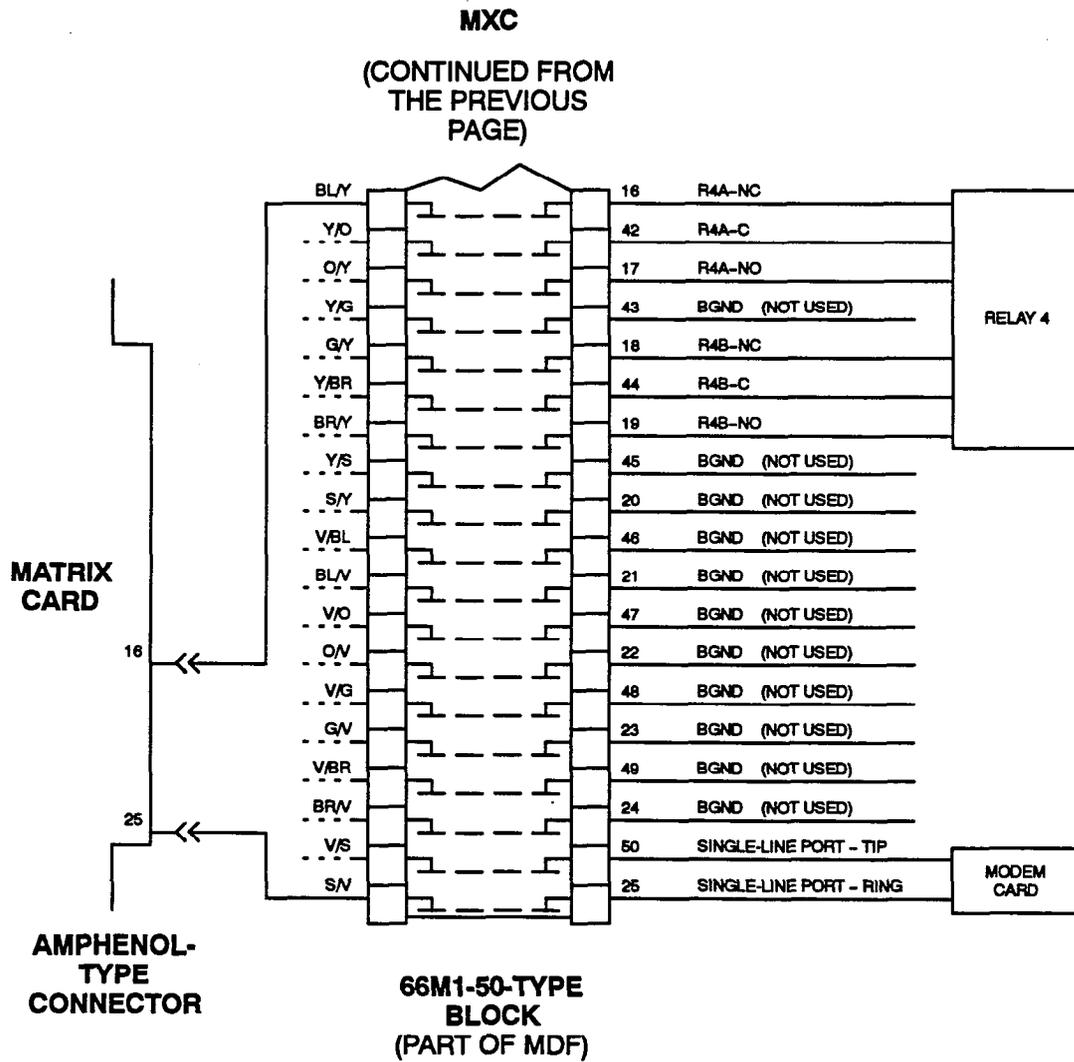


FIGURE 3-20. MATRIX CARD (MXC) CABLE TERMINATIONS (CONT'D)



**G. CONNECTING THE EXPANSION (EXP)
CARD TO THE MDF**

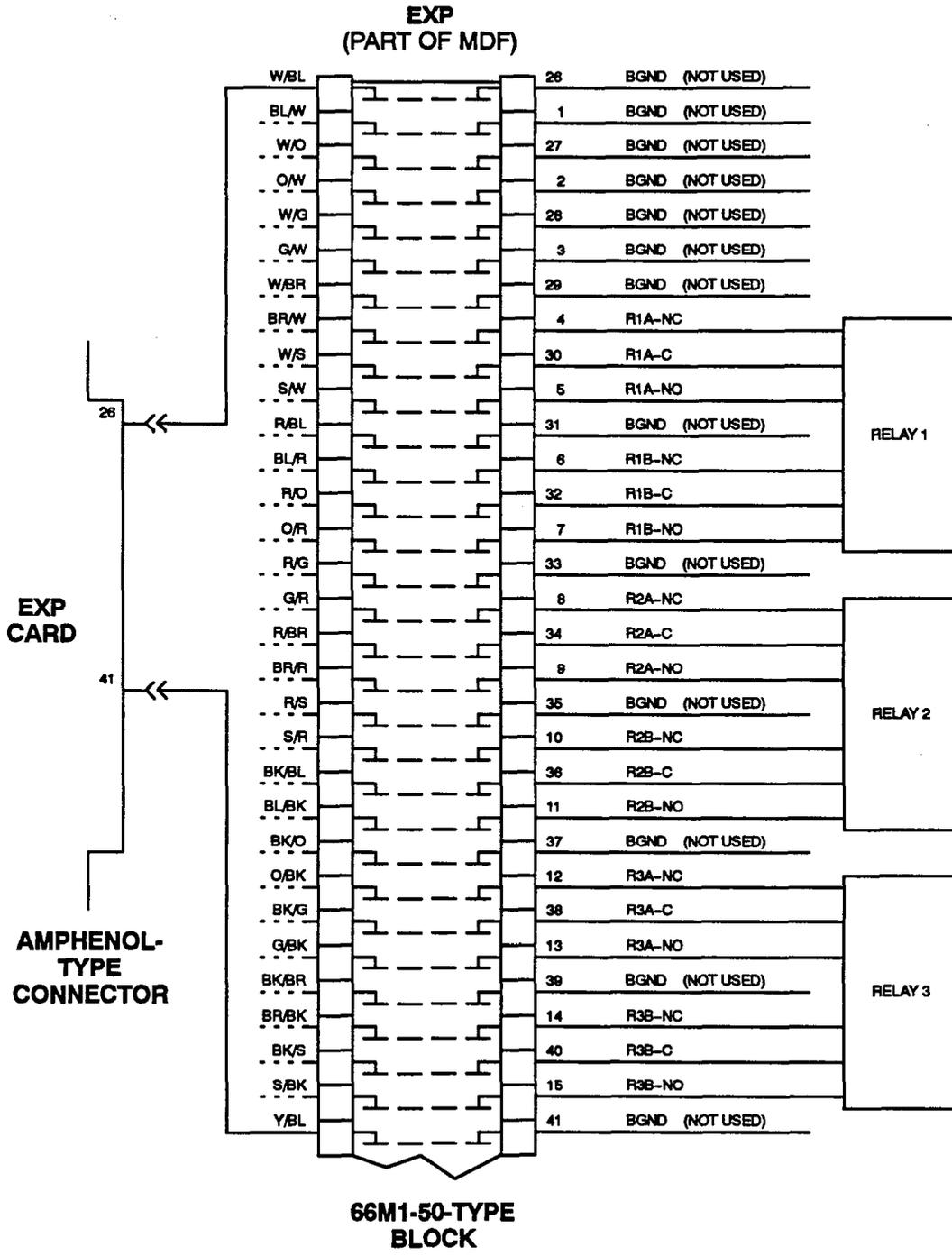
5.26 The EXP Card is terminated at the MDF so that it can be connected to a variety of optional equipment, including signaling devices, night transfer equipment, etc. Connect the EXP Card to the MDF as follows:

- (1) Using enough 25-pair cable to run from the EXP terminal block to the EXP Card in the expansion cabinet, make a termination cable. Attach a 50-pin female amphenol-type connector to the EXP Card end of the cable. Label the connector

"EXP." This connector will be attached to the EXP Card after it is installed in the expansion cabinet.

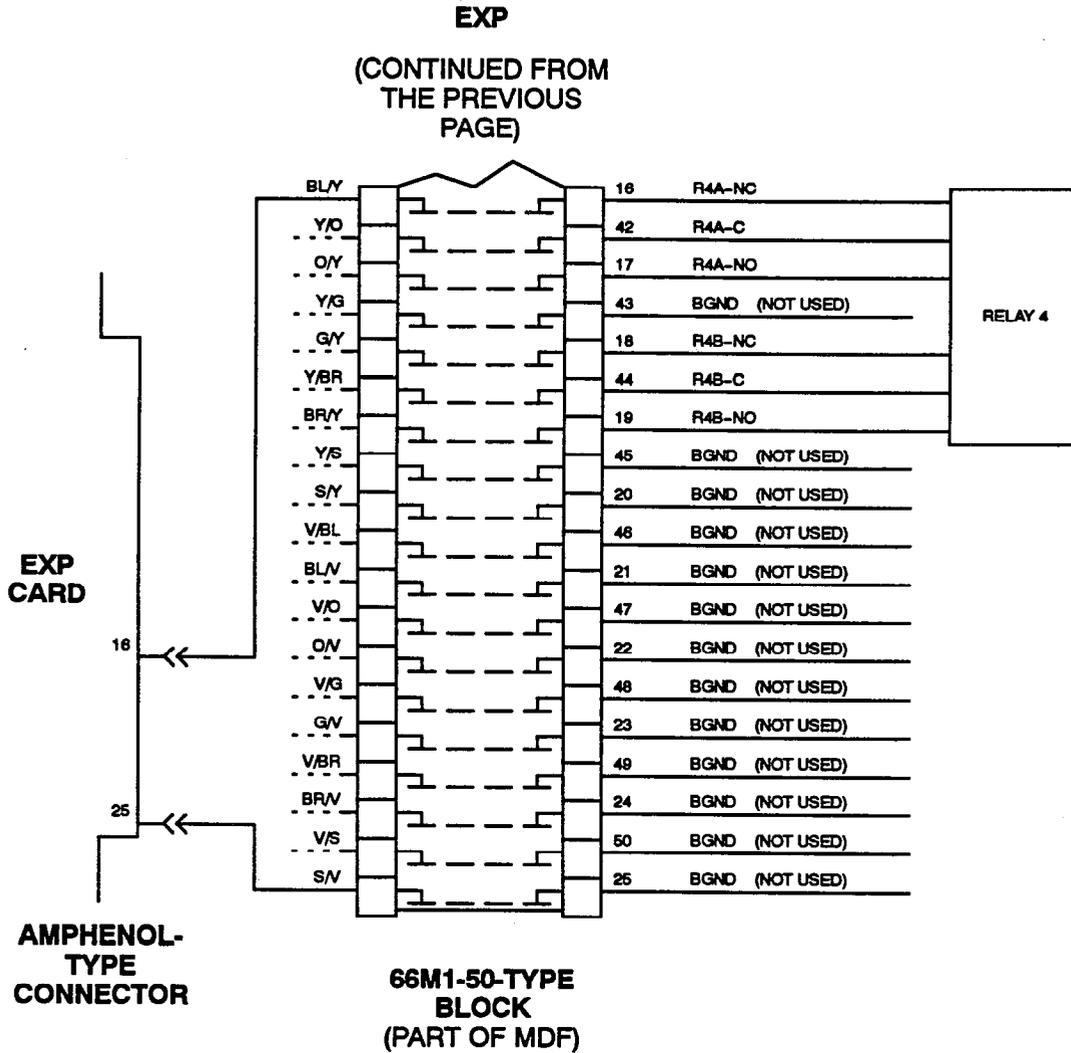
- (2) Terminate the other end of the cable on the *left* side of the EXP block.
- (3) Terminate the desired optional equipment on the *right* side of the EXP block as shown in Figure 3-20 on the following two pages.
- (4) Install bridging clips on the EXP block to complete the installation.

FIGURE 3-21. EXPANSION (EXP) CARD CABLE TERMINATIONS



66M1-50-TYPE
 BLOCK
 (CONTINUED
 ON THE NEXT
 PAGE)

FIGURE 3-21. EXPANSION (EXP) CARD CABLE TERMINATIONS (CONT'D)



H. CONNECTING OPTIONAL T1 ALARM RELAY DEVICES TO THE MDF

5.27 In addition to the T1 span connection (as outlined on page 3-18), T1 Cards may also be connected to optional T1 alarm signaling devices.

5.28 Terminate each T1 Card alarm relay on the MDF as follows:

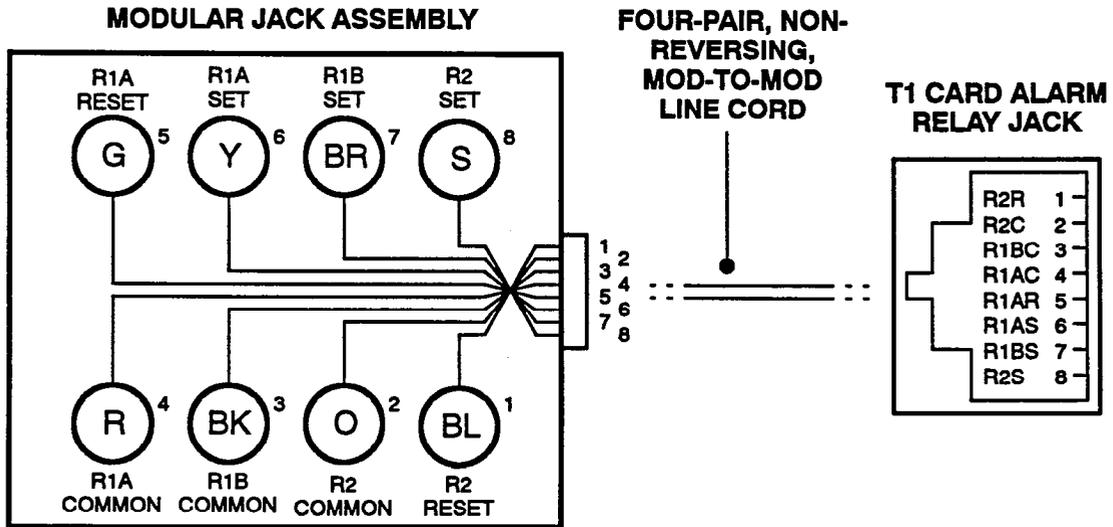
- (1) Run cable from the optional T1 alarm signaling device(s) to the MDF.
- (2) At the MDF, mount an eight-conductor modular jack assembly.

- (3) Wire the cable(s) onto the modular jack. Refer to Figure 3-22 below for a diagram of the wiring.

NOTE: For information on programming T1 alarm relays, refer to page 5-129 in the PROGRAMMING section of the manual.

- (4) Plug one end of a four-pair, non-reversing (straight through), mod-to-mod line cord into the modular jack assembly. The other end of the line cord will later be plugged into the alarm relay jack on the corresponding T1 Card.

FIGURE 3-22. MODULAR JACK ASSEMBLY WIRING FOR OPTIONAL T1 ALARM RELAYS



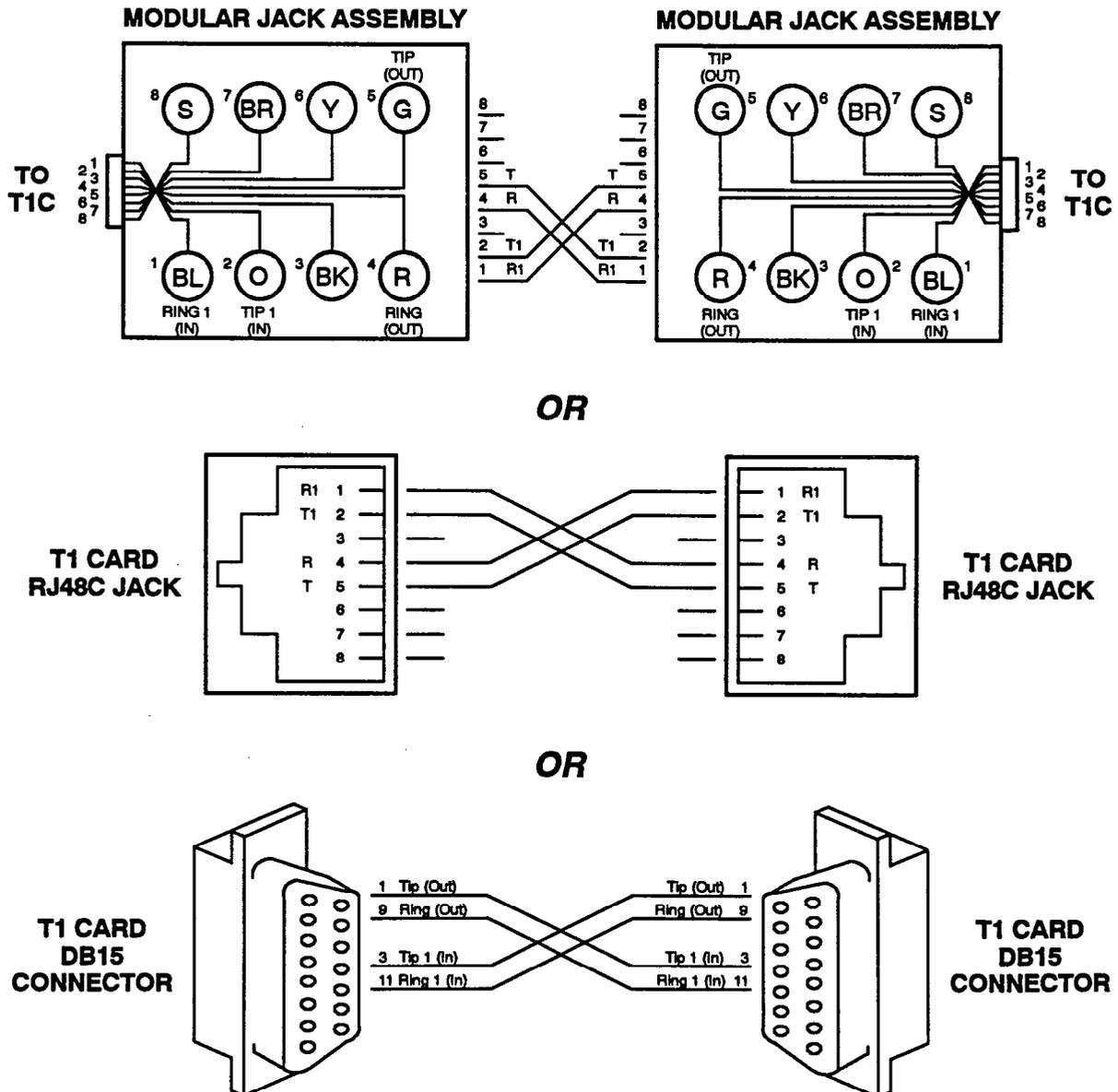
I. CONNECTING TWO 416/832 SYSTEMS TOGETHER USING T1 CARDS

5.29 Although most T1 interfaces will be with the public network, it is possible to use T1 Cards to connect two telephone systems together (e.g., two 416/832 Systems). To do this without CSUs, the two systems must be located in the same building and the cabling between them must be less than 655 feet. If each system is equipped with a CSU, they may be located in separate

buildings and the cabling between them may be as long as 6000 feet.

5.30 In addition, when connecting two 416/832 Systems together, the line cord (or cabling) between the two T1 Cards must be wired so that the receive pair (tip1 in and ring1 in) on each card is connected to the transmit pair (tip out and ring out) on the other card, as shown in the figure below. (For information on programming various types of T1 installations, refer to pages 5-122 to 5-130.)

FIGURE 3-23. CONNECTING TWO T1 CARDS TOGETHER



6. EQUIPMENT CABINET INSTALLATION

A. UNPACK THE EQUIPMENT

Main Equipment Cabinet

6.1 The main equipment cabinet and its accompanying parts are shipped in several boxes. Two of the boxes, labeled A and B, contain all of the equipment necessary to assemble a basic 416/832 System. The remaining boxes contain equipment ordered for the customer's specific application needs.

6.2 Box A contains the main equipment cabinet with the following items already installed: main power supply chassis, AC power cable, main Telecom Motherboard, Telecom Motherboard power cable, system status panel, system status panel (display) cable, HDLC power cable (in the same cable binder as the system status panel cable), peripheral connector panel, keyboard interface cable, serial port 1 interface cable, serial port 2 interface cable, and monitor interface cable. Also included inside the cabinet are a set of keys to the front door and two cable brackets for securing any cables that will be dropped from the ceiling.

6.3 Box B contains these items: PC Motherboard power cable, two disk drive power cables, two Quad Modules, +30V Master Module, -48V Module, 90VAC Ring Generator Module, PC Motherboard, HDLC Card, Monitor Card, 68000 Co-Processor (Pro68) Card (or Pro68E Card), Modem Card (with mod-to-mod line cord), Disk Controller Card, Matrix Card, hard disk drive, floppy disk drive, PC cover, two or three disk-to-controller interface cables (one floppy and one or two hard), Pro68-to-HDLC interface cable, HDLC-to-MXC interface cable, floppy disks containing MS-DOS software, and all necessary mounting hardware (screws, washers, etc.).

6.4 Depending on the number and type of station cards, trunk cards, station instruments, and optional equipment ordered by the customer, the remaining boxes can contain a variety of items including: installation manual, user documentation, keysets, single-line sets, +30V Slave Modules, Keyset Cards, Single-Line Cards, Inward Dialing Cards, Loop/Ground Start Cards, Loop Start Cards, E&M Cards, T1 Cards, Pro68 512k Memory Card, system software disks, Matrix Peripheral Processor Chip, etc.

Expansion Cabinet

6.5 The expansion cabinet is shipped with the expansion Telecom Motherboard, expansion power cable, and EXP-to-MXC data cable already installed. Other items shipped with the expansion cabinet include: expansion

power supply chassis, V-ring power cable, Quad Module, Master 30V Module, Expansion (EXP) Card, Pro68 3MB Memory Card or Pro68E SIMMs, MXC Expansion Chips, lifting handles, cable bracket, keys to the front door, and all necessary mounting hardware (screws, washers, etc.).

6.6 The system software disks and the Expansion Peripheral Processor Chip are shipped in a separate box. Depending on the quantity and type of additional equipment ordered, a -48V Module and one or two Slave 30V Modules may also be included.

Checking the Equipment

6.7 Unpack the boxes and inspect the equipment cabinet, the expansion cabinet (if ordered), and all accompanying parts following these guidelines:

- (1) Check the parts against the packing slip and inspect them for damage. If any item is missing or damaged, contact Customer Support immediately.
- (2) Check all computer and telecommunication circuit card assemblies as follows:

NOTE: The cards contain static-sensitive components. Handle all cards by the edges only; however, avoid touching the gold contacts on the side of the card that plugs into the equipment cabinet. (For additional precautionary information, refer to the CAUTION on page 3-60.)

- a. Check each card to ensure there is no shipping foam or tape attached.
- b. Inspect each card for shorted components.
- c. Return all cards to their protective bags until they are ready to be installed in the equipment cabinet.

B. CHECK THE EQUIPMENT CABINET PRE-ASSEMBLY

Main Equipment Cabinet Pre-Assembly

6.8 The main equipment cabinet is shipped partially assembled. To ensure that none of the items have been damaged or have become unattached during shipment, follow the instructions below and refer to the drawings on the following pages.

- (1) Position the equipment cabinet near the MDF backboard.
- (2) If desired, the equipment cabinet front door and back panel may be removed for easier access to the internal structure.

To remove the back panel:

- a. Turn the locking screw near the top of the panel a $\frac{1}{4}$ -turn counterclockwise, allowing the panel to open from the top.
- b. Lift the panel up off of the two supporting pins at the bottom. Set the panel aside.

NOTE: A set of keys for the lock on the front door is packaged along with the cable brackets and placed inside the cabinet.

To remove the front door:

- a. Unlock the door, open it, and (if applicable) unhook the wire cable or chain between the cabinet and the door.
 - b. Pull/push the two spring-loaded retention bars in the appropriate direction and slide the door off. Set the door aside.
- (3) Check to see that the Telecom Motherboard is securely installed in the bottom portion of the rear of the equipment cabinet (there should be 22, 6-32 \times $\frac{3}{8}$ -inch screws with self-locking star washers holding the card in place).
 - (4) Check to make sure that the metal power supply chassis is securely installed in the upper portion of the rear of the equipment cabinet (the bottom edge of the chassis fits under a metal lip, and there should be three, 8-32 \times $\frac{1}{2}$ -inch screws with self-locking star washers holding the chassis in place).
 - (5) Ensure that the Telecom Motherboard power cable, which comes pre-routed in the channel on the side of the cabinet, is securely attached to both the Telecom Motherboard and the front of the power supply chassis (see Figure 3-24 on the next page for a drawing of the Telecom Motherboard power cable location):
 - a. At the rear of the cabinet, confirm that the 31 small power cable connectors are attached to the appropriate connectors on the Telecom Motherboard. (See Figures 3-25 and 3-26 on pages 3-42 and 3-43.)
 - b. At the front of the cabinet, confirm that the four large power cable connectors are attached to the appropriate connectors on the front of the power supply chassis. (Refer to Figure 3-30 on page 3-49.)

- (6) Ensure that the power supply end of the HDLC power cable is attached to the appropriate connector on the front of the power supply chassis. (See Figure 3-30 on page 3-49.)

NOTE: The HDLC power cable is included in the same cable binder as the system status panel cable. The free ends of the cables hang from a cable tie near where the PC Motherboard will be installed.

- (7) *If installing an older MFM-type hard disk drive, confirm that the disk drive cooling fan, which is provided to circulate air over the hard and floppy disk drives, is properly installed in the disk drive mounting compartment. If not, follow these steps:*
 - a. With the tabs to the front, position the fan in the bottom of the disk drive mounting compartment (see Figure 2-3 on page 2-39).
 - b. Squeeze the two sides of the fan's mounting bracket together enough to slide the tabs into the slots on the bottom of the disk drive mounting compartment.
 - c. Plug the plastic connector on the free end of the fan's power cable into one of the vacant disk drive connectors on the power supply chassis.
- (8) Check to make sure that the system status panel is securely installed in the upper-left corner of the front of the equipment cabinet.
- (9) Ensure that the system status panel (display) cable is attached to the panel (see the NOTE to step 6).
- (10) Confirm that the peripheral connector panel is securely installed in the upper-left corner of the back of the equipment cabinet. (Refer to Figure 3-27 on page 3-44.)
- (11) Check to see that the following cables are properly attached to the internal side of the peripheral connector panel and are routed so that their free ends are lying in the soffit (the cable shelf separating the top and bottom sections of the cabinet):
 - Keyboard interface cable
 - Serial port 1 interface cable
 - Serial port 2 interface cable
 - Monitor interface cable

FIGURE 3-24. TELECOM MOTHERBOARD POWER CABLE (REAR VIEW)

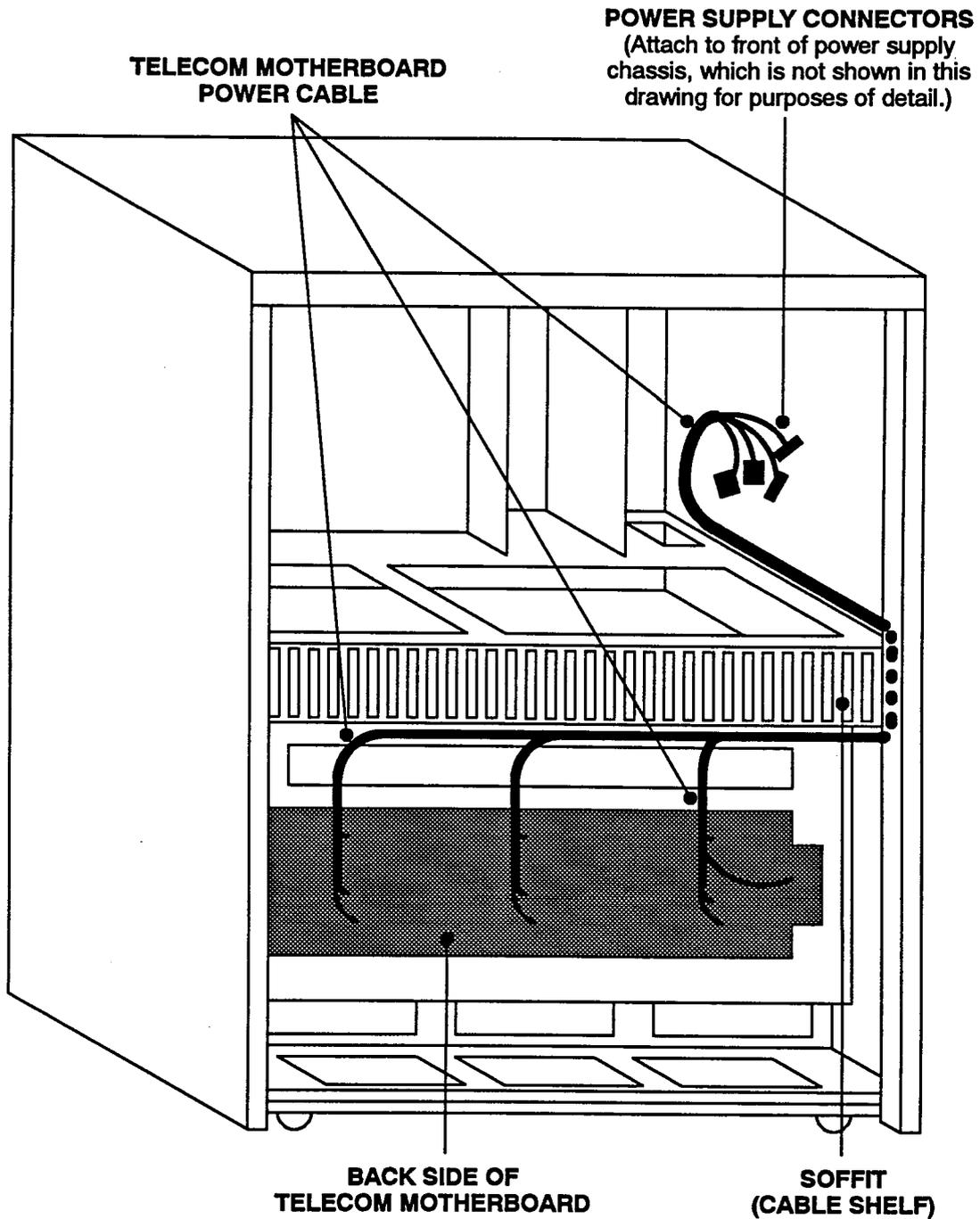


FIGURE 3-25. POWER CABLE CONNECTORS ON THE MAIN TELECOM MOTHERBOARD

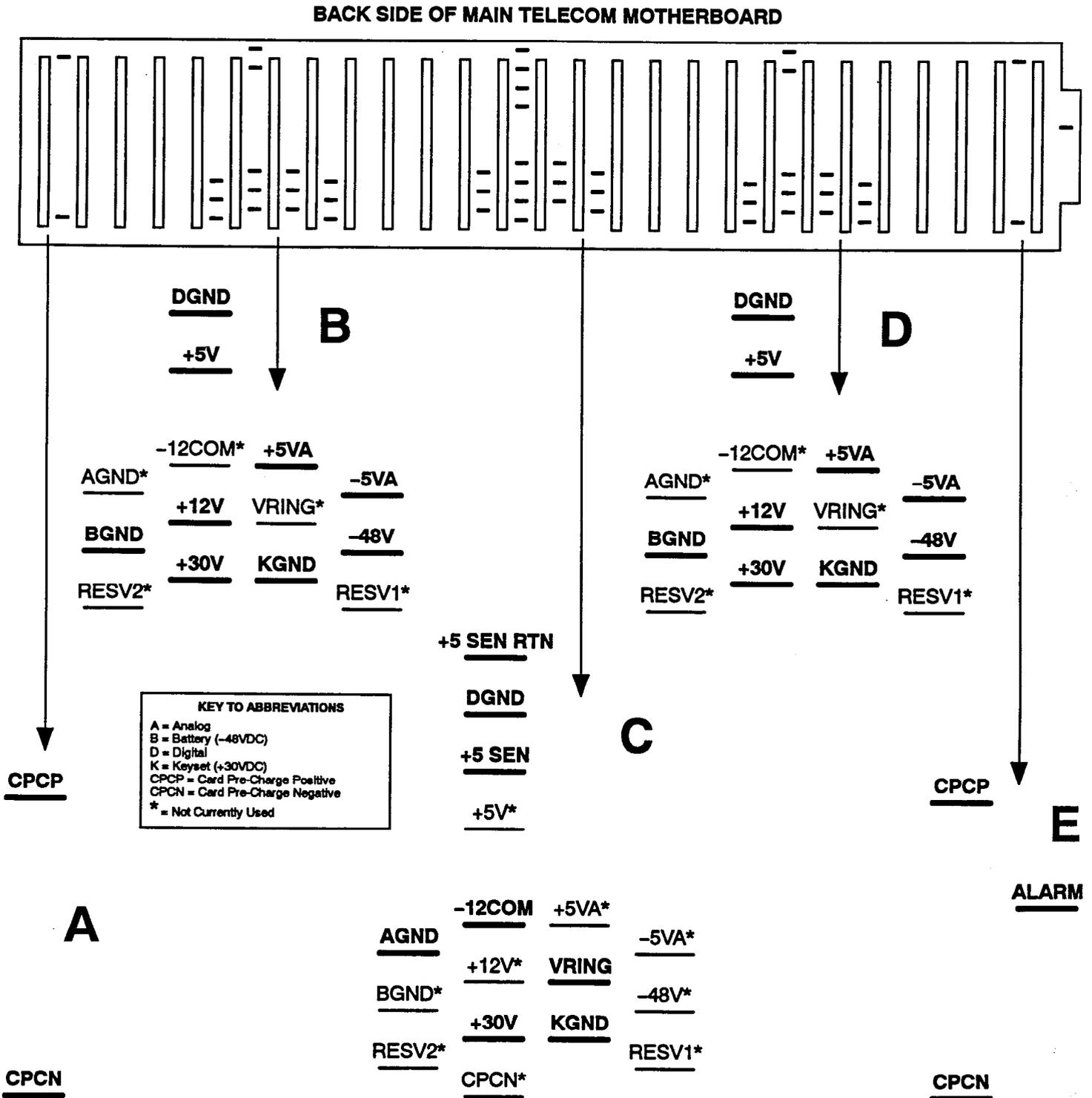
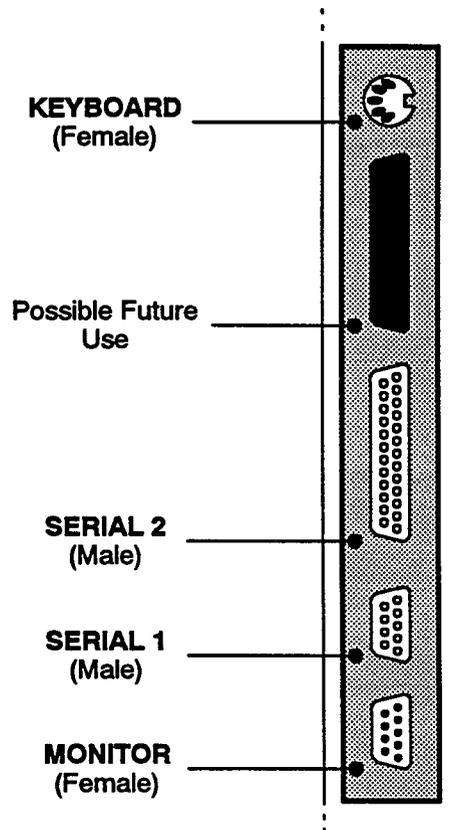


FIGURE 3-26. CONNECTING THE POWER CABLE TO THE MAIN TELECOM MOTHERBOARD

	<u>CONNECTOR</u>	<u>WIRE COLOR</u>	
A	CPCP	— ORANGE (18 GAUGE)	
	CPCN	— RED (18 GAUGE)	
	AGND	— <i>NOT CURRENTLY USED</i>	
	BGND	— ORANGE/RED	
	RESV2	— <i>NOT CURRENTLY USED</i>	
	DGND	— BROWN	
	+5V	— GREEN/BLACK	
	-12COM	— <i>NOT CURRENTLY USED</i>	
	B	+12V	— BLUE
		+30V	— WHITE/YELLOW
+5VA		— GRAY/BLACK	
VRING		— <i>NOT CURRENTLY USED</i>	
KGND		— WHITE/BROWN	
-5VA		— YELLOW (18 GAUGE)	
-48V		— ORANGE/YELLOW	
RESV1		— <i>NOT CURRENTLY USED</i>	
C		AGND	— PURPLE (14 GAUGE)
		BGND	— <i>NOT CURRENTLY USED</i>
	RESV2	— <i>NOT CURRENTLY USED</i>	
	+5 SEN RTN	— BLACK	
	DGND	— RED (14 GAUGE)	
	+5 SEN	— RED (22 GAUGE)	
	+5V	— <i>NOT CURRENTLY USED</i>	
	-12COM	— GREEN	
	+12V	— <i>NOT CURRENTLY USED</i>	
	+30V	— WHITE/GREEN	
D	CPCN	— <i>NOT CURRENTLY USED</i>	
	+5VA	— <i>NOT CURRENTLY USED</i>	
	VRING	— ORANGE/BROWN	
	KGND	— WHITE/RED	
	-5VA	— <i>NOT CURRENTLY USED</i>	
	-48V	— <i>NOT CURRENTLY USED</i>	
	RESV1	— <i>NOT CURRENTLY USED</i>	
	E	AGND	— <i>NOT CURRENTLY USED</i>
		BGND	— ORANGE (14 GAUGE)
		RESV2	— <i>NOT CURRENTLY USED</i>
DGND		— YELLOW (14 GAUGE)	
+5V		— PURPLE (18 GAUGE)	
-12COM		— <i>NOT CURRENTLY USED</i>	
+12V		— WHITE	
+30V		— WHITE/BLUE	
+5VA		— WHITE/BLACK	
VRING		— <i>NOT CURRENTLY USED</i>	
F	KGND	— WHITE/ORANGE	
	-5VA	— GRAY	
	-48V	— ORANGE/GREEN	
	RESV1	— <i>NOT CURRENTLY USED</i>	
	G	CPCP	— ORANGE (18 GAUGE)
		ALARM	— ORANGE (22 GAUGE)
		CPCN	— RED (18 GAUGE)

NOTE: The CPCP and CPCN connectors listed in section A above exist only on newer-version Telecom Motherboards, and they are only connected when using a newer-version power cable.

FIGURE 3-27. PERIPHERAL CONNECTOR PANEL



Expansion Cabinet Pre-Assembly

6.9 The expansion cabinet is shipped partially assembled. To ensure that none of the items have been damaged or have become unattached during shipment, follow the instructions below and refer to the drawings on the following pages.

- (1) Position the expansion cabinet near the main equipment cabinet.
- (2) If desired, the expansion cabinet front door and back panel may be removed for easier access to the internal structure.

To remove the back panel:

Lift the panel up off of the supporting pins and set the panel aside.

To remove the front door:

- a. Unlock the door, open it, and (if applicable) unhook the wire cable or chain between the cabinet and the door.

NOTE: A set of keys for the lock on the front door is packaged along with the cable bracket, lifting handles, and other miscellaneous hardware.

b. Pull/push the two spring-loaded retention bars in the appropriate directions and slide the door off. Set the door aside.

- (3) Check to make sure that the Telecom Motherboard is securely installed in the rear of the expansion cabinet (there should be 22, 6-32 \times $\frac{3}{8}$ -inch screws with self-locking star washers holding the card in place).
- (4) At the rear of the expansion cabinet, confirm that the 35 small connectors on the end of the expansion power cable are attached to the appropriate connectors on the Telecom Motherboard. (Refer to Figures 3-25 and 3-26 on pages 3-42 and 3-43.)

NOTE: The five large connectors on the other end of the power cable will later be attached to the expansion power supply chassis.

- (5) Check to make sure that one end of the EXP-to-MXC data cable is securely installed on the back, inside wall of the *expansion* cabinet just above the last (27th) connector on the expansion Telecom Motherboard.

NOTE: The other end of the cable will later be installed in the *main* equipment cabinet just below the connector for the Matrix Card.

FIGURE 3-28. POWER CABLE CONNECTORS ON THE EXPANSION TELECOM MOTHERBOARD

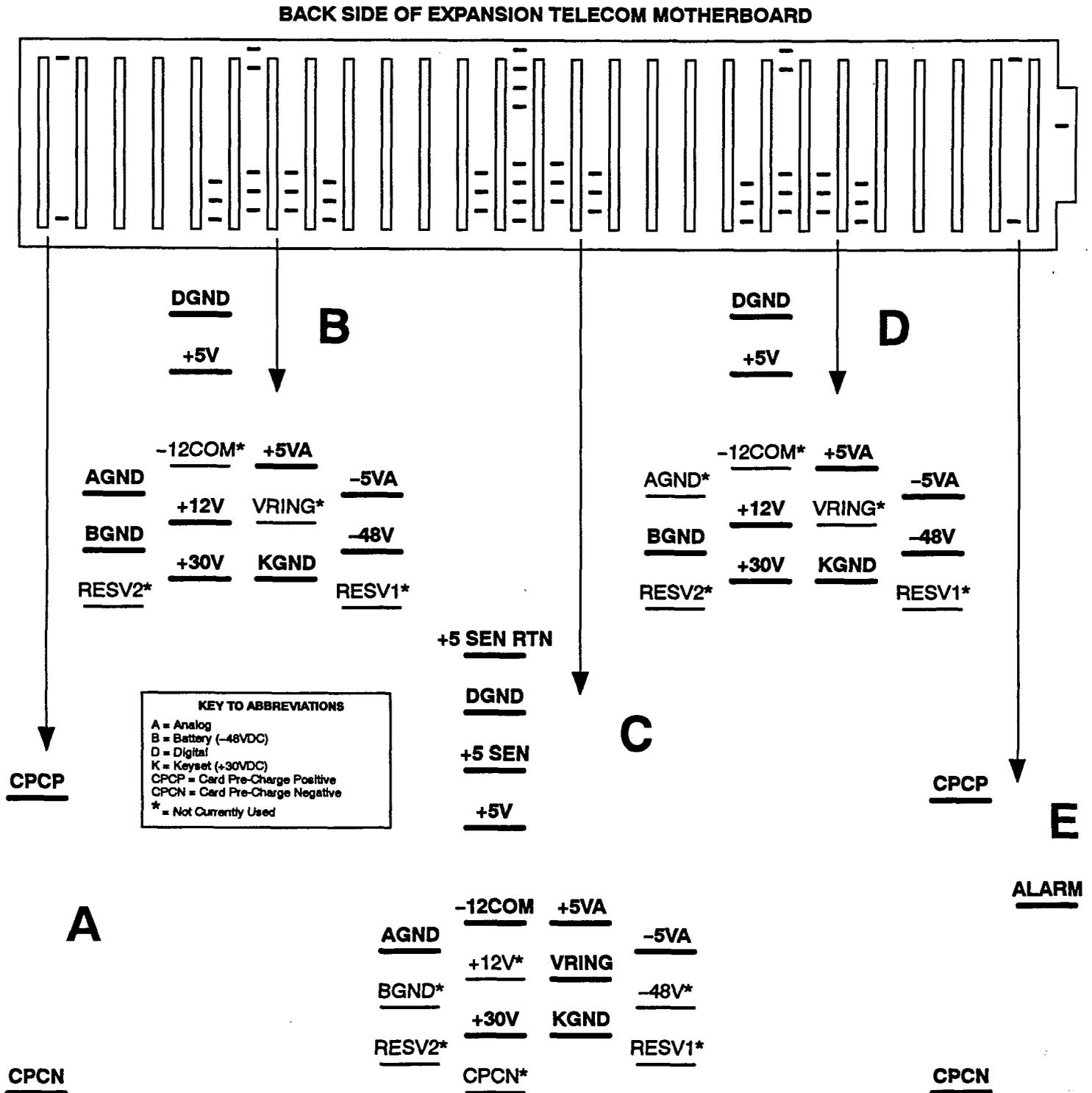


FIGURE 3-29. CONNECTING THE POWER CABLE TO THE EXPANSION TELECOM MOTHERBOARD

	CONNECTOR	WIRE COLOR
A	CPCP	— ORANGE (18 GAUGE)
	CPCN	— RED (18 GAUGE)
B	AGND	— BLACK (14 GAUGE)
	BGND	— ORANGE/RED
	RESV2	— <i>NOT CURRENTLY USED</i>
	DGND	— BROWN
	+5V	— GREEN/BLACK
	-12COM	— <i>NOT CURRENTLY USED</i>
	+12V	— BLUE
	+30V	— WHITE/YELLOW
	+5VA	— GRAY/BLACK
	VRING	— <i>NOT CURRENTLY USED</i>
	KGND	— WHITE/BROWN
	-5VA	— YELLOW (18 GAUGE)
	-48V	— ORANGE/YELLOW
	RESV1	— <i>NOT CURRENTLY USED</i>
C	AGND	— PURPLE (14 GAUGE)
	BGND	— <i>NOT CURRENTLY USED</i>
	RESV2	— <i>NOT CURRENTLY USED</i>
	+5 SEN RTN	— BLACK (22 GAUGE)
	DGND	— RED (14 GAUGE)
	+5 SEN	— RED (22 GAUGE)
	+5V	— BLACK/RED
	-12COM	— GREEN
	+12V	— <i>NOT CURRENTLY USED</i>
	+30V	— WHITE/GREEN
	CPCN	— <i>NOT CURRENTLY USED</i>
	+5VA	— BLACK/ORANGE
	VRING	— ORANGE/BROWN
	KGND	— WHITE/RED
-5VA	— BLACK/YELLOW	
-48V	— <i>NOT CURRENTLY USED</i>	
RESV1	— <i>NOT CURRENTLY USED</i>	
D	AGND	— <i>NOT CURRENTLY USED</i>
	BGND	— ORANGE (14 GAUGE)
	RESV2	— <i>NOT CURRENTLY USED</i>
	DGND	— YELLOW (14 GAUGE)
	+5V	— PURPLE (18 GAUGE)
	-12COM	— <i>NOT CURRENTLY USED</i>
	+12V	— WHITE
	+30V	— WHITE/BLUE
	+5VA	— WHITE/BLACK
	VRING	— <i>NOT CURRENTLY USED</i>
	KGND	— WHITE/ORANGE
	-5VA	— GRAY
	-48V	— ORANGE/GREEN
	RESV1	— <i>NOT CURRENTLY USED</i>
E	CPCP	— ORANGE (18 GAUGE)
	ALARM	— ORANGE (22 GAUGE)
	CPCN	— RED (18 GAUGE)

NOTE: The CPCP and CPCN connectors listed in section A above exist only on newer-version Telecom Motherboards, and they are only connected when using a newer-version power cable.

C. INSTALL THE REMAINING POWER CABLES

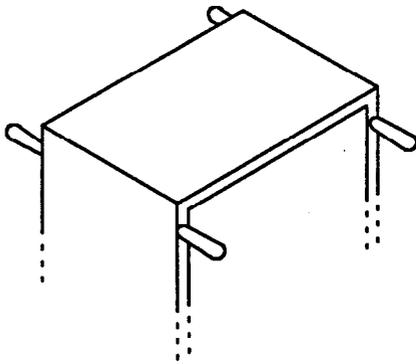
6.10 The PC Motherboard and disk drive power cables, which are included in Box B, must be installed as follows:

- (1) Attach the power supply end of the PC Motherboard power cable to the appropriate connectors on the front of the power supply chassis. (Refer to Figure 3-30 on page 3-49.)
- (2) Attach the power supply ends of the two disk drive power cables to the two remaining disk drive connectors on the front of the power supply chassis. (Refer to Figure 3-30 on page 3-49.)

D. CONNECT THE TWO CABINETS TOGETHER

6.11 To install an expansion cabinet underneath the main equipment cabinet and connect the two together, perform the following steps:

- (1) If not already done, remove the front door and back panel from the main equipment cabinet as outlined on page 3-39.
- (2) Screw the four lifting handles into the holes provided on the main equipment cabinet (as shown below).

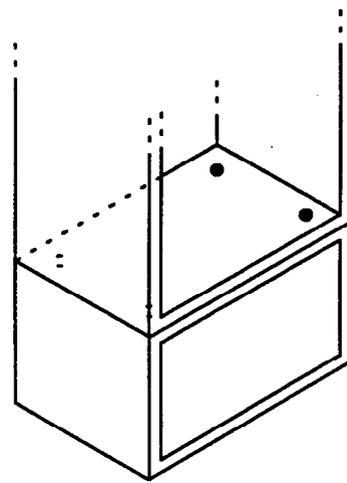


- (3) With one person at each corner, carefully lift the main equipment cabinet up and place it securely on top of the expansion cabinet.

CAUTION

A fully loaded equipment cabinet can weigh several hundred pounds. To avoid injury, use proper lifting technique and exercise extreme caution.

- (4) At each of the four corners, use a $\frac{1}{4}$ -20 \times $\frac{1}{2}$ -inch bolt and a star washer to secure the main equipment cabinet to the expansion cabinet (as shown below).



- (5) Route the free end of the expansion power cable (with the five large connectors) up the back of the equipment cabinet, in through the soffit (cable shelf), and out to the front of the cabinet.
- (6) Connect one end of the V-ring power cable to the appropriate connector on the front side of the *main* power supply chassis. (Refer to Figure 3-30 on page 3-49.)
- (7) While sliding the expansion power supply chassis into place (the bottom edge of the chassis fits under a metal lip that is to the left of the main chassis), connect the free end of the V-ring power cable to the appropriate connector on the front side of the *expansion* power supply chassis. (Refer to Figure 3-31 on page 3-50.)
- (8) Using three, 8-32 \times $\frac{1}{2}$ -inch screws with washers, secure the bottom of the expansion power supply chassis to the equipment cabinet.
- (9) Reaching in through the front of the cabinet, attach the five large connectors on the end of the expansion power cable to the appropriate connectors on the expansion power supply chassis. (Refer to Figure 3-31 on page 3-50.)

FIGURE 3-30. CABLE CONNECTIONS TO THE MAIN POWER SUPPLY CHASSIS

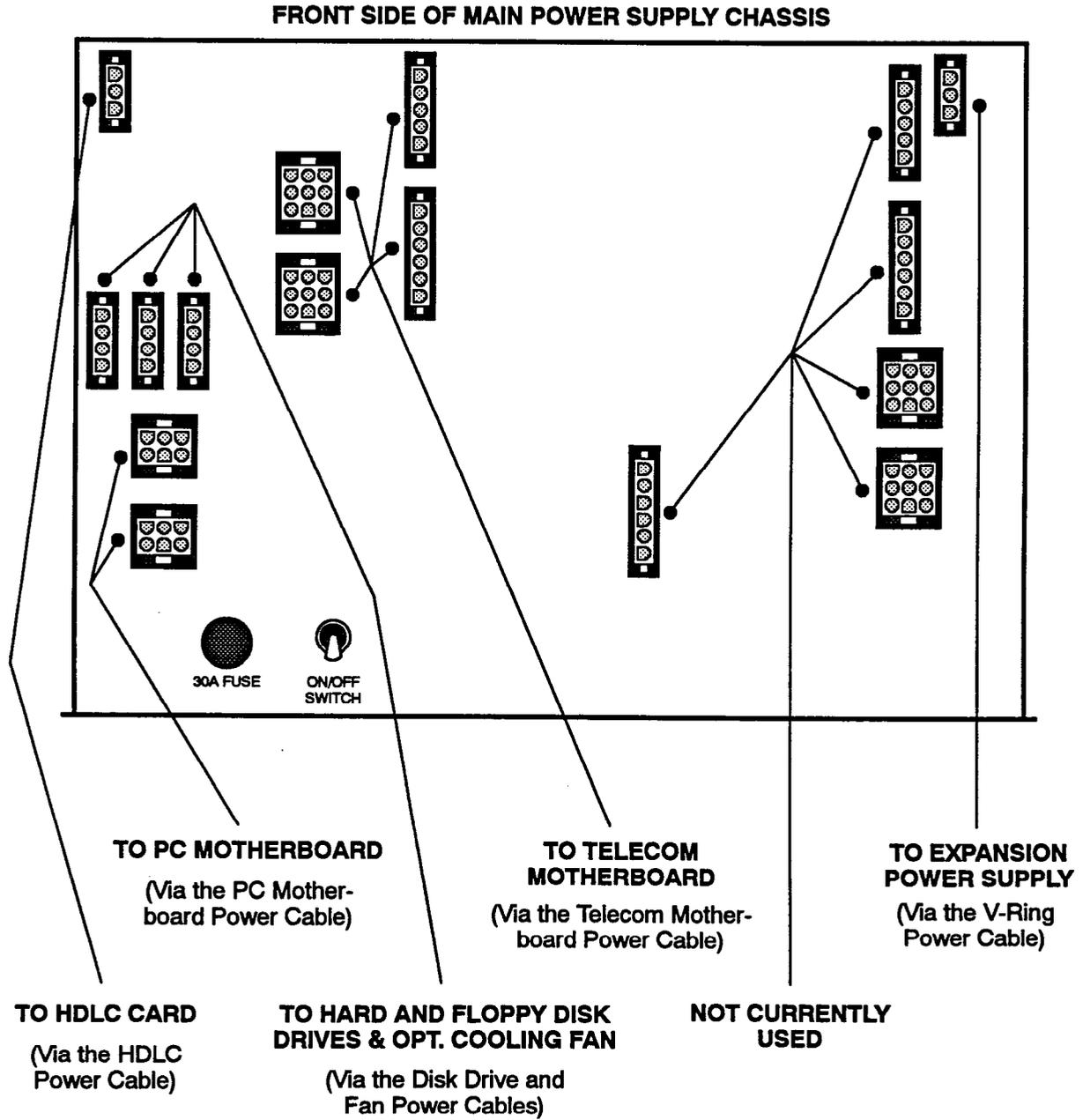
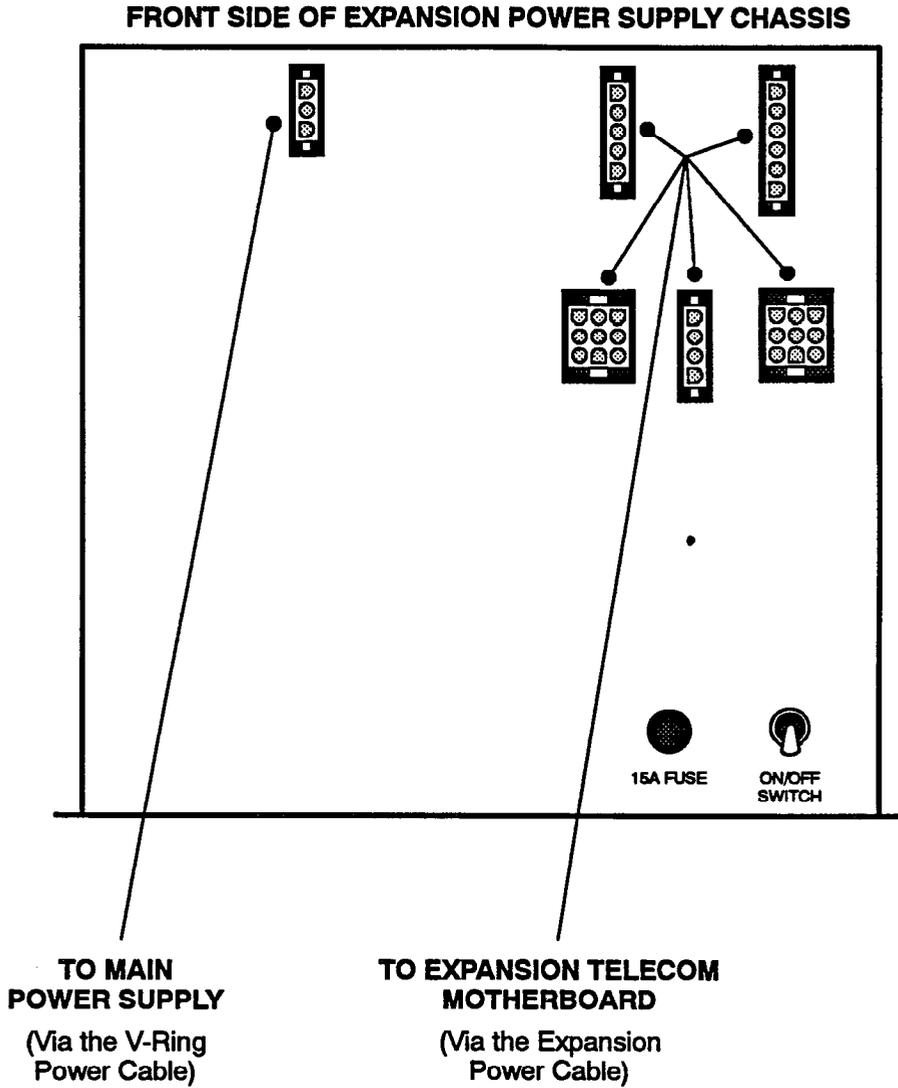


FIGURE 3-31. CABLE CONNECTIONS TO THE EXPANSION POWER SUPPLY CHASSIS



NOTE: Since the fuse on the main power supply chassis also protects the expansion power supply, newer-version expansion power supply chassis are not equipped with a fuse.

E. INSTALL THE POWER SUPPLY
MODULES

CAUTION

HIGH VOLTAGE. When the system power is turned on, each module contains both 350VDC and 110VAC. Before inserting or removing the power supply modules, make sure that the AC POWER switch has been turned OFF for *at least five minutes*. Failure to allow the high voltage to dissipate can cause bodily injury.

6.12 After the main power supply chassis and, if necessary, the expansion power supply chassis have been installed (as outlined on page 3-48), install the power supply modules as follows:

NOTE: Refer to pages 2-10 and 2-11 in SPECIFICATIONS for information concerning module compatibilities and special T1 requirements.

- (1) On each power supply, ensure that the AC power cable is not plugged in and the AC POWER switch is OFF.
- (2) At the rear of the cabinet, remove the screws to the back cover(s) of the power supply chassis, and set the cover(s) aside.

NOTE: For easier power supply module removal, each version C power supply chassis is shipped with an extractor tool attached to the inside of the back cover. The extractor tool may be used with version B and C modules only.

- (3) With the components *facing right*, insert the power supply modules in the appropriate slots. (Refer to Figures 3-32 and 3-33 on the following pages for slot locations.) Note the following requirements:

CAUTION

When inserting the power supply modules, be sure that each module is fully seated in the appropriate slot. If a module is not securely seated when power is turned on, the power supply and circuit cards may be damaged.

- The *main* power supply chassis must be equipped with two Quad Modules, one Master 30V Module, one -48V Module, and one Ring Generator Module.

- If an *expansion* power supply chassis is installed, it must be equipped with one Quad Module and one Master 30V Module.
- Depending on the number and type of keysets to be connected to Keyset Cards (DKSCs, KSCs, or KSC-Ds) in the main equipment cabinet, one or two Slave 30V Modules may also be needed in the main power supply chassis (see page 2-10 for details).
- Depending on the number and type of keysets to be connected to Keyset Cards in the expansion cabinet, one or two Slave 30V Modules may also be needed in the expansion power supply chassis (see page 2-10 for details).
- If any Single-Line Cards (SLCs), Inward Dialing Cards (IDCs), Loop/Ground Start Cards (LGCs), or E&M Cards (EMCs) are to be installed in the expansion cabinet, a -48V Module must also be installed in the expansion power supply chassis.

NOTE: Loop Start Cards (LSCs) and T1 Cards (T1Cs) do not require a -48V Module.

- (4) Slide the back cover(s) of the power supply chassis into place and replace the screws.

CAUTION

Always replace the back cover *before* turning on the system power.

- (5) Plug the AC power cable on the *expansion* power supply chassis into the AC expansion receptacle on the *main* power supply chassis.

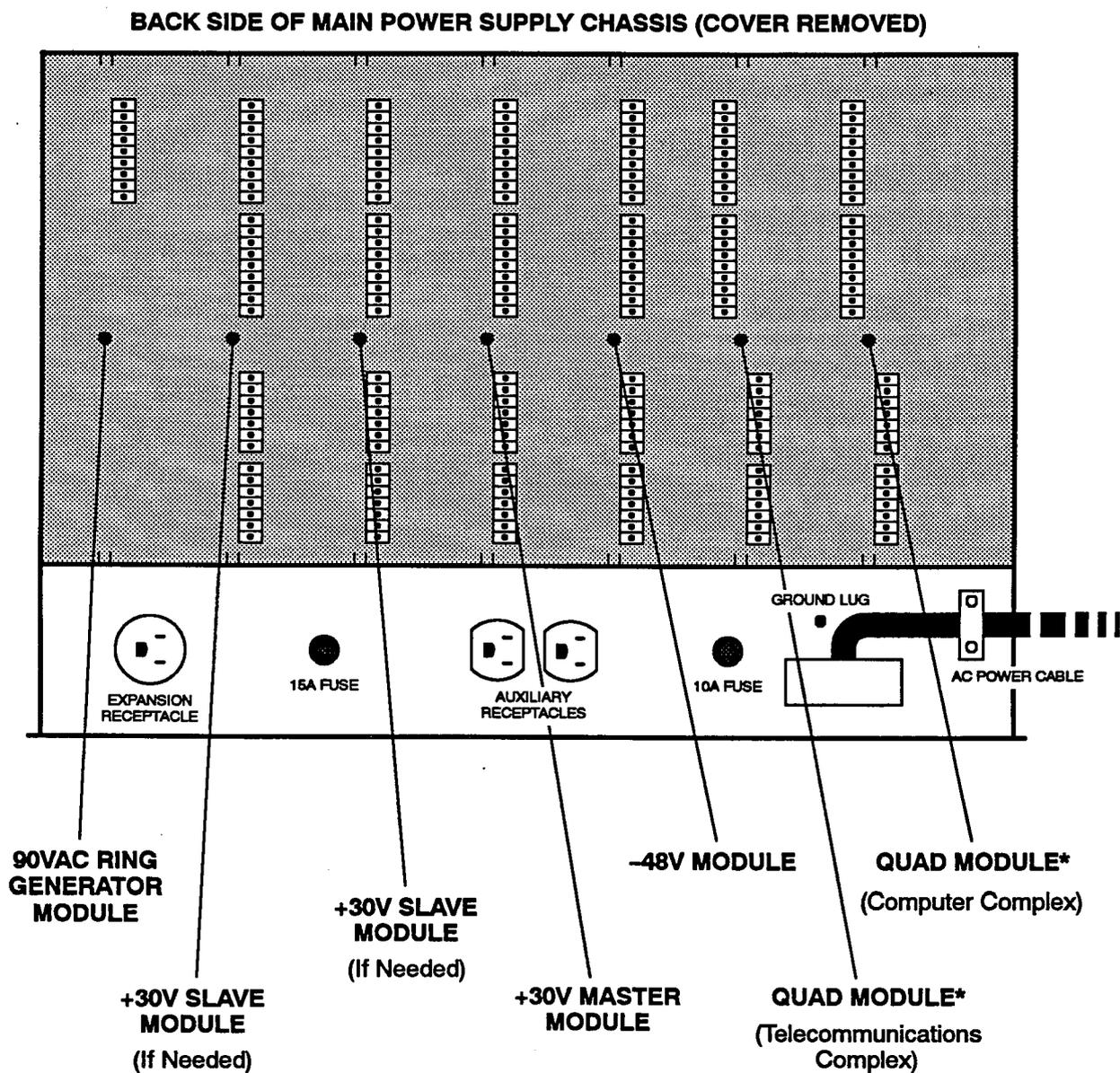
NOTE: **DO NOT** plug in the system AC power cable until the power supply electrical test, as outlined on page 3-55, has been performed.

- (6) Ground the system according to the instructions on page 3-54.

CAUTION

To prevent damage, do not move the equipment cabinet any great distance while the power supply modules are installed.

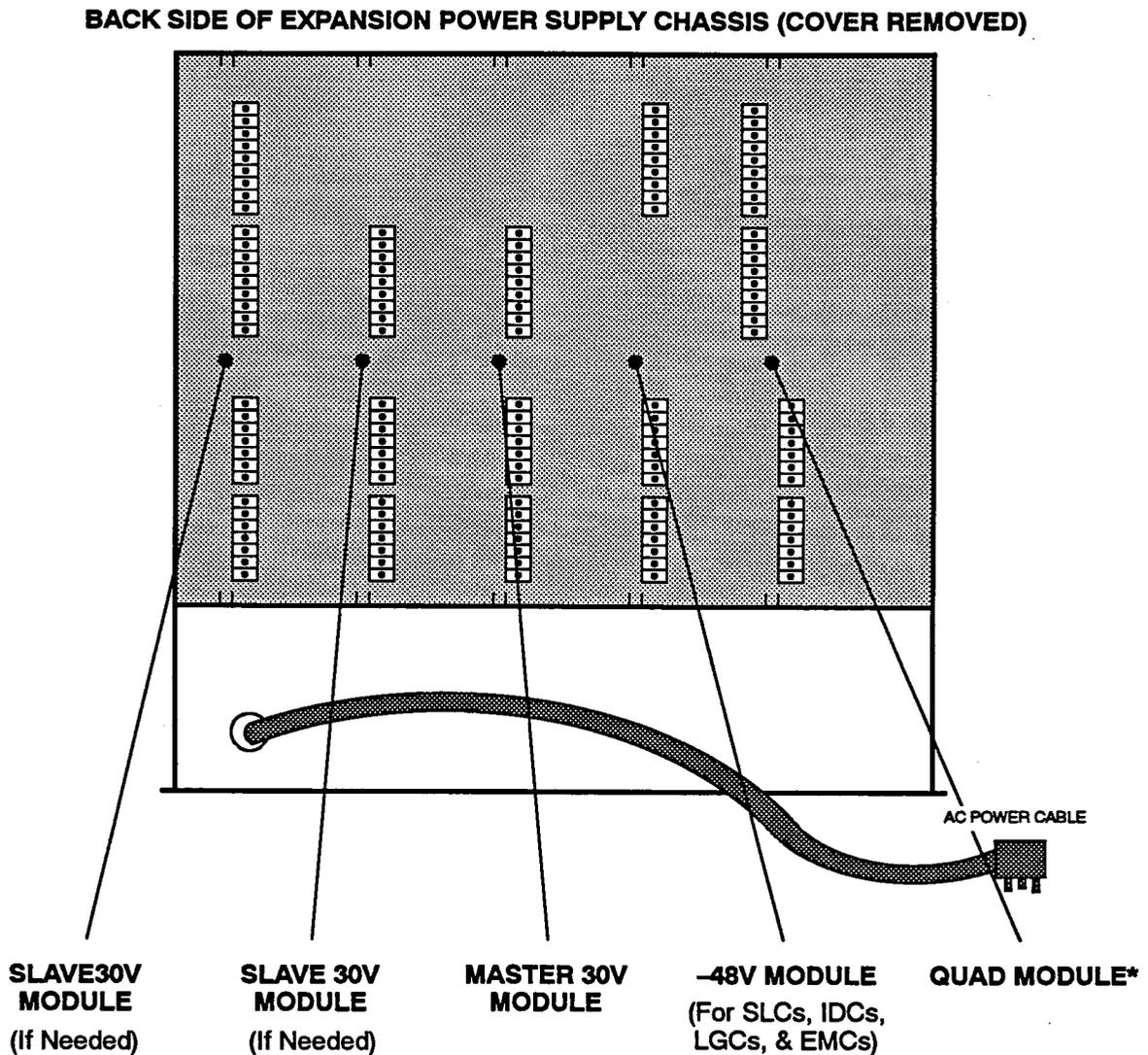
FIGURE 3-32. MAIN POWER SUPPLY MODULE INSTALLATION



* Quad Module supplies +5V, -5V, +12V, and -12V

NOTE: With newer-version power supply chassis, there is more flexibility as to which type of power supply module can be installed in which slot (e.g., some slots can be equipped with either a 30V Module or a -48V Module). To ensure proper installation, refer to the slot labels provided on the chassis.

FIGURE 3-33. EXPANSION POWER SUPPLY MODULE INSTALLATION



* Quad Module supplies +5V, -5V, +12V, and -12V

NOTE: With newer-version expansion power supply chassis, there is more flexibility as to which type of power supply module can be installed in which slot (e.g., some slots can be equipped with either a 30V Module or a -48V Module). To ensure proper installation, refer to the slot labels provided on the chassis.

Grounding Requirements

6.13 The equipment cabinet must be properly grounded to an earth ground point. A copper, cold water pipe is usually a good ground point

NOTE: According to UL 1459, "an insulated grounding conductor that is not smaller in size and equivalent in insulation material and thickness to the grounded and ungrounded branch-circuit supply conductors, except that it is green with or without one or more yellow stripes, is to be installed as part of the circuit that supplies the product or system." Also, "the attachment-plug receptacles in the vicinity of the product or system are all to be of a grounding type, and the grounding conductors serving these receptacles are to be connected to earth ground at the service equipment."

6.14 The grounding wire should be 10AWG or larger and should not exceed 25 feet (7.5 meters) to help provide RFI/EMI protection, or should not exceed 10 feet (3 meters) to help provide both RFI/EMI and lightning protection.

6.15 To ground the system (see Figure 3-34 below):

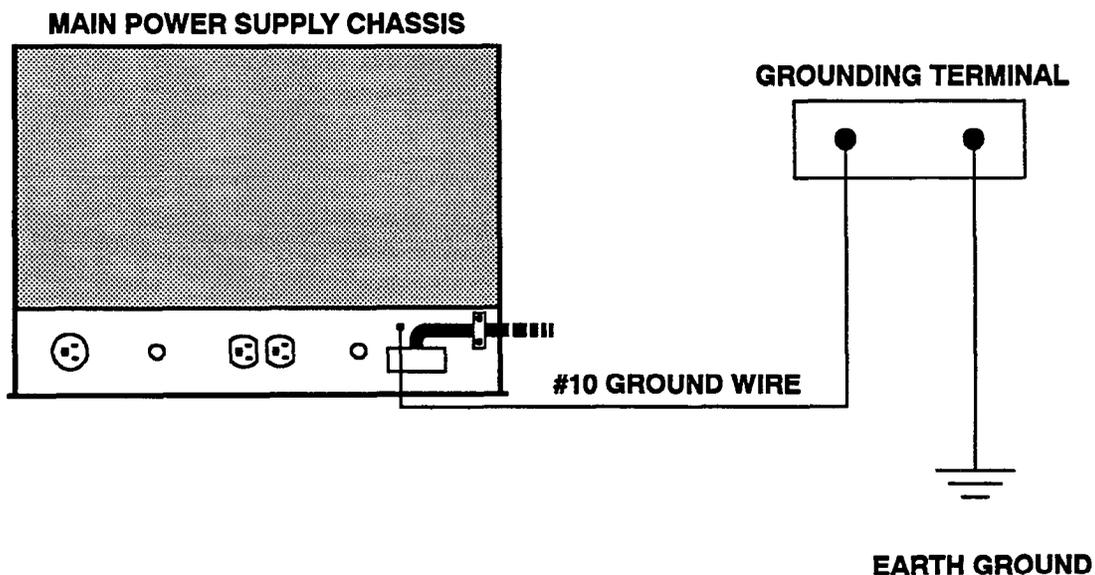
- (1) Ensure that the system's main AC power cable is not plugged into the AC outlet.

- (2) Mount a grounding terminal on the MDF back-board and connect it to:
 - a. An earth ground.
 - b. The ground lug on the back side of the main power supply chassis.
 - c. Battery compartments, if used.
 - d. Trunk gas discharge tubes, if used.

6.16 If AC power-related problems appear on the system while in operation, one of the following two methods can be used to test the ground.

- Use a digital multimeter to measure the difference of potential between the equipment cabinet ground point and the power neutral, and between the equipment cabinet ground point and the third wire ground. If the voltage measurement exceeds 0.5V, noise may develop on the system. If this occurs, call an electrician.
- Use a Megger to test the ground point. (A Megger should be available through the local power company.) The reading should be 5 ohms or less.

FIGURE 3-34. EQUIPMENT CABINET GROUNDING



Power Supply Electrical Test

6.17 Perform the following electrical check on the power supply(s).

- (1) Ensure that the main system AC power cable is not plugged in and that the AC POWER switch on the front of each power supply unit is OFF.
- (2) Check the condition of the fuses located on the power supply(s).
 - a. On the *main* power supply unit, the main fuse (located on the front) should be: 300VAC, 30A, time-delay Buss SC-30 (or equivalent). The auxiliary fuse (located on the back) should be: 125/250VAC, 10A, time-delay Buss SC-10 (or equivalent). The expansion fuse (also located on the back) should be: 125/250VAC, 15A, time-delay Buss SC-15 (or equivalent).
 - b. On the *expansion* power supply unit, the fuse on the front should be: 125/250VAC, 15A, time-delay Buss SC-15 (or equivalent).

NOTE: Since the fuse on the main power supply chassis also protects the expansion power supply, newer-version expansion power supply chassis are not equipped with a fuse.

- (3) Plug the surge/spike protector provided with the system into a 105-125VAC, 57-63Hz, 30A, single-phase commercial power source. Since the surge/spike protector is terminated on a NEMA L5-30 twist-lock plug, a compatible AC receptacle (L5-30R) is needed.

NOTE: This *MUST* be an isolated, dedicated circuit. *DO NOT* use an extension cord when installing the power supply. Also, *DO NOT* plug any other equipment into the same AC outlet; however, the two auxiliary AC receptacles on the back of the main power supply can be used for connecting external equipment such as the programming monitor and/or SMDR/SMDA output device(s).

- (4) Plug the main system AC power cable into the surge/spike protector and turn ON the AC POWER switch on the *main* power supply unit *first*, then turn ON the AC POWER switch on the *expansion* power supply unit.

CAUTION

When powering up the entire system, turn on the *main* power supply *first*, then turn on the expansion power supply. (See page 2-10 for details.) Newer-version main power supply chassis have been modified so that turning off the AC power switch will also turn off the expansion supply.

- (5) Measure the following system voltages. A digital voltmeter of $\pm 0.5\%$ accuracy is required.
 - a. Referring to Figure 3-25 on page 3-42, Figure 3-28 on page 3-46, and the chart following step b, measure the applicable voltages on the back of the main Telecom Motherboard and, if installed, the expansion Telecom Motherboard. Use ground as a reference. The measurements should be within the limits listed in the chart below. (If necessary, remove each power cable connector one at a time and measure the voltage inside the connector.)
 - b. Referring to Figure 3-35 on page 3-57 and the chart below, measure the applicable voltages on the free ends of the PC Motherboard power cable, the two disk drive power cables, and the HDLC power cable. Use ground as a reference. The measurements should be within the following limits:

VOLTAGE	TOLERANCE
-5VDC	$\pm 20\%$ VDC
+5VDC	$\pm 20\%$ VDC
-12VDC	$\pm 20\%$ VDC
+12VDC	$\pm 20\%$ VDC
+30VDC	$\pm 20\%$ VDC
-48VDC	$\pm 20\%$ VDC
VRING (90VAC)	$\pm 20\%$ VAC
PWR ALARM (+4.5VDC)	$\pm 20\%$ VDC
CPCP (+5.5VDC)	$\pm 20\%$ VDC
CPCN (-0.5VDC)	$\pm 20\%$ VDC

NOTE: The CPCP measurement should be .7V (± 0.20 V) *higher* than the actual +5V measurement. The CPCN measurement should be .7V (± 0.20 V) *lower* than the actual ground measurement.

- (6) *If the voltages are within the specified limits, skip to step 8.*

If voltage measurements are not within the specified limits, remove the power cable(s) from the power supply(s) and check the voltages directly at the individual connectors on the front of the main and/or expansion power supply units. Refer to Figures 3-36 and 3-37 on pages 3-58 and 3-59.

- (7) *If the voltages at the individual connectors are within the specified limits, replace the defective cable(s).*

If voltage measurements at the individual connectors are not within the specified limits, replace the defective power supply module(s) and/or the power supply chassis(s).

- (8) Turn OFF the AC POWER switch.

CAUTION

If using a hard disk drive that does not have "self-parking" heads: When powering down the entire system, first "park the heads" on the hard disk drive (as outlined on page 3-154), then turn off the *main* power supply *first* before turning off the expansion power supply. This sequence allows the hard disk drive to shut down properly; the reverse does not allow proper shutdown and may damage the hard disk drive. (See page 2-10 for additional information.) Newer-version main power supply chassis have been modified so that turning off the AC power switch will also turn off the expansion supply.

FIGURE 3-35. CABLE CONNECTOR PINOUTS AND VOLTAGE TEST POINT LOCATIONS

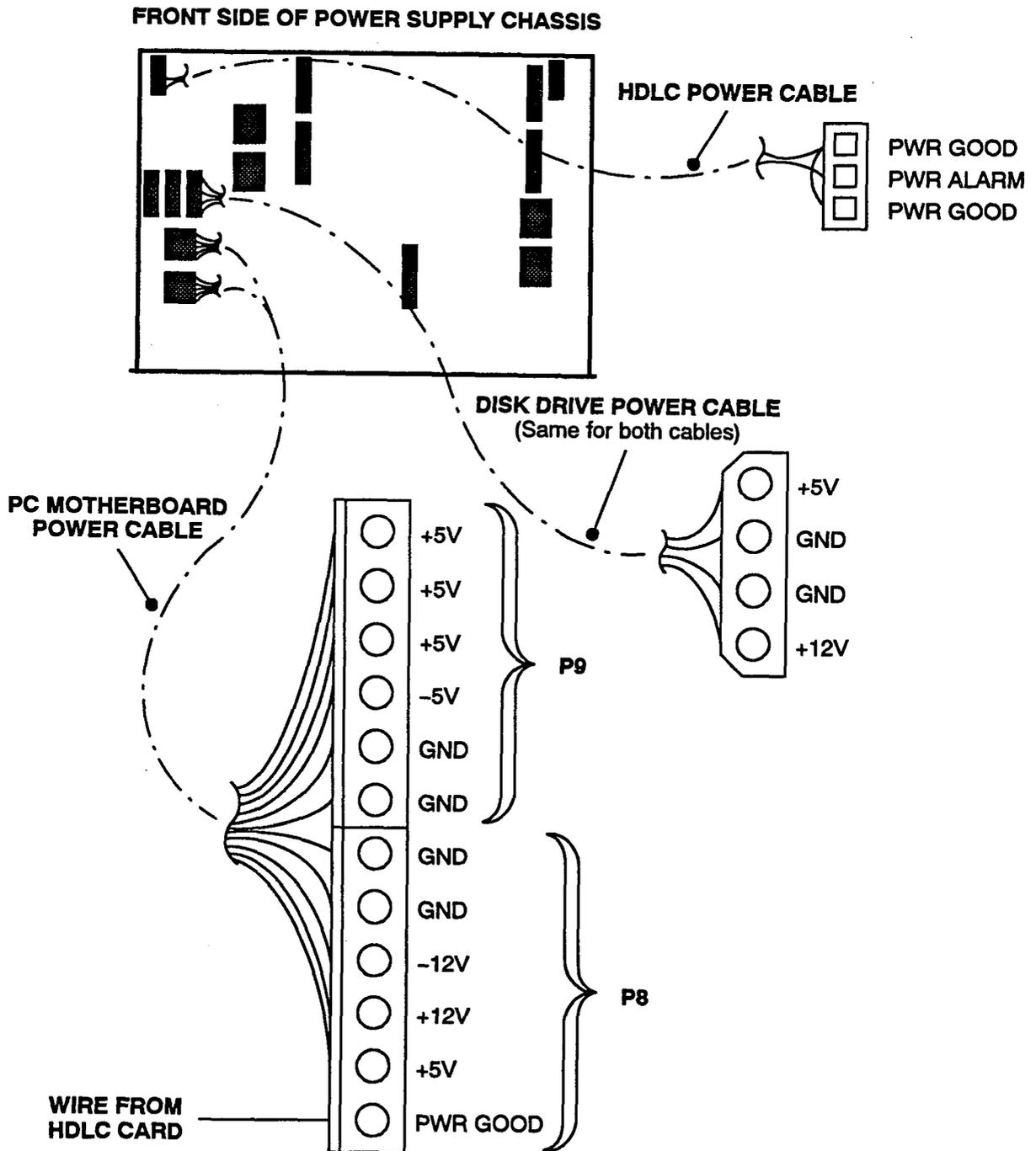


FIGURE 3-36. MAIN POWER SUPPLY CONNECTOR PINOUTS AND VOLTAGE TEST POINT LOCATIONS

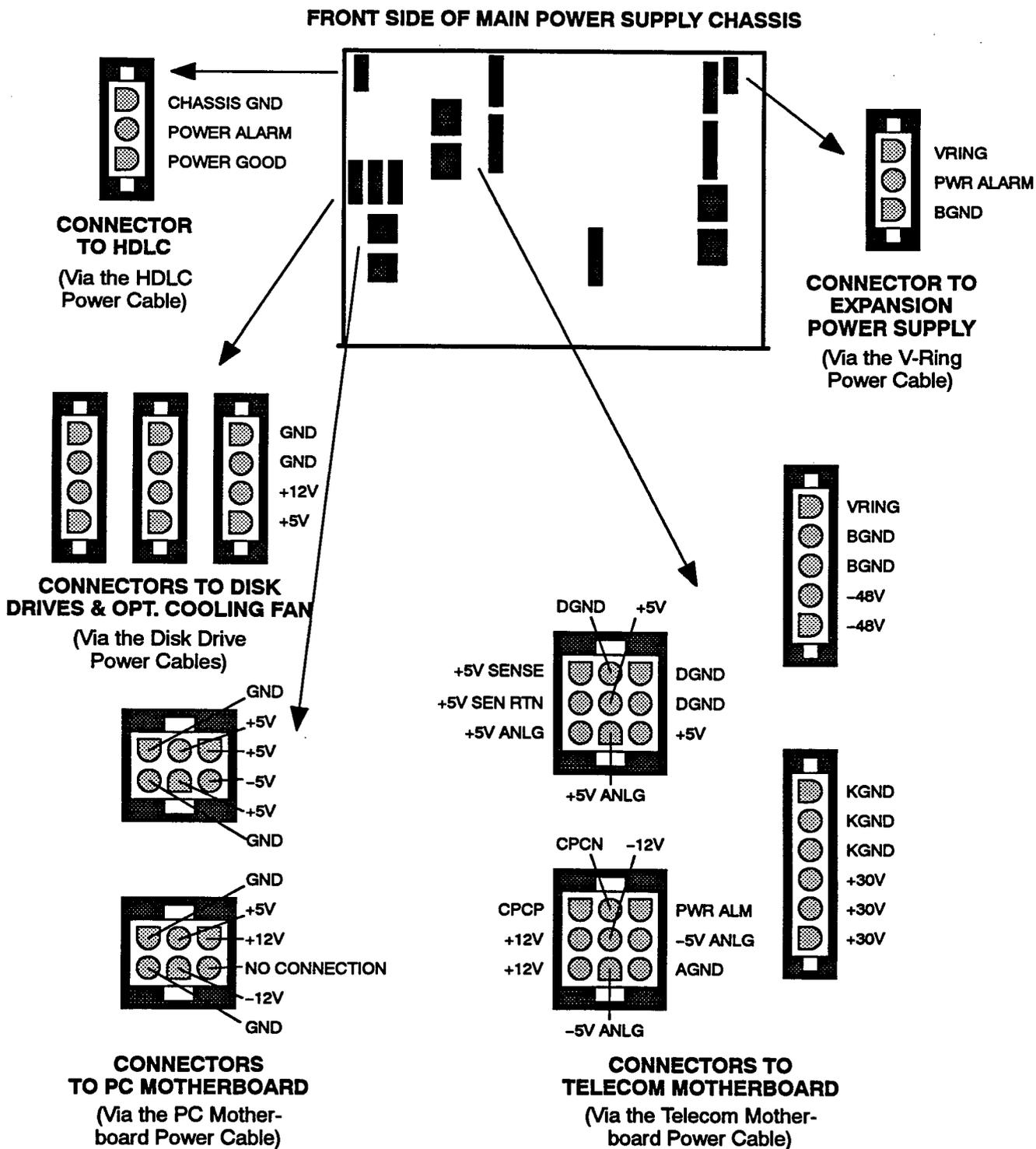
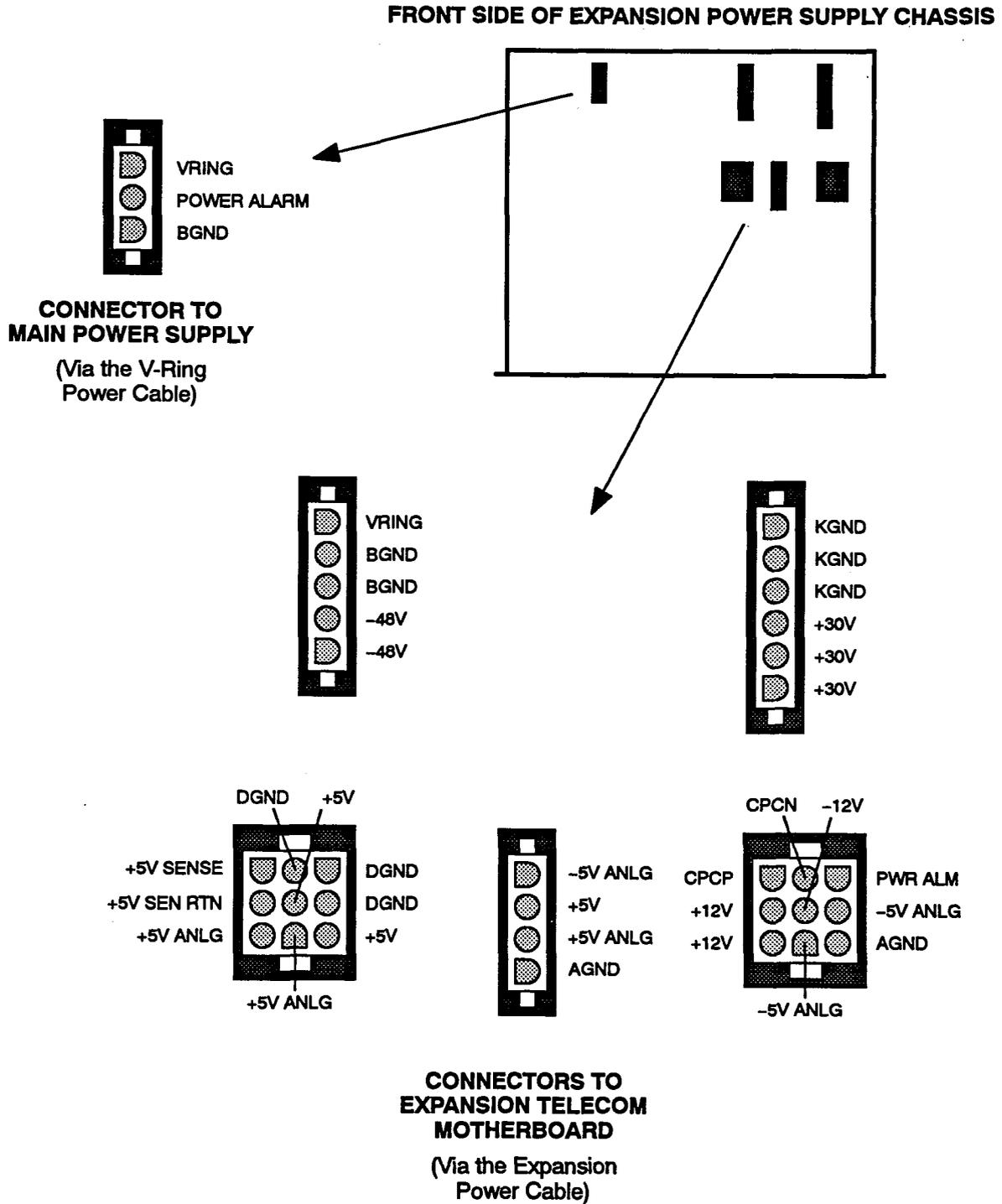


FIGURE 3-37. EXPANSION POWER SUPPLY CONNECTOR PINOUTS AND VOLTAGE TEST POINT LOCATIONS



F. INSTALL THE COMPUTER CARDS

NOTICE

Personal computer (PC) technology is continually evolving. As it does, the 416/832 System will continue to incorporate important design enhancements. Thus, depending on the actual version of equipment that is shipped, the following installation instructions could vary somewhat. If revised instructions are included with the equipment, refer to them instead.

6.18 Install the computer cards in the computer complex as outlined on the following pages.

CAUTION

The cards and components are static sensitive. Handle the cards by the edges only and keep them in their protective bags until they are to be installed. Do not bend or touch the pins of the components or subject them to a static charge. When working with the cards, use a properly terminated anti-static wrist strap and cover the work surface with the bag that protected the card during shipping. Any static charge (no matter how small the charge) must be discharged from the body before touching the cards or components. *The warranty for this equipment does not cover damage caused by static or mishandling. Cards or components damaged in such a manner will not be replaced.*

6.19 Currently, there are five versions of PC Motherboards used on the 416/832 System: PCC (PC Calc), SUNTAC, VLSI, MXIC, and the new M396F. Installation instructions for all five are included.

PC Motherboard — PCC (PC Calc) Version

6.20 Install the "PCC" version PC Motherboard as outlined in the following steps. For a drawing of the card, refer to Figure 3-38 on page 3-61.

- (1) Ensure that the AC POWER switch is OFF.

NOTE: When inserting or removing the computer cards, the system power must be turned off to prevent damage to the cards.

- (2) Measure the voltage of the battery on the PC Motherboard. If the voltage is not greater than 2.4VDC, replace the onboard battery with an external battery as outlined in Inter-Tel 256/832 Tech Tip No. 0002, or return the card for repair.

NOTE: If the battery is rechargeable, it must be charged for at least 48 hours before testing.

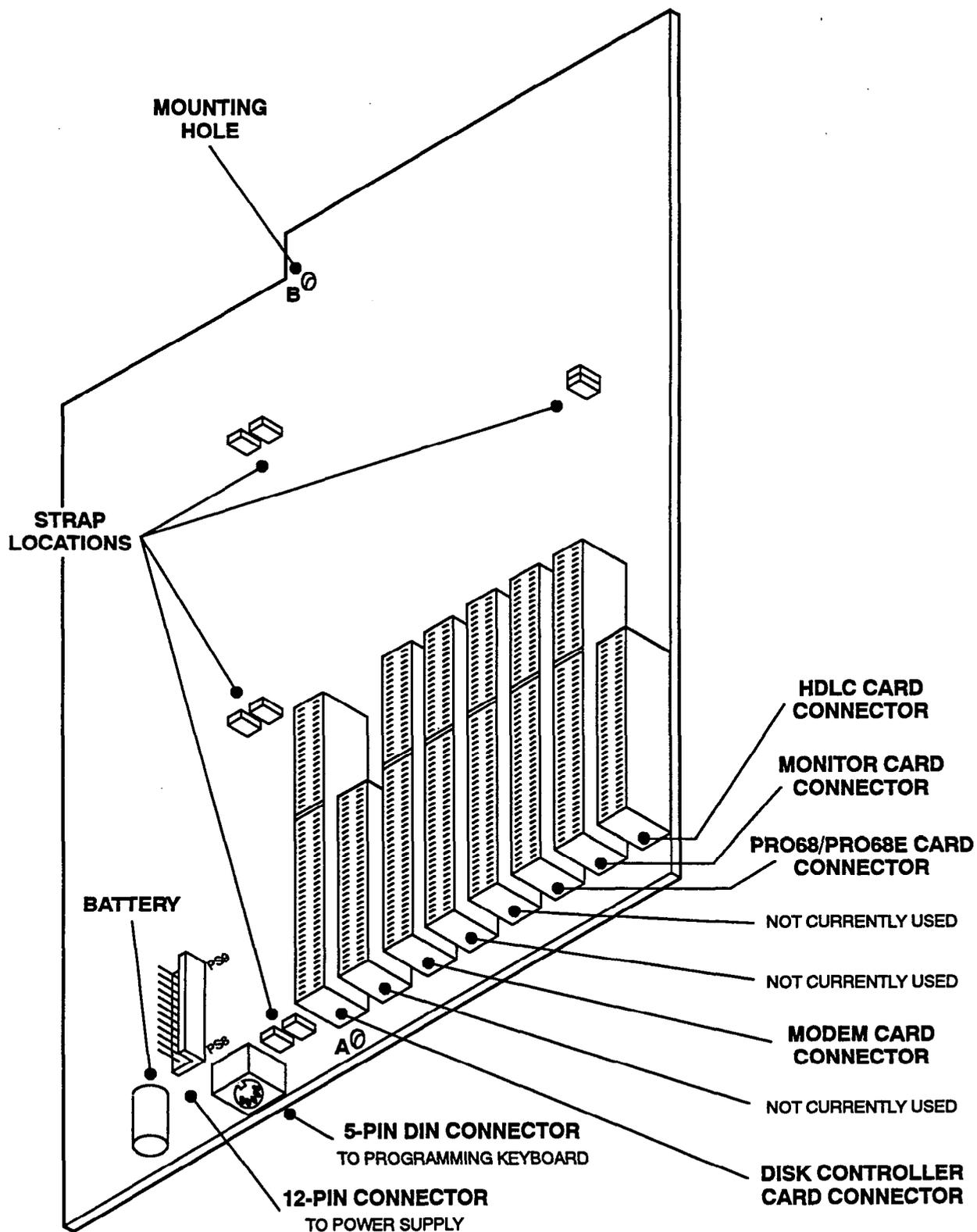
- (3) Check to make sure that jumper straps are installed in the following locations (see Figure 3-38 for orientation): ROM-SEL (pins 3 and 6), ROM-SEL (pins 4 and 5), E2 (pins 1 and 2), E3 (pins 1 and 2), J17 (pins 1 and 2), J18 (pins 1 and 2), J25 (pins 1 and 2), and J29 (pins 2 and 3).
- (4) Check to see that all components on the card are seated securely in their sockets and that no pins are bent.
- (5) Place a self-locking star washer on the 6-32 × ½-inch mounting screw included with the system and insert it through mounting hole A at the bottom of the card.
- (6) Then place the ¾-inch spacer included with the system over the mounting screw and hold it in place while performing the next two steps.
- (7) With the computer card connectors at the bottom and facing to the front, slide the PC Motherboard in through the front of the top portion of the equipment cabinet.
- (8) Align the PC Motherboard over the plastic stand-offs and snap it into place. Make sure the card is securely seated. Then insert the screw from step 5.
- (9) Place a self-locking star washer on the 6-32 × ¾-inch mounting screw included with the system and insert it in mounting hole B at the top of the card.
- (10) Attach the free ends, P9 and P8, of the 12-pin PC Motherboard power cable to the 12-pin connector on the front of the PC Motherboard. The single wire that extends from the bottom edge of connector P8 will be attached to the HDLC Card after it is installed.

NOTE: The other end of the power cable was previously attached to the power supply.

- (11) Attach the free end of the keyboard interface cable to the 5-pin DIN connector on the bottom edge of the PC Motherboard.

NOTE: The keyboard interface cable comes pre-routed in the equipment cabinet. The free end of the cable lies in the soffit (cable shelf), while the other end is attached to the internal side of the peripheral connector panel on the back of the cabinet.

FIGURE 3-38. PCC PC MOTHERBOARD



PC Motherboard — SUNTAC Version

6.21 Install the "SUNTAC" version PC Motherboard as outlined in the following steps. For a drawing of the card, refer to Figure 3-39 on page 3-63.

NOTE: The SUNTAC PC Motherboard cannot be used with the new IDE-type Disk Controller Card.

- (1) Ensure the AC POWER switch is turned OFF.

NOTE: When inserting or removing the computer cards, the system power must be turned off to prevent damage to the cards.

- (2) Measure the voltage of the battery on the PC Motherboard. If the voltage is not greater than 2.4VDC, replace the onboard battery with an external battery as outlined in Inter-Tel 256/832 Tech Tip No. 0002, or return the card for repair.

NOTE: If the battery is rechargeable, it must be charged for at least 48 hours before testing.

- (3) Check to make sure jumper straps are installed in the following locations on the card (see Figure 3-39 for card orientation):

JUMPER PINS	STRAP LOCATION
JP1	Over pins 1 and 2 (bottom two pins)
JP2	Over pins 1 and 2 (both pins)
JP3	Over set of pins 1 (left set of pins)
JP4	Over pins 1 and 2 (both pins)
JP5	No strap
JP6	No strap
JP7A	No strap
JP9	Over pins 2 and 3 (top two pins)
J18	Over pins 2 and 3 (top two pins)
JP19	No strap
JP20	No strap
J21	No strap
SW1	Over pins 1 and 2 (bottom two pins)

- (4) Ensure that the DIP switches are set in the following positions:

SWITCH	OFF	ON
1	X	
2		X
3	X	
4	X	
5	X	
6		X
7	X	
8		X

- (5) Check to see that all components on the card are seated securely in their sockets and that no pins are bent.

- (6) Place a self-locking star washer on the 6-32 × 3/4-inch mounting screw included with the system and insert it through mounting hole A at the bottom of the card.

- (7) *If a spacer for the motherboard is not already mounted on the equipment cabinet frame:* Place the 3/8-inch spacer included with the system over the mounting screw and hold it in place while performing the next two steps.

- (8) With the computer card connectors at the bottom and facing to the front, slide the PC Motherboard in through the front of the top portion of the equipment cabinet.

- (9) Align the PC Motherboard over the plastic stand-offs and snap it into place. Make sure the card is securely seated. Then, insert the screw from step 6.

- (10) Place a self-locking star washer on the 6-32 × 3/8-inch mounting screw included with the system and insert it in mounting hole B at the top of the card.

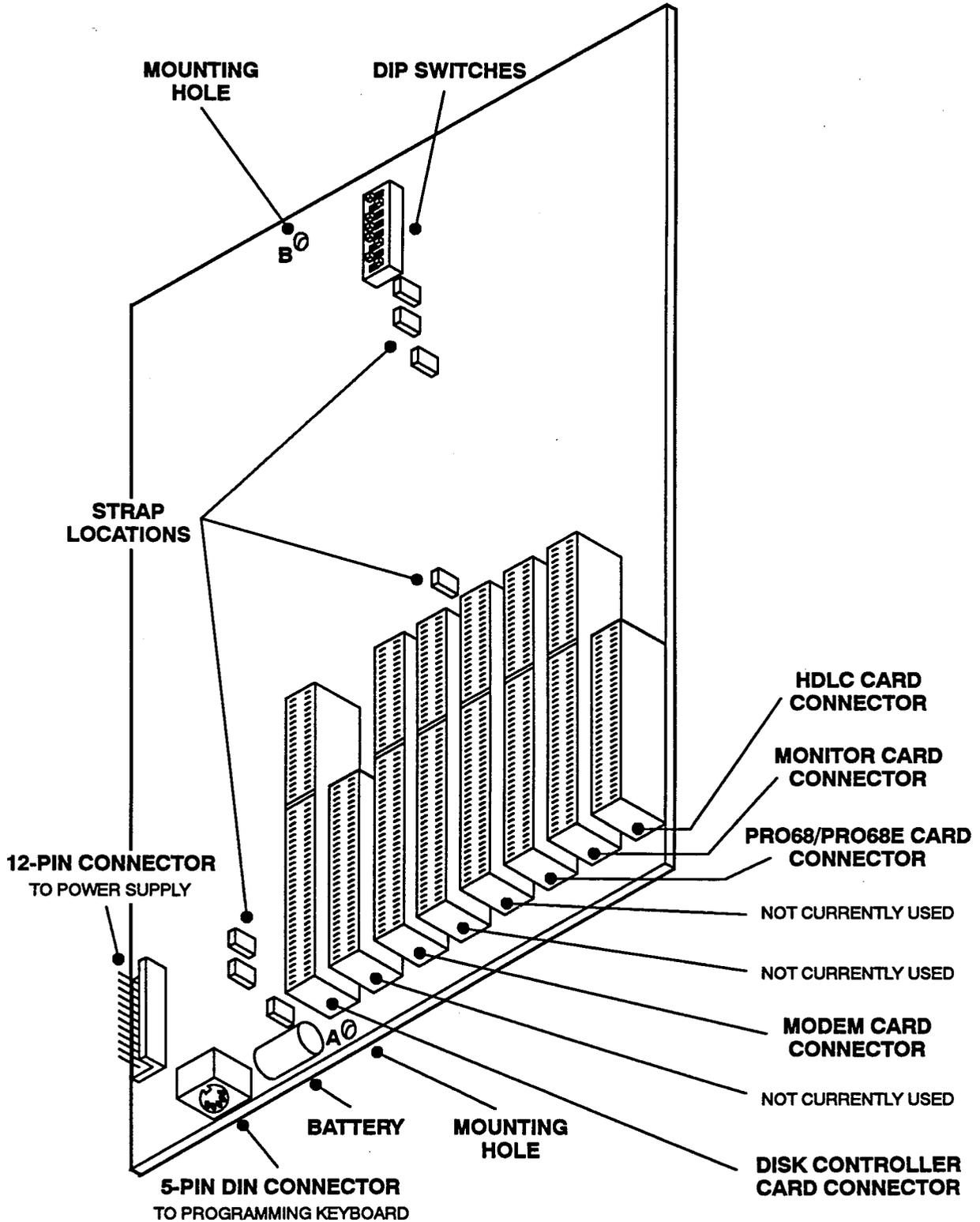
- (11) Attach the free ends of the 12-pin PC Motherboard power cable to the 12-pin connector on the front of the PC Motherboard. The single wire that extends from the bottom edge of the lower connector will be attached to the HDLC Card after it is installed.

NOTE: The other end of the PC Motherboard power cable was previously attached to the power supply.

- (12) Attach the free end of the keyboard interface cable to the 5-pin DIN connector on the bottom edge of the PC Motherboard.

NOTE: The keyboard interface cable comes pre-routed in the equipment cabinet. The free end of the cable lies in the soffit (cable shelf), while the other end is attached to the internal side of the peripheral connector panel on the back of the cabinet.

FIGURE 3-39. SUNTAC PC MOTHERBOARD



PC Motherboard — VLSI Version

6.22 Install the "VLSI" version PC Motherboard as outlined in the following steps. For a drawing of the card, refer to Figure 3-40 on page 3-65.

NOTE: The VLSI PC Motherboard can only be used with HDLC Cards that have been modified and labeled with ECN-2279 or stamped with artwork number 826.3806-1, -2, or higher.

- (1) Ensure that the AC POWER switch is turned OFF.

NOTE: When inserting or removing the computer cards, the system power must be turned off to prevent damage to the cards.

- (2) Measure the voltage of the battery on the PC Motherboard. If the voltage is not greater than 2.4VDC, replace the onboard battery with an external battery as outlined in Inter-Tel 256/832 Tech Tip No. 0002, or return the card for repair.

NOTE: If the battery is rechargeable, it must be charged for at least 48 hours before testing.

- (3) Check to make sure jumper straps are installed in the following locations on the card (see Figure 3-40 for card orientation):

<u>JUMPER PINS</u>	<u>STRAP LOCATION</u>
JP1	No strap
JP2	Over both pins
JP3	No strap
JP4	No strap
JP5	Over both pins
JP6	No strap
JP7	Over the top pin only (or no strap)
JP8	Over the right two pins
JP9	Over the left pin only (or no strap)
JP10	Over both pins
JP11	Over both pins
JP12	Over both pins
JP14	No strap
JP16	No strap
JP18	No strap
JP19	No strap
JP20	No strap
JP21	No strap
JP22	No strap

- (4) Check to see that all components on the card are seated securely in their sockets and that no pins are bent.
- (5) Place an "insulating" washer on the 6-32 × 3/4-inch mounting screw included with the system and insert it through the appropriate mounting hole at the bottom of the card (see Figure 3-40).
- (6) *If a spacer for the motherboard is not already mounted on the equipment cabinet frame:* Place the 3/8-inch spacer included with the system over the mounting screw and hold it in place while performing the next two steps.
- (7) With the computer card connectors at the bottom and facing to the front, slide the PC Motherboard in through the front of the top portion of the equipment cabinet.
- (8) Align the PC Motherboard over the plastic stand-offs and snap it into place. Make sure the card is securely seated. Then, secure the screw from step 5.

NOTE: If replacing an older-version PC Motherboard, it may be helpful to rearrange some of the plastic stand-offs for better seating.

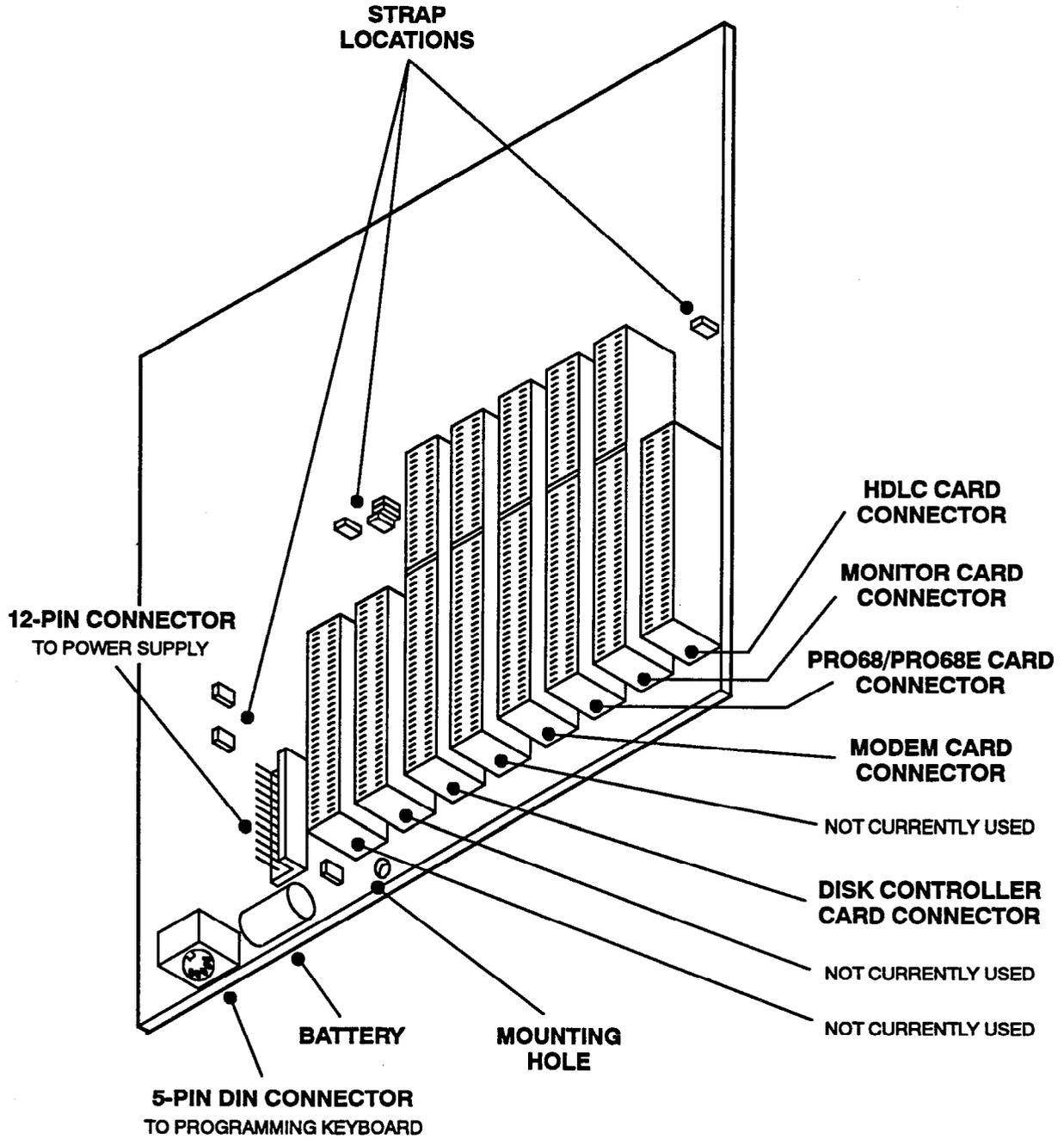
- (9) Attach the free ends of the 12-pin PC Motherboard power cable to the 12-pin connector on the front of the PC Motherboard. The single wire that extends from the bottom edge of the lower connector will be attached to the HDLC Card after it is installed.

NOTE: The other end of the PC Motherboard power cable was previously attached to the power supply.

- (10) Attach the free end of the keyboard interface cable to the 5-pin DIN connector on the bottom edge of the PC Motherboard.

NOTE: The keyboard interface cable comes pre-routed in the equipment cabinet. The free end of the cable lies in the soffit (cable shelf), while the other end is attached to the internal side of the peripheral connector panel on the back of the cabinet.

FIGURE 3-40. VLSI PC MOTHERBOARD



PC Motherboard — MXIC Version

6.23 Install the MXIC PC Motherboard as outlined in the following steps. For a drawing of the board, refer to Figure 3-41 on page 3-67.

NOTE: The MXIC PC Motherboard can only be used with HDLC Cards that have been modified and labeled with ECN-2279 or stamped with artwork number 826.3806-1, -2, or higher.

- (1) Ensure that the system AC POWER is turned OFF.

NOTE: When inserting or removing the computer cards, the system power must be turned off to prevent damage to the cards.

- (2) Measure the voltage of the battery on the PC Motherboard. If the voltage is not greater than 2.4VDC, replace the onboard battery with an external battery, or return the card for repair.

NOTE: The battery, which is rechargeable, must be charged for at least 48 hours before testing.

- (3) Check to make sure that the PC Motherboard is equipped with four SIMMs as shown in Figure 3-41. If any of the SIMMs are missing or damaged, contact Customer Support.
- (4) Check to make sure that the CMOS discharge jumper strap (JP1) is located over pins 1 and 2—the bottom two pins. (See Figure 3-41 for card orientation.)
- (5) With the computer card connectors at the bottom and facing to the front, slide the PC Motherboard

in through the front of the top portion of the equipment cabinet.

- (6) Align the PC Motherboard over the plastic stand-offs and snap it into place. Make sure the card is securely seated.

NOTE: If replacing an older-version PC Motherboard, it may be helpful to rearrange some of the plastic stand-offs for better seating. Also, with some older equipment cabinets, it may be necessary to place one or more 3/8-inch spacers between the motherboard and the cabinet frame.

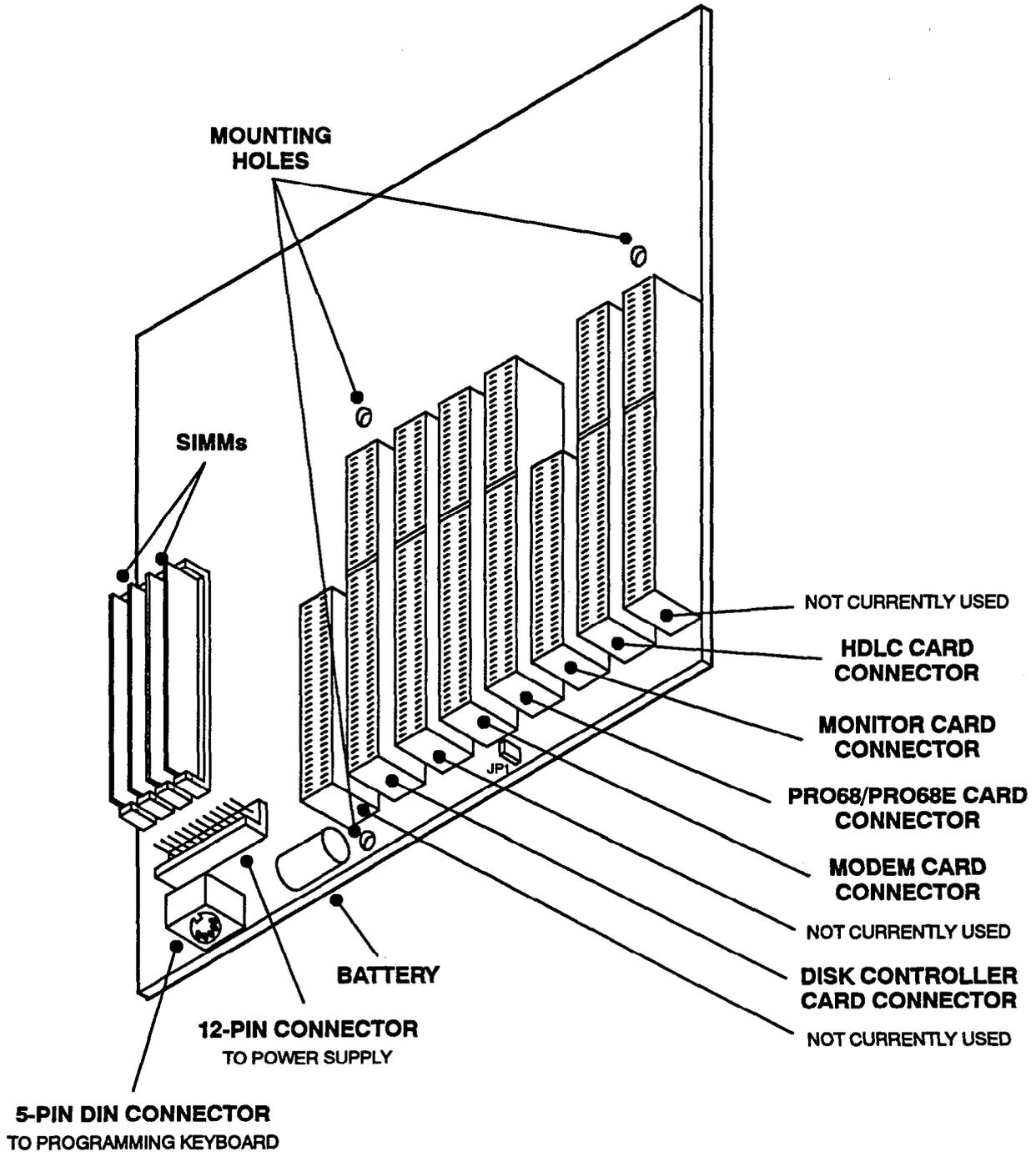
- (7) Insert the three 6-32 x 3/4-inch mounting screws (included with the system) through the appropriate mounting holes on the card (see Figure 3-41).
- (8) Attach the free ends of the 12-pin PC Motherboard power cable to the 12-pin connector on the front of the PC Motherboard. The single wire that extends from the left edge of the left (PG) connector will be attached to the HDLC Card after it is installed.

NOTE: The other end of the PC Motherboard power cable should already be attached to the power supply.

- (9) Attach the free end of the keyboard interface cable to the 5-pin DIN connector on the bottom edge of the PC Motherboard.

NOTE: The keyboard interface cable comes pre-routed in the equipment cabinet. The free end of the cable lies in the soffit (cable shelf), while the other end is attached to the internal side of the peripheral connector panel on the back of the cabinet.

FIGURE 3-41. MXIC PC MOTHERBOARD



PC Motherboard — M396F Version

6.24 Install the M396F PC Motherboard as outlined in the following steps. For a drawing of the board, refer to Figure 3-42 on page 3-69.

NOTE: The M396F PC Motherboard can only be used with HDLC Cards that have been modified and labeled with ECN-2279 or stamped with artwork number 826.3806-1, -2, or higher.

- (1) Ensure that the system AC POWER is turned OFF.

NOTE: When inserting or removing the computer cards, the system power must be turned off to prevent damage to the cards.

- (2) Measure the voltage of the battery on the PC Motherboard. If the voltage is not greater than 2.4VDC, replace the onboard battery with an external battery, or return the card for repair.

NOTE: The battery, which is rechargeable, must be charged for at least 48 hours before testing.

- (3) Check to make sure that the PC Motherboard is equipped with four SIMMs as shown in Figure 3-42. If any of the SIMMs are missing or damaged, contact Customer Support.
- (4) Check to make sure that jumper straps are installed in the following locations (see Figure 3-42): JP1 (over pins 2 and 3), JP6 (over both pins), JP9 (over pins 2 and 3), and JP10 (over pins 2 and 3).
- (5) With the computer card connectors to the right and facing to the front, slide the PC Motherboard

in through the front of the top portion of the equipment cabinet.

- (6) Align the PC Motherboard over the plastic stand-offs and snap it into place. Make sure the card is securely seated.

NOTE: If replacing an older-version PC Motherboard, it may be helpful to rearrange some of the plastic stand-offs for better seating. Also, with some older equipment cabinets, it may be necessary to place one or more $\frac{3}{8}$ -inch spacers between the motherboard and the cabinet frame.

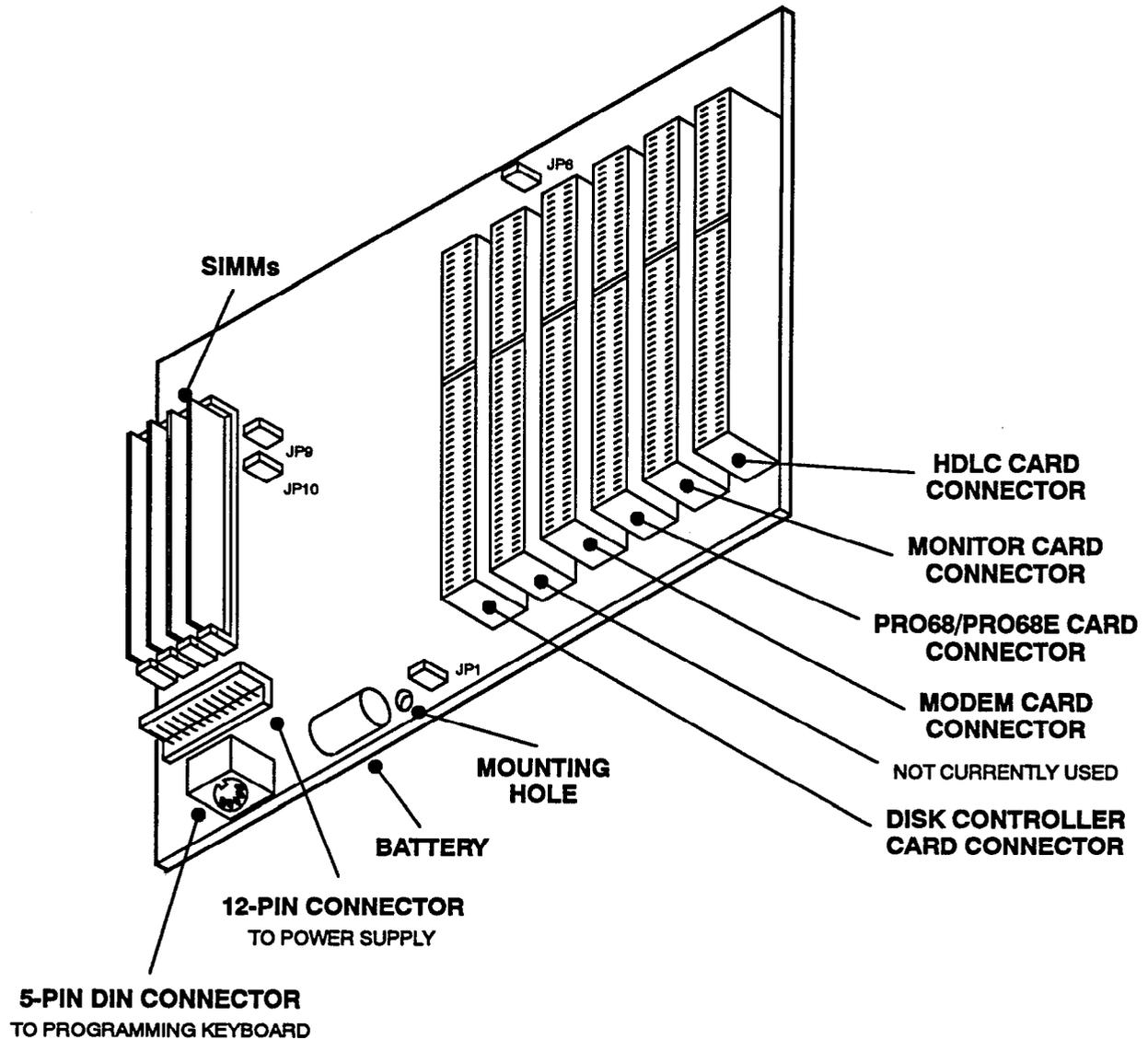
- (7) Insert the 6-32 x $\frac{3}{4}$ -inch mounting screw (included with the system) through the appropriate mounting hole on the card (see Figure 3-42).
- (8) Attach the free ends of the 12-pin PC Motherboard power cable to the 12-pin connector on the front of the PC Motherboard. The single wire that extends from the outside edge of the connector will be attached to the HDLC Card after it is installed.

NOTE: The other end of the PC Motherboard power cable should already be attached to the power supply.

- (9) Attach the free end of the keyboard interface cable to the 5-pin DIN connector on the bottom edge of the PC Motherboard.

NOTE: The keyboard interface cable comes pre-routed in the equipment cabinet. The free end of the cable lies in the soffit (cable shelf), while the other end is attached to the internal side of the peripheral connector panel on the back of the cabinet.

FIGURE 3-42. M396F PC MOTHERBOARD



High-Level Data Link Control (HDLC) Card

6.25 Attach the High-Level Data Link Control (HDLC) Card to the PC Motherboard as follows. For a drawing of the card, refer to Figure 3-43 on page 3-74.

NOTE: Only HDLC Cards that have been modified and labeled with ECN-2279 or stamped with artwork number 826.3806-1, -2, or higher can be used with the VLSI, MXIC, and M396F PC Motherboards.

- (1) Check to make sure jumper straps are installed in the following locations on the HDLC Card (see Figure 3-43 for card orientation):

JUMPER PINS	STRAP LOCATION
J6	Over pins 1 and 2 (right two pins)
J7	Over pins 1 and 2 (right two pins)
J8	Over pins 1 and 2 (right two pins)
J9	Over pins 2 and 3 (bottom two pins)
J11	No strap

NOTE: When used with *previous* versions of software, the jumper straps in locations J6, J7, and J8 must be placed over pins 2 and 3 (left two pins). Also, in location J11, a jumper strap must be placed over pins 1 and 12 (right two pins).

- (2) Ensure that the DIP switches on the HDLC Card are set in the following positions:

SWITCH	OPEN (OFF)	CLOSED (ON)
1	X	
2	X	
3		X
4		X

- (3) Check to see that all components on the card are seated securely in their sockets and that no pins are bent.
- (4) With the components *facing left*, insert the HDLC Card in the slot labeled HDLC and attach it securely to the PC Motherboard.

NOTE: The slot label on some equipment cabinets may not match the actual slots available on the PC Motherboard. For proper slot locations, refer to the appropriate PC Motherboard drawing or to the instructions included with the motherboard.

- (5) Attach one end of the 60-pin Pro68-to-HDLC interface cable included with the system to the 60-pin connector on the front edge of the HDLC card. (See Figure 3-43.) The other end of the cable will be attached to the Pro68/Pro68E Card after it is installed.

NOTE: The colored edge of the cable can be aligned with either the top or bottom edge of the connector as long as it matches the connection to the Pro68/Pro68E Card.

- (6) Attach one end of the 15-pin HDLC-to-MXC interface cable included with the system to the 15-pin connector on the bottom edge of the HDLC card. The other end will be connected to the Matrix Card after it is installed.
- (7) Attach the free end of the HDLC power cable to the 3-pin connector on the front edge of the HDLC Card. (The two outside pins on the cable are common so that it can be connected in either direction.)

NOTE: The HDLC power cable comes pre-routed in the equipment cabinet. It is included in the same cable binder as the system status panel cable. The free end of the HDLC power cable hangs from a cable tie near where the PC Motherboard is installed, while the other end of the cable is attached to the front of the power supply chassis.

- (8) Attach the 7-pin system status panel (display) cable to the 4-pin and 2-pin connectors on the front edge of the HDLC Card.

NOTE: The system status panel cable comes pre-routed in the equipment cabinet. The free ends of the cable hang from a cable tie near the PC Motherboard, while the other end of the cable is attached to the system status panel located in the front, upper-left corner of the cabinet.

- (9) Attach the single wire from the PC Motherboard power cable to the 2-pin connector on the HDLC card.

6.26 When installing the rest of the cards in the computer complex, route the HDLC power cable and the system status panel cable through the space between the back edge of the cards and the PC Motherboard.

Monitor Card

6.27 Attach the Monitor Card to the PC Motherboard as follows. For a drawing of the card, refer to Figure 3-44 on page 3-75.

- (1) Check to see that all components on the card are seated securely in their sockets and that no pins are bent.
- (2) With the components *facing left*, insert the Monitor Card in the slot labeled MGA and attach it securely to the PC Motherboard.

NOTE: The slot label on some equipment cabinets may not match the actual slots available on the PC Motherboard. For proper slot locations, refer to the appropriate PC Motherboard drawing or to the instructions included with the motherboard.

- (3) Attach the free end of the 9-pin monitor interface cable to the DB9 connector on the bottom edge of the Monitor Card. (See Figure 3-44.)

NOTE: The monitor interface cable comes pre-routed in the equipment cabinet. The free end of the cable lies in the soffit (cable shelf), while the other end of the cable is attached to the internal side of the peripheral connector panel on the back of the cabinet.

68000 Co-Processor (Pro68) Card

6.28 Attach the Pro68 Card or the new "expanded" Pro68 Card, called the Pro68E Card, to the PC Motherboard as follows. For drawings of the cards, refer to Figures 3-45 and 3-46 on pages 3-76 and 3-77.

(1) *If installing a Pro68 Card:*

- a. Attach the appropriate memory card to the Pro68 Card as shown in Figure 3-45. For *standard-size systems (main equipment cabinet only)*, attach the 512k Memory Card. For *large-size systems (expansion cabinet installed)*, attach the 3MB Memory Card.
- b. Make sure that the connectors and the stand-offs are properly aligned and seated.
- c. Ensure that the three jumper straps are installed in location J5.
- d. Ensure that a jumper strap is installed over the bottom two pins in location J12.

NOTE: When used with *previous* versions of software, the jumper strap in location J12 must be removed.

If installing a Pro68E Card:

- a. For *large-size systems only (expansion cabinet installed)*: With the memory components *facing left*, attach two 1MB single in-line memory modules (SIMMs) to the Pro68E Card. Place one SIMM in slot Z2 and the other in slot Z5 (see Figure 3-46).

NOTE: The Pro68E Card comes equipped with 2 SIMMs (in slots Z1 and Z4), which is enough memory for a standard-size system.

- b. Ensure that a jumper strap is installed over the bottom two pins in location J5.

NOTE: When used with *previous* versions of software, the jumper strap in location J5 must be removed.

- (2) Ensure that the DIP switches on the Pro68/Pro68E Card are set in the following positions:

SWITCH	OPEN	CLOSED
1		X
2	X	
3	X	
4	X	
5	X	
6	X	

- (3) Check to see that all components on the card are seated securely in their sockets and that no pins are bent.
- (4) With the components *facing left*, insert the Pro68/Pro68E Card in the slot labeled PRO and attach it securely to the PC Motherboard.

NOTE: The slot label on some equipment cabinets may not match the actual slots available on the PC Motherboard. For proper slot locations, refer to the appropriate PC Motherboard drawing or to the instructions included with the motherboard.

- (5) Attach the free end of the 60-pin Pro68-to-HDLC interface cable to the 60-pin connector on the front edge of the Pro68/Pro68E card. (See Figure 3-45.) The other end of the cable was previously attached to the HDLC Card.

NOTE: The ribbon cable for the new Pro68E Card is much shorter than the ribbon cable that is used with the older Pro68 Card. If an existing Pro68 Card is replaced with a new Pro68E Card, the shorter cable may be used instead. (Refer to REPLACEMENT PARTS for the part numbers.)

- (6) Attach the free end of the 9-pin serial port 1 interface cable to the *rear* DB9 connector on the bot-

tom edge of the Pro68/Pro68E Card. Then attach the free end of the 9-pin serial port 2 interface cable to the *front* DB9 connector on the bottom edge of the card.

NOTE: The serial port 1 and serial port 2 interface cables come pre-routed in the equipment cabinet. The free ends of the cables lie in the soft-fit (cable shelf), while the other ends of the cables are attached to the internal side of the peripheral connector panel on the back of the cabinet.

6.29 After the system is installed, optional SMDR/SMDA output devices may be connected to the SERIAL 1 (DB9) and SERIAL 2 (DB25) ports on the peripheral connector panel at any time. Refer to page 2-36 for RS-232-C DB9 and DB25 pin connections, and refer to page 3-141 for installation instructions. The baud rates for the two ports are set individually in database programming.

Modem Card

6.30 Attach the Modem Card to the PC Motherboard as follows. For a drawing of the card, refer to Figure 3-47 on page 3-78.

- (1) Select the desired COM port and its associated interrupt level by placing the jumper straps or switches in the appropriate positions. (Refer to the modem's user manual for a diagram of the jumper locations and for any additional modem information.)

NOTE: To function properly, the Modem Card must be set to use the appropriate communications (COM) port on the PC. For example, if COM1 is already being used by another serial port in the PC, the jumper straps or switches on the card must be set to use one of the other COM ports (2, 3, or 4). Currently, all 416/832 Systems are shipped with the Modem Card configured for COM1.

- (2) Check to see that all components on the card are seated securely in their sockets and that no pins are bent.
- (3) With the components *facing left*, insert the Modem Card in the slot labeled MOD and attach it securely to the PC Motherboard.

NOTE: The slot label on some equipment cabinets may not match the actual slots available on the PC Motherboard. For proper slot locations, refer to the appropriate PC Motherboard drawing or to the instructions included with the motherboard.

- (4) Connect one end of the mod-to-mod line cord included with the Modem Card to the modular jack connector labeled WALL (or LINE) on the bottom edge of the Modem Card. (See Figure 3-47.) The other end of the line cord will be connected to the Matrix Card after it is installed.

Disk Controller Card — MFM-Type

NOTE: Currently, there are two types of Disk Controller Cards used on the 416/832 System: MFM-type, and the new IDE-type. These two card types, along with their associated hard disk drives and hard disk-to-controller interface cables, are not compatible. Either use all IDE-type equipment, or use all MFM-type equipment. *Do not mix the two types.* (For more information, see pages 2-13 and 2-12 in SPECIFICATIONS.)

6.31 Attach the MFM-type Disk Controller Card to the PC Motherboard as follows. For a drawing of the card, refer to Figure 3-48 on page 3-79.

- (1) Check to see that all components on the card are seated securely in their sockets and that no pins are bent.
- (2) With the components *facing left*, insert the MFM-type Disk Controller Card in the slot labeled DSK and attach it securely to the PC Motherboard.

NOTE: The slot label on some equipment cabinets may not match the actual slots available on the PC Motherboard. For proper slot locations, refer to the appropriate PC Motherboard drawing or to the instructions included with the motherboard.

- (3) Attach the appropriate end of the *floppy* disk-to-controller interface cable included with the system to the *bottom* 33-pin connector on the front edge of the MFM-type Disk Controller Card. (See Figure 3-48.)

NOTE: Be sure that the colored edge of the disk-to-controller cable aligns with Pin 1 on the connector. The other end of the cable will be connected to the floppy disk drive after it is installed.

- (4) Attach the appropriate end of the *hard 34-conductor (B)* disk-to-controller interface cable included with the system to the *top* 33-pin connector on the front edge of the MFM-type Disk Controller Card.

NOTE: Be sure that the colored edge of the disk-to-controller cable aligns with Pin 1 on the connector. The other end of the cable will be connected to the hard disk drive after it is installed.

- (5) Attach the appropriate end of the *hard 20-conductor (A)* disk-to-controller interface cable included with the system to the 19-pin connector on the front edge of the MFM-type Disk Controller Card.

NOTE: Be sure that the colored edge of the disk-to-controller cable aligns with Pin 1 on the connector. The other end of the cable will be connected to the hard disk drive after it is installed.

- (6) Attach the free end of the 4-pin system status panel cable to the 4-pin connector on the front edge of the MFM-type Disk Controller Card.

NOTE: The system status panel cable comes pre-routed in the equipment cabinet. The free ends of the cable hang from a cable tie near where the PC Motherboard is installed, while the other end of the cable is attached to the system status panel located in the front, upper-left corner of the cabinet.

Disk Controller Card — IDE-Type

6.32 Attach the IDE-type Disk Controller Card to the PC Motherboard as follows. For a drawing of the card, refer to Figure 3-49 on page 3-80.

NOTE: The IDE-type Disk Controller Card cannot be used with the SUNTAC PC Motherboard. Instead, use the PCC, VLSI, MXIC, or M396F PC Motherboards.

- (1) Check to make sure jumper straps are installed in the following locations on the IDE-type Disk Controller Card (see Figure 3-49 for card orientation):

JUMPER PINS	STRAP LOCATION
W1	Over pins 3 and 4
W2	Over pins 1 and 2

- (2) Check to see that all components on the card are seated securely in their sockets and that no pins are bent.
- (3) With the components *facing left*, insert the IDE-type Disk Controller Card in the slot labeled DSK and attach it securely to the PC Motherboard.

NOTE: The slot label on some equipment cabinets may not match the actual slots available on

the PC Motherboard. The IDE-type Disk Controller Card should be installed in the first available large (16-bit) slot on the left side of the motherboard. For proper slot locations, refer to the appropriate PC Motherboard drawing or to the instructions included with the motherboard.

- (4) Attach the appropriate end of the *floppy* disk-to-controller interface cable to the *bottom* 34-pin connector (J3) on the front edge of the IDE-type Disk Controller Card. (See Figure 3-49.)

NOTE: Be sure that the colored edge of the disk-to-controller cable aligns with Pin 1 on the connector. The other end of the cable will be connected to the floppy disk drive after it is installed.

- (5) Attach the appropriate end of the IDE-type (40-conductor) *hard* disk-to-controller interface cable to the *middle* 40-pin connector (J2) on the front edge of the IDE-type Disk Controller Card.

NOTE: Be sure that the colored edge of the disk-to-controller cable aligns with Pin 1 on the connector. The other end of the cable will be connected to the hard disk drive after it is installed.

- (6) Attach the free end of the 4-pin system status panel cable to the *top* 4-pin connector (J1) on the front edge of the IDE-type Disk Controller Card.

NOTE: The system status panel cable comes pre-routed in the equipment cabinet. The free ends of the cable hang from a cable tie near where the PC Motherboard is installed, while the other end of the cable is attached to the system status panel located in the front, upper-left corner of the cabinet.

PC Cover

6.33 The PC cover acts as an EMI shield for the computer cards, as required by FCC regulations. Install the cover as outlined below:

With the two access holes to the top, snap the PC cover into place over the front of the computer cards (see Figure 2-3 on page 2-39).

NOTE: The access hole on the right side of the cover can be used to reach the reset switch on the HDLC Card.

FIGURE 3-43. HIGH-LEVEL DATA LINK (HDLC) CARD

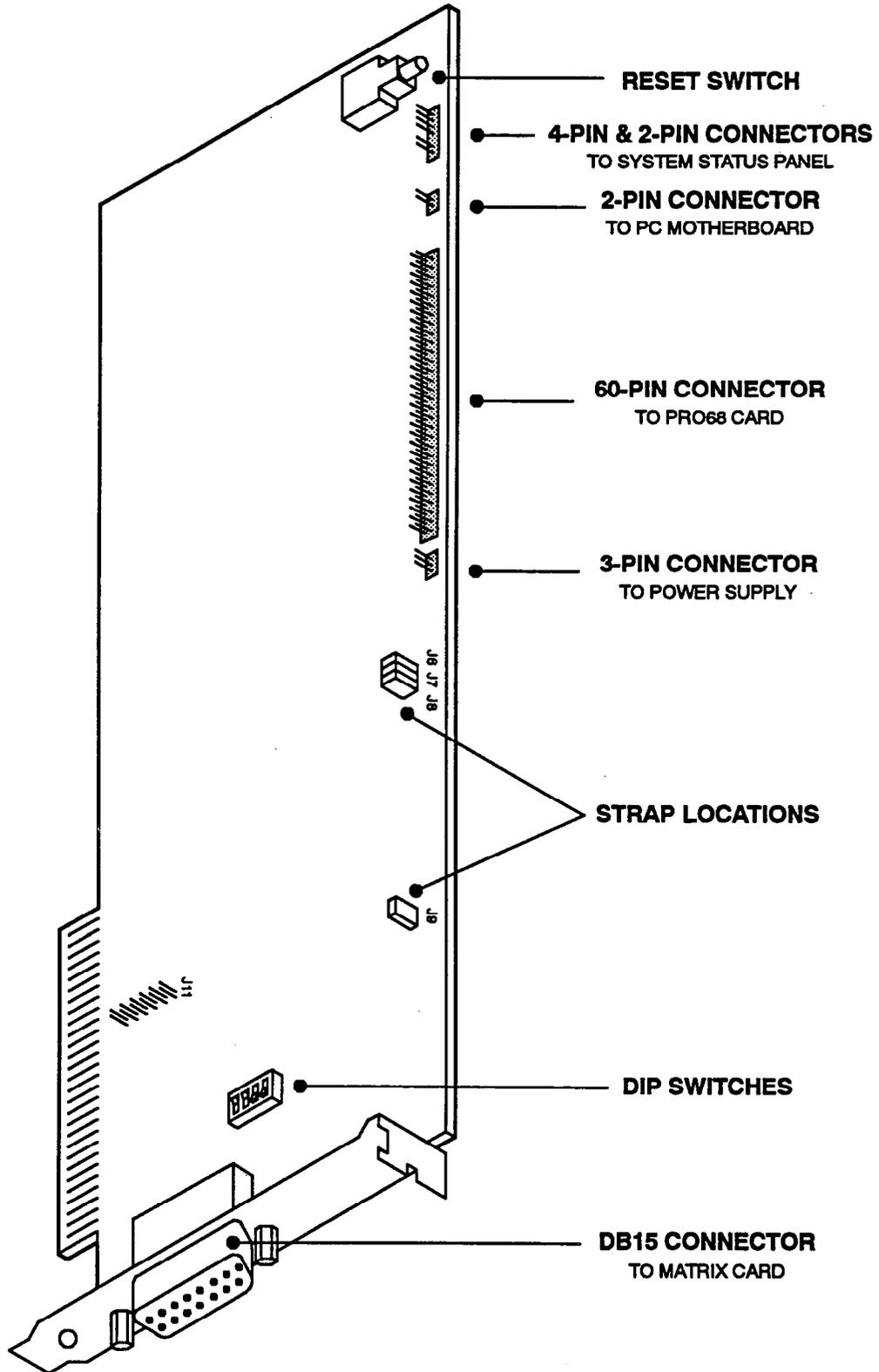


FIGURE 3-44. MONITOR CARD

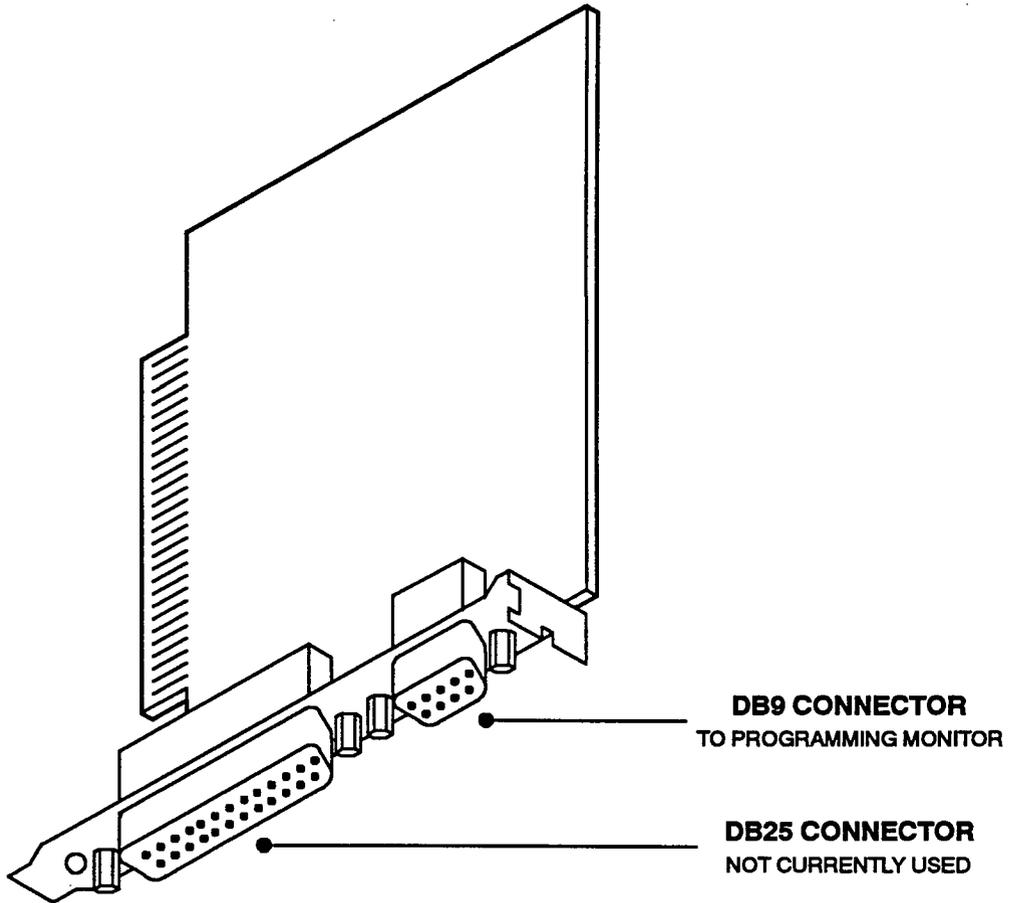


FIGURE 3-45. 68000 CO-PROCESSOR (PRO68)

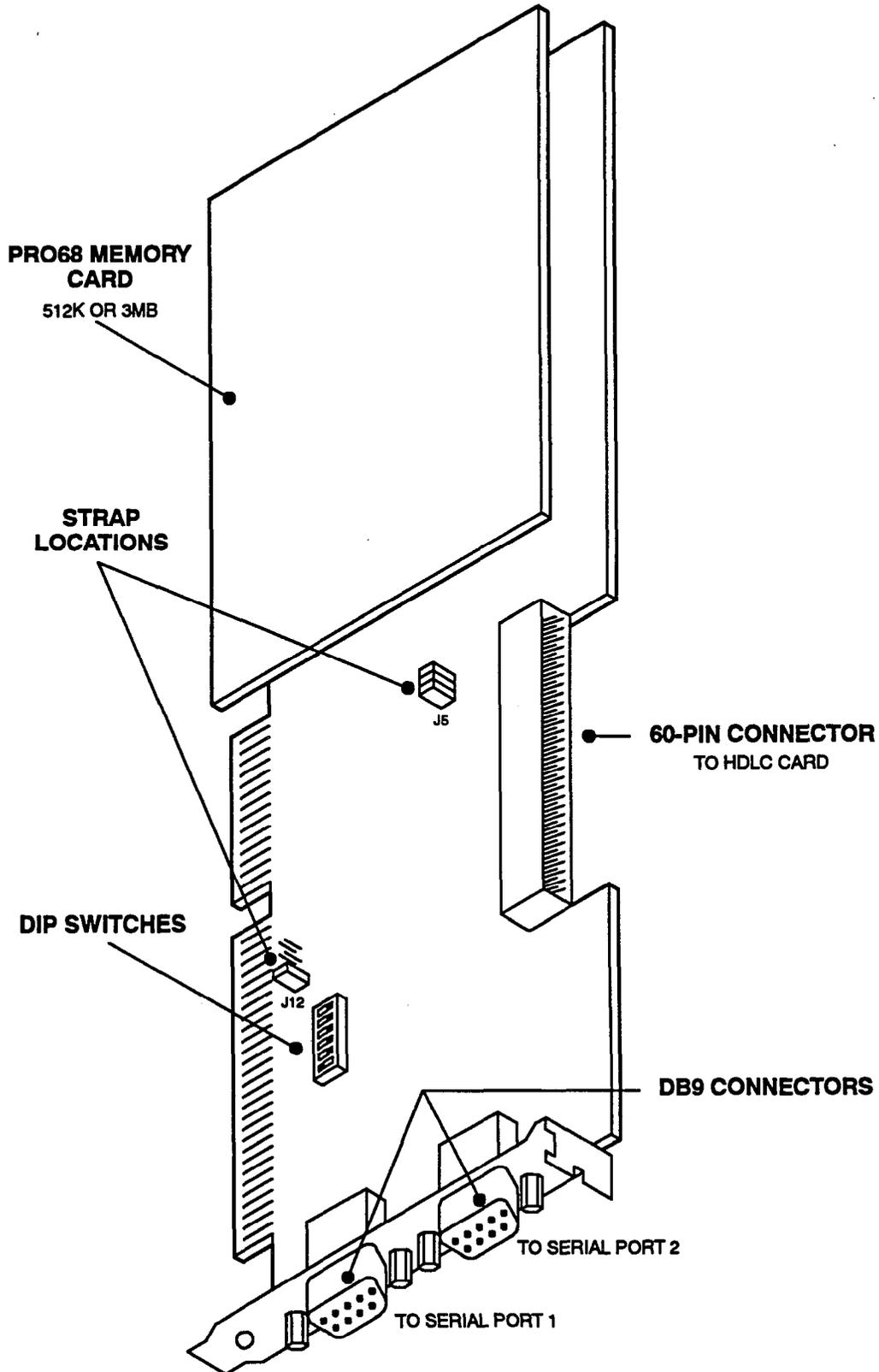


FIGURE 3-46. 68000 EXPANDED CO-PROCESSOR (PRO68E) CARD

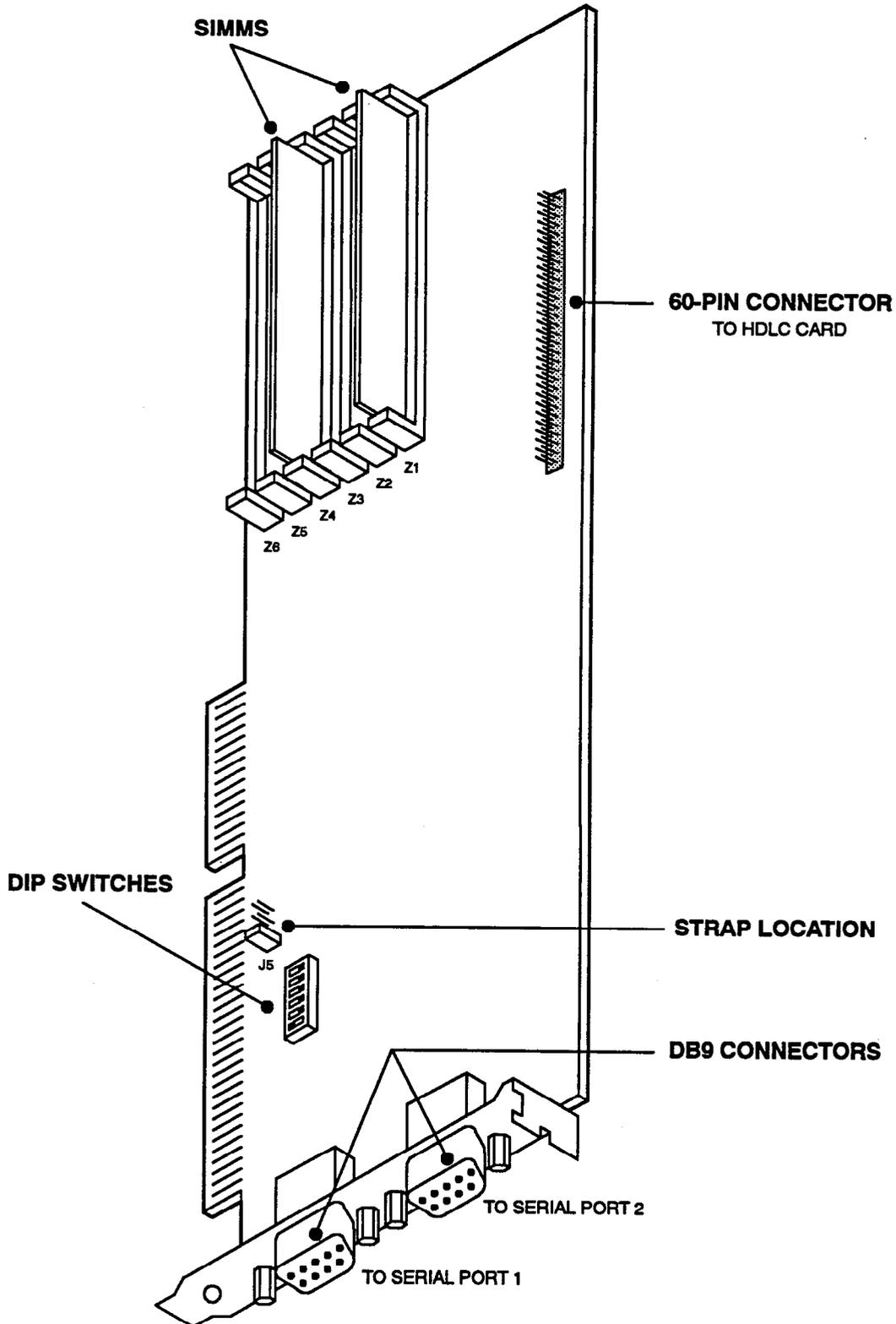
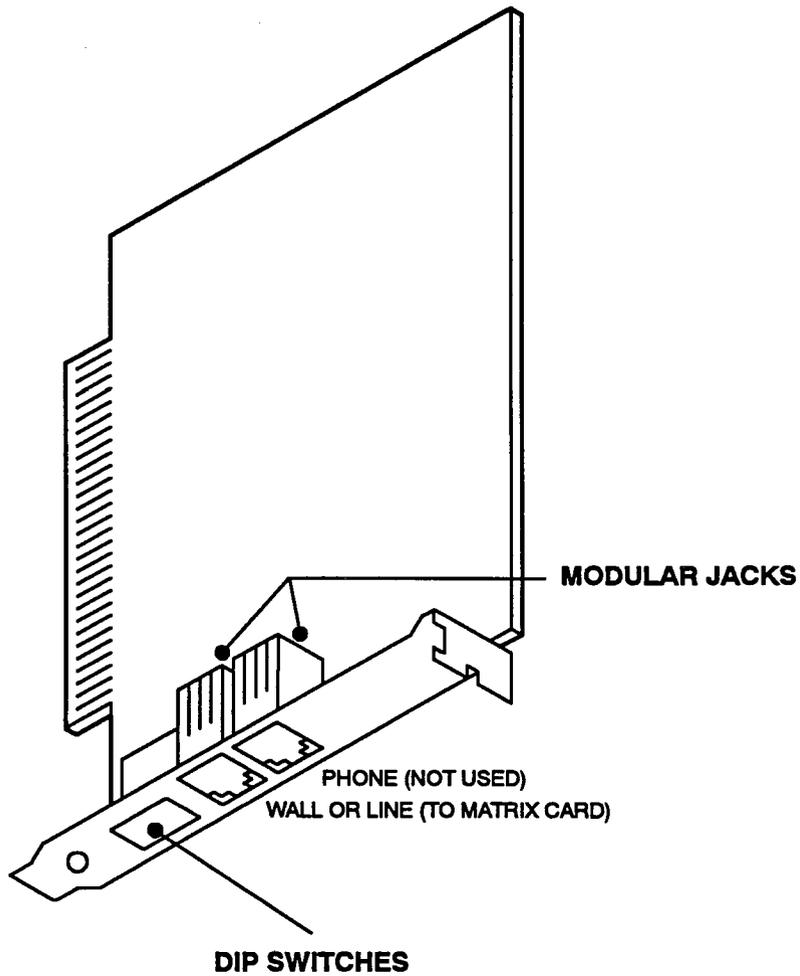


FIGURE 3-47. MODEM CARD



NOTE: Depending on the specific model of Modem Card being installed, the location and order of the PHONE jack and the LINE (or WALL) jack can vary from card to card.

FIGURE 3-48. MFM-TYPE DISK CONTROLLER CARD

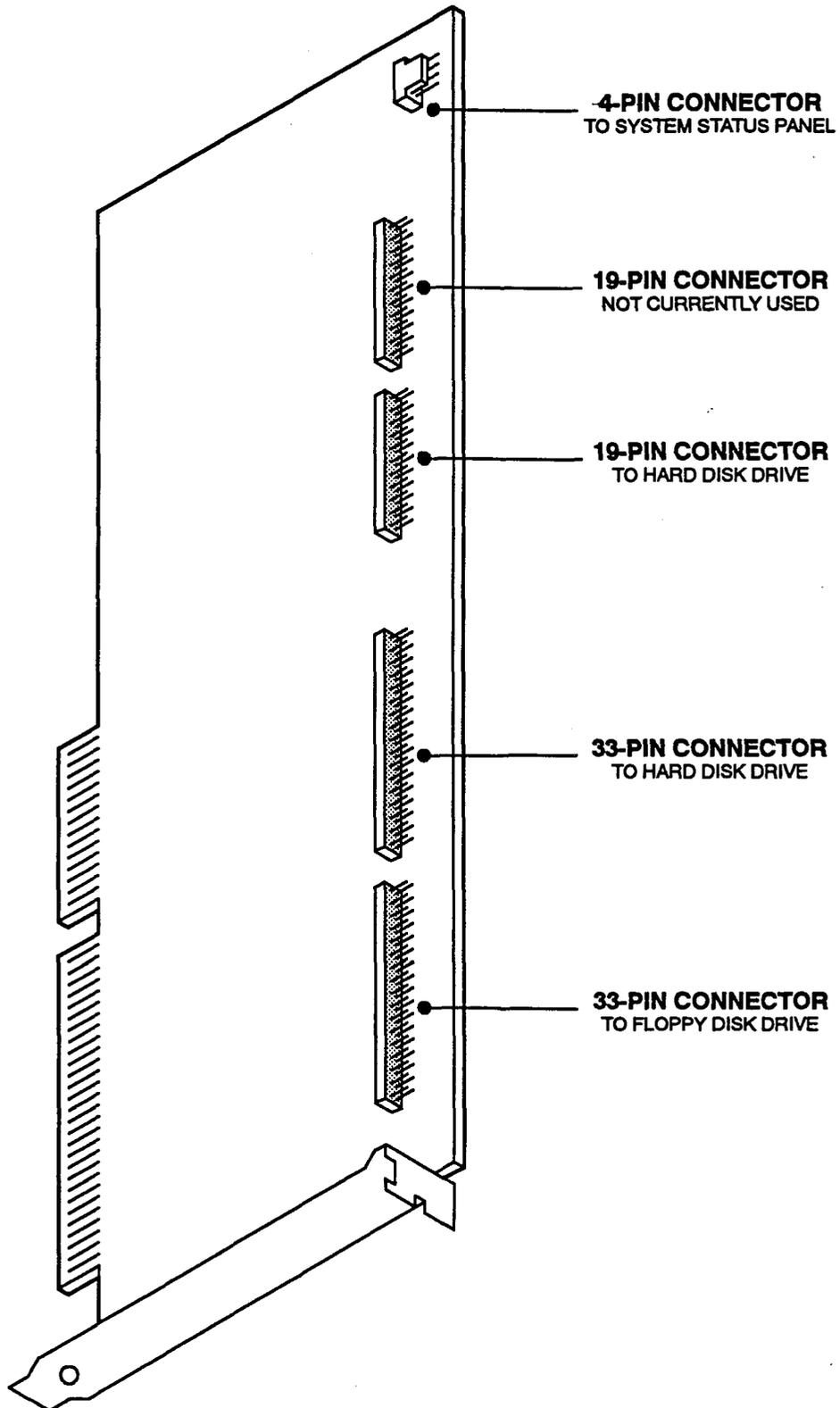
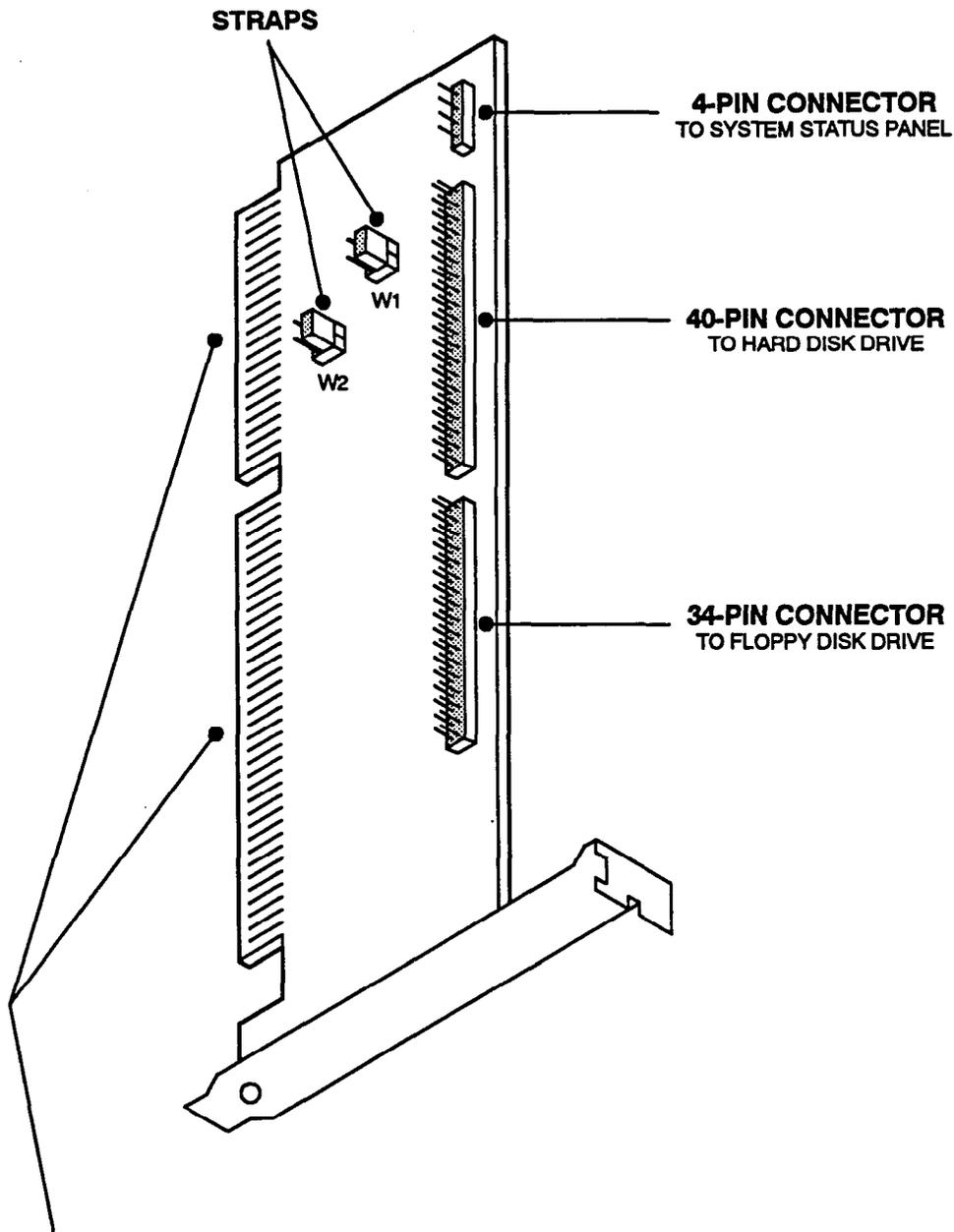


FIGURE 3-49. IDE-TYPE DISK CONTROLLER CARD



NOTE: Both of these connectors on the edge of the card must be plugged into a single large (16-bit) slot on the PC Motherboard, rather than plugging only the bottom connector into a small (8-bit) slot. For proper slot locations, refer to the appropriate PC Motherboard drawing or to the instructions included with the motherboard.

G. INSTALL THE COMPUTER DRIVES

NOTICE

Personal computer (PC) technology is continually evolving. As it does, the 416/832 System will continue to incorporate important design enhancements. Thus, depending on the actual version of equipment that is shipped, the following installation instructions could vary somewhat. If revised instructions are included with the equipment, refer to them instead.

6.34 Currently, there are two types of hard disk drives used on the 416/832 System: 5¼-inch MFM-type (Mini-Scribe 8425 or Seagate ST-225), and the new 3½-inch IDE-type (Quantum Pro-Drive 40AT, Conner CP3000, Conner CP341, or Seagate ST3120A). Installation instructions for both types are included.

NOTE: These two hard disk drive types, along with their associated Disk Controller Cards and hard disk-to-controller interface cables, are not compatible. Either use all IDE-type equipment, or use all MFM-type equipment. *Do not mix the two types.*

CAUTION

Both the hard disk drive and the floppy disk drive are static sensitive. When handling the disk drives, use a properly terminated anti-static wrist strap and work surface. Any static charge (no matter how small the charge) must be discharged from the body before touching the disk drives. *The warranty for this equipment does not cover damage caused by static or mishandling. Disk drives damaged in such a manner will not be replaced.*

Floppy Disk Drive

6.35 Install the floppy disk drive as outlined below. Refer to Figure 3-50 on page 3-83.

- (1) Ensure that the plastic slide rails have been installed on both sides of the floppy disk drive.
- (2) Route the free ends of the disk-to-controller interface cables (that were previously attached to the Disk Controller Card) through the large cut-out in the right side of the disk drive mounting shelf, and then up and out through the front of the mounting shelf.
- (3) Plug the free end (the *outside* end if there are two) of the floppy disk-to-controller interface cable into the *male* connector on the back of the floppy disk drive.

NOTE: Be sure that the colored edge of the disk-to-controller cable aligns with Pin 1 on the disk drive's male connector.

- (4) Remove one of the two disk drive power cables from the power supply chassis and plug the other end of the cable into the *power* connector on the back of the floppy disk drive. (There should now be two cables attached to the back of the floppy disk drive.)
- (5) While guiding the cables, carefully slide the floppy disk drive into the *top* slot of the disk drive mounting shelf until it locks into place (see Figure 3-50).

NOTE: To provide adequate air circulation and dissipate excess heat, separate the two disk drives in the mounting shelf by installing the floppy disk drive in the *top* slot and the hard disk drive in the *bottom* slot.

- (6) Plug the free end of the disk drive power cable (removed in step 4) into one of the vacant disk drive connectors on the power supply chassis.

Hard Disk Drive — MFM-Type

6.36 Install the MFM-type hard disk drive as outlined below. Refer to Figure 3-50 on page 3-83.

- (1) Ensure that the plastic slide rails have been installed on both sides of the MFM-type hard disk drive.
- (2) Plug the free end of the MFM-type *hard 20-conductor (A)* disk-to-controller interface cable into the *small male* connector on the back of the hard disk drive.

NOTE: Be sure that the colored edge of the disk-to-controller cable aligns with Pin 1 on the disk drive's male connector.

- (3) Plug the free end (the *inside* end if there are two) of the MFM-type *hard 34-conductor (B)* disk-to-controller interface cable into the *large male* connector on the back of the hard disk drive.

NOTE: Be sure that the colored edge of the disk-to-controller cable aligns with Pin 1 on the disk drive's male connector.

- (4) Remove the second disk drive power cable from the power supply chassis and plug the other end of the cable into the *power* connector on the back of the MFM-type hard disk drive. (There should now be three cables attached to the back of the hard disk drive.)
- (5) While guiding the cables, carefully slide the MFM-type hard disk drive into the *bottom* slot of

the disk drive mounting shelf until it locks into place (see Figure 3-50).

NOTE: To provide adequate air circulation and dissipate excess heat, separate the two disk drives in the mounting shelf by installing the floppy disk drive in the *top* slot and the hard disk drive in the *bottom* slot.

- (6) Plug the free end of the disk drive power cable (removed in step 3) into one of the vacant disk drive connectors on the power supply chassis.

Hard Disk Drive — IDE-Type

6.37 Install the IDE-type hard disk drive as outlined below. Refer to Figure 3-50 on page 3-83.

NOTE: Quantum Pro-Drive 40AT, Conner CP3000, Conner CP341, and Seagate ST3120A hard disk drives are equipped with "self-parking" heads. *Do not attempt to park the heads on a hard disk drive that has self-parking heads.*

- (1) Ensure that the frame extension brackets (which allow a 3½-inch drive to be installed in a 5¼-inch slot) and the plastic slide rails have been installed on both sides of the IDE-type hard disk drive.
- (2) Plug the free end of the IDE-type (40-conductor) *hard* disk-to-controller interface cable into the *male* connector on the back of the IDE-type hard disk drive.

NOTE: Be sure that the colored edge of the disk-to-controller cable aligns with Pin 1 on the disk drive's male connector.

- (3) Remove the second disk drive power cable from the power supply chassis and plug the other end

of the cable into the *power* connector on the back of the IDE-type hard disk drive. (There should now be two cables attached to the back of the hard disk drive.)

- (4) While guiding the cables, carefully slide the IDE-type hard disk drive into the *bottom* slot of the disk drive mounting shelf until it locks into place (see Figure 3-50).

NOTE: To provide adequate air circulation and dissipate excess heat, separate the two disk drives in the mounting shelf by installing the floppy disk drive in the *top* slot and the hard disk drive in the *bottom* slot.

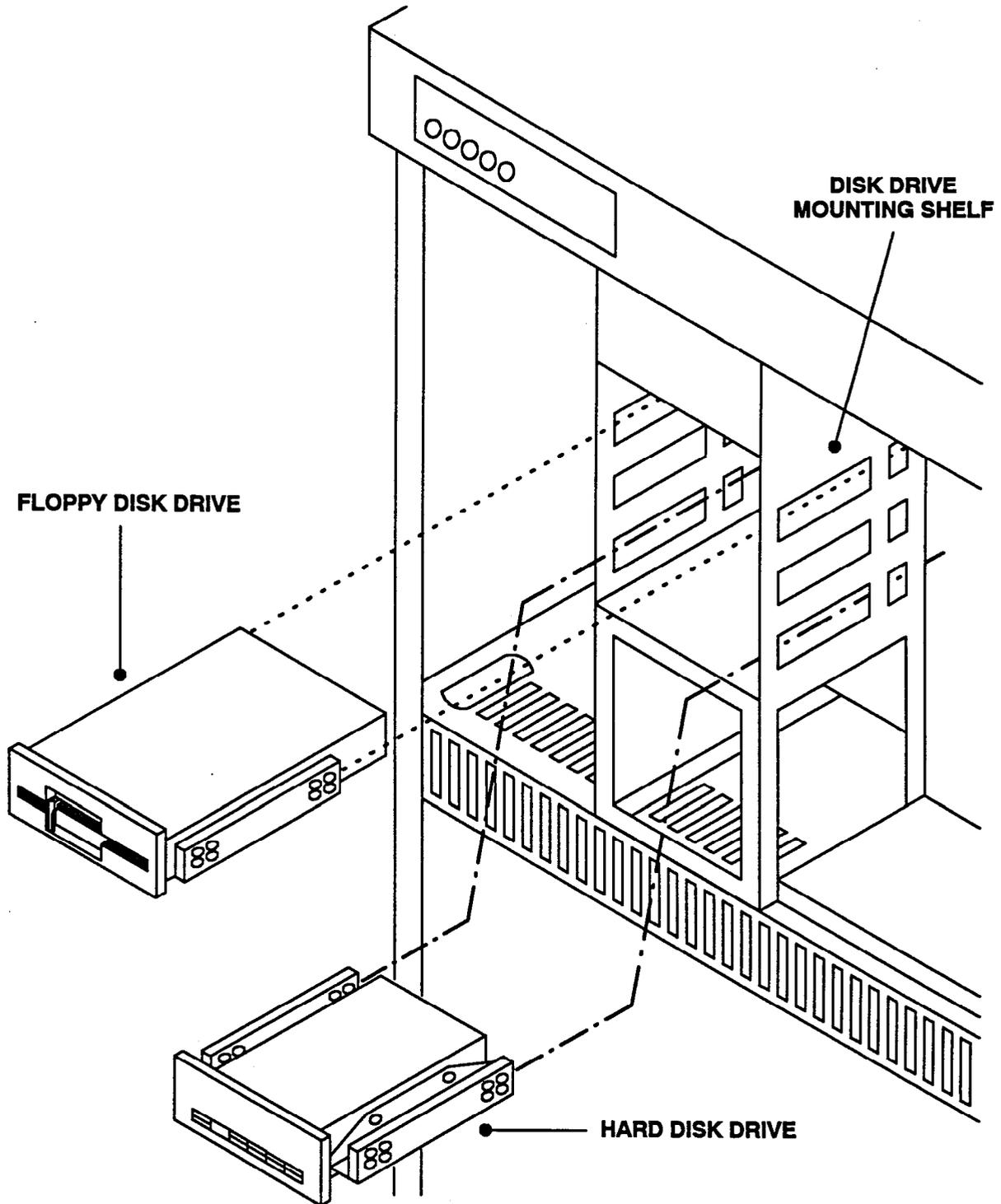
- (5) Plug the free end of the disk drive power cable (removed in step 3) into one of the vacant disk drive connectors on the power supply chassis.

H. INSTALL THE PROGRAMMING MONITOR AND KEYBOARD

6.38 The programming monitor and the keyboard must meet the requirements described in SPECIFICATIONS on page 2-36. To connect them to the 416/832 System:

- (1) Carefully connect the monitor cable to the MONITOR (DB9) port on the peripheral connector panel.
- (2) Plug the monitor's power cable into an AC power source (e.g., one the auxiliary receptacles on the power supply chassis).
- (3) Carefully connect the keyboard cable to the KEYBOARD (5-pin DIN) port on the peripheral connector panel.

FIGURE 3-50. INSTALLING THE COMPUTER DISK DRIVES



I. INSTALL THE TELECOMMUNICATION CIRCUIT CARDS

6.39 With the exception of the Matrix Card (which is installed in the last slot of the main cabinet — slot 27) and the Expansion Card (which is installed in the last slot of the expansion cabinet — slot 27), the telecommunication circuit cards can be installed in any card slot. However, to facilitate installation and programming, it is recommended that the cards be installed to match one of the two or three default configurations as closely as possible. (See SPECIFICATIONS, page 2-18, for more on default configurations.)

CAUTION

The cards and components are static sensitive. Handle the cards by the edges only and keep them in their protective bags until they are to be installed. Do not bend or touch the pins of the components or subject them to a static charge. When working with the cards, use a properly terminated anti-static wrist strap and cover the work surface with the bag that protected the card during shipping. Any static charge (no matter how small the charge) must be discharged from the body before touching the cards or components. *The warranty for this equipment does not cover damage caused by static or mishandling. Cards or components damaged in such a manner will not be replaced.*

Matrix Card (MXC)

6.40 Before installing the Matrix Card (MXC) in the equipment cabinet, install the Matrix Peripheral Processor Chip included with the software disks. This component, which works in conjunction with the software stored on the hard disk drive, determines the specific software package that the system will use. Refer to OVERVIEW, page 1-2, for a listing of the available software packages.

- (1) Check the part number on the Matrix Peripheral Processor Chip. It should match the number of the software package that the customer purchased. Refer to REPLACEMENT PARTS for part numbers.
- (2) Place the MXC on a clean, flat surface.
- (3) Carefully insert the Matrix Peripheral Processor Chip in socket U13 on the MXC. The notch (or small dot in the corner indicating pin 1) on the component must match the notch of the outline silkscreened on the card — pin 1 on the chip to pin 1 on the socket. (See Figure 3-51 on page 3-86 for chip location.)

6.41 If an expansion cabinet is installed, install the five MXC Expansion Chips and the EXP-to-MXC data cable as follows. Refer to Figure 3-51 on page 3-86 for an illustration of the card.

- (1) Carefully insert the small chip labeled 74HCT541 in socket U8. The notch (or small dot in the corner indicating pin 1) on the component must match the notch of the outline silkscreened on the card — pin 1 on the chip to pin 1 on the socket.
- (2) Carefully insert the small chip labeled 74HC573 in socket U21. The notch on the component must match the notch of the outline silkscreened on the card.
- (3) Carefully insert the three large chips labeled MO88 in sockets U22, U43, and U45. The notches on the components must match the notches of the outlines silkscreened on the card.
- (4) Install the free end of the EXP-to-MXC data cable on the back, inside wall of the *main* equipment cabinet just below the connector for the Matrix Card. The colored edge (pin 1) of the ribbon cable should be to the top.

NOTE: The other end of the EXP-to-MXC data cable comes already installed on the back, inside wall of the *expansion* cabinet just above the connector for the Expansion Card.

6.42 If desired, up to eight additional DTMF decoding circuits (besides the eight that already exist) can be added to the MXC. Refer to SPECIFICATIONS, page 2-15, for more information on DTMF decoding circuits. To install the DTMF Expansion Chips, follow the instructions included with the kit (refer to REPLACEMENT PARTS for part numbers).

6.43 Install the Matrix Card in the equipment cabinet as follows. Refer to Figure 3-51 on page 3-86 for an illustration of the card.

- (1) Check to see that all components on the card are seated securely in their sockets and that no pins are bent.
- (2) *If connecting one or two external music sources*, place the associated music-on-hold (MOH) jumper strap(s) (Port 1 or Port 2) on the MXC in the ON position (over the top two pins) to enable music, or place the jumper strap(s) in the OFF position (bottom two pins) to disable music. If enabled, outside callers will hear music when placed on hold. If disabled, outside callers will not hear music when placed on hold.

NOTE: By entering a feature code, individual keypad users can choose to listen to background

music from either music source. For the Music-On-Hold feature, either music source can be assigned on a trunk group-by-trunk group basis.

- (3) *Make sure the main and expansion AC POWER switches are turned OFF. Inserting or removing the MXC with the power on may damage the processor.*
- (4) *With the components facing right, slowly and carefully insert the MXC in the last (27th) card slot in the bottom half of the main equipment cabinet.*

NOTE: To fully insert the MXC in an expanded system, it may be necessary to slightly re-align the EXP-to-MXC data cable that was installed in step 4 on the previous page.

- (5) *Attach the free end of the 15-pin HDLC-to-MXC interface cable to the 15-pin connector on the MXC (the other end of the cable was previously attached to the HDLC Card).*
- (6) *Attach the free end of the mod-to-mod line cord to the modular jack connector on the MXC (the other end of the line cord was previously attached to the Modem Card).*
- (7) *Ensure that the programming monitor attached to the peripheral connector panel is plugged into an AC power source (e.g., one of the auxiliary receptacles on the power supply chassis) and turned on.*
- (8) *Turn ON the AC POWER switch on each power supply unit (main supply first) and observe the system power-up process:*

NOTE: The system is shipped with the operating system software and the purchased software package already installed on the hard disk. *If the system does not power up as outlined below, contact Customer Support.*

- a. *The system performs a memory test. The MAJOR ALARM LED on the system status panel is lit, while the DISK ACTIVE LED should flash intermittently. The LEDs on the MXC are unlit.*
- b. *The system download process begins.*
- c. *The system checks the OS (operating system) status and displays the 416/832 copyright momentarily.*

- d. *The download process continues. During this stage of the download, the CPU ACTIVE LED on the system status panel should light.*
- e. *After the power-up process is complete, the monitor displays the Inter-Tel logo and the words "416/832 Applications." The MAJOR ALARM and DISK ACTIVE LEDs should go out. (The DISK ACTIVE LED will then flash whenever the hard disk is accessed.)*

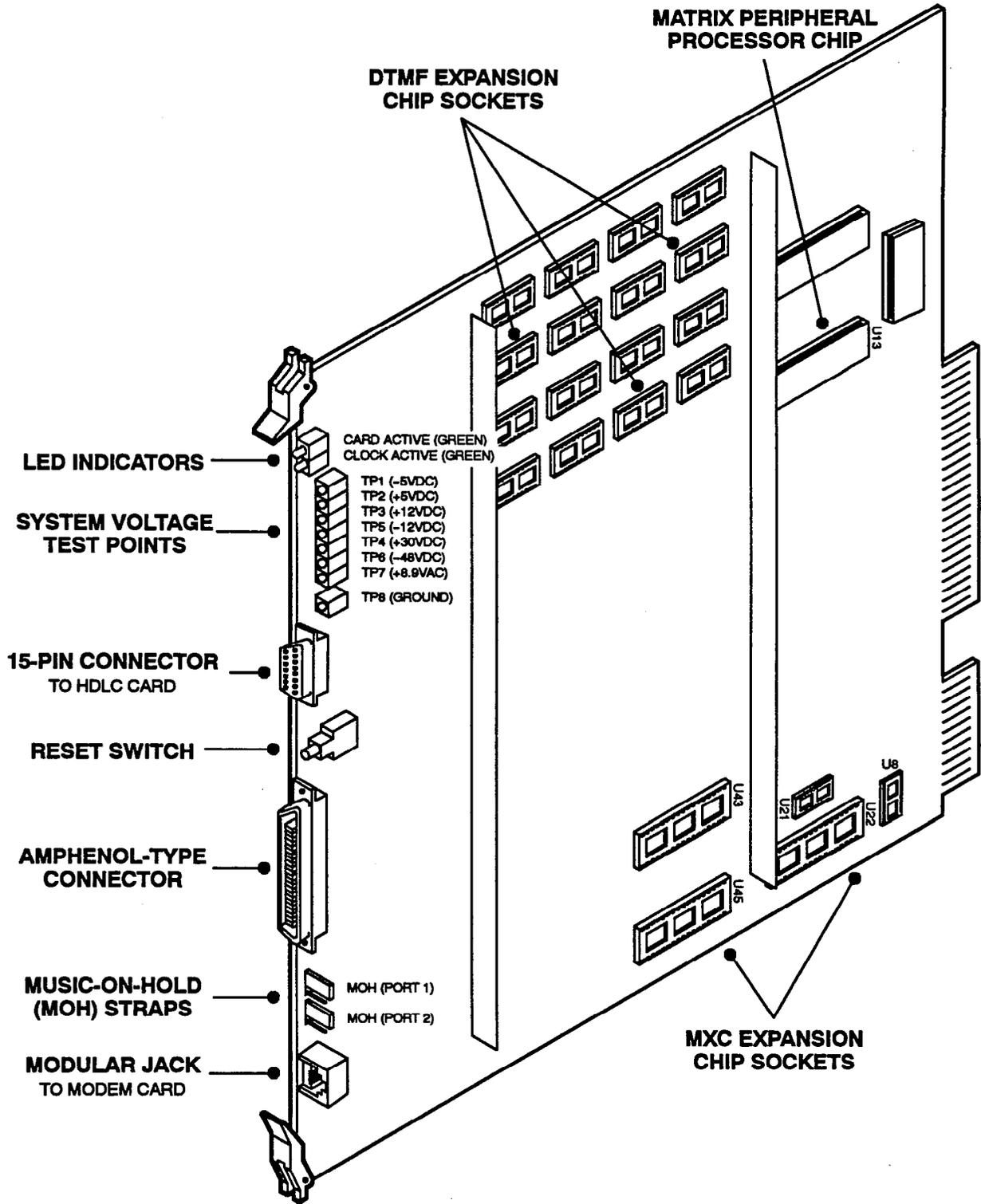
- (9) *Measure the following system voltages on the MXC. A digital voltmeter of $\pm 0.5\%$ accuracy is required. Insert the "common" voltmeter probe into the ground point (TP8) and insert the other probe into the desired voltage test point. (Refer to Figure 3-51 on page 3-86 for system voltage test point locations.)*

TEST POINTS	VOLTAGE
TP 1 to TP 8	-5 $\pm 20\%$ VDC
TP 2 to TP 8	+5 $\pm 20\%$ VDC
TP 3 to TP 8	+12 $\pm 20\%$ VDC
TP 5 to TP 8	-12 $\pm 20\%$ VDC
TP 4 to TP 8	+30 $\pm 20\%$ VDC
TP 6 to TP 8	-48 $\pm 20\%$ VDC
TP 7 to TP 8	9 $\pm 20\%$ VAC

NOTE: The AC ring voltage (VRING) measured on the MXC is $\frac{1}{10}$ the actual power supply ring voltage of 90VAC.

- (10) *If the voltages are within tolerance, proceed to step 11. If the voltages are out of tolerance:*
 - a. *Turn OFF the AC POWER switches (main supply first).*
 - b. *Take out the MXC and check for shorted components.*
 - c. *Re-insert the card, turn ON the AC POWER switches (main supply first), and check the voltages again.*
 - d. *If still out of tolerance, turn OFF the AC POWER switches (main supply first) and replace the defective MXC.*
- (11) *Turn OFF the AC POWER switches (main supply first).*
- (12) *After installing the MXC, optional equipment such as music sources, power failure transfer equipment, signaling devices, etc. may be connected to the MXC terminal block at any time. Refer to page 3-142 for external music source installation instructions.*

FIGURE 3-51. MATRIX CARD (MXC)



Expansion (EXP) Card

6.44 Before installing the EXP in the expansion cabinet, install the Expansion Peripheral Processor Chip included with the software disks. This component, which works in conjunction with the software stored on the hard disk drive, allows the system to have an expansion cabinet installed.

- (1) Place the EXP on a clean, flat surface.
- (2) Carefully insert the Expansion Peripheral Processor Chip in socket U15 on the EXP. The notch (or small dot in the corner indicating pin 1) on the component must match the notch of the outline silkscreened on the card — pin 1 on the chip to pin 1 on the socket. (Refer to Figure 3-51 on page 3-86 for the chip location.)
- (3) If desired, up to six additional DTMF decoding circuits (in addition to the eight that already exist) can be added to the EXP. To install the DTMF Expansion Chips, follow the instructions included with the kit (see REPLACEMENT PARTS for part numbers).
- (4) Check to see that all components on the card are seated securely in their sockets and that no pins are bent.

NOTE: Install the EXP in the expansion cabinet as follows. Refer to Figure 3-51 on page 3-86 for an illustration of the card.

- (1) *Make sure the main and expansion AC POWER switches are turned OFF. Installing the EXP with the power on may damage the processor.*
- (2) Install the EXP with the components *facing right* in the last (27th) card slot in the expansion cabinet.
- (3) Ensure that the programming monitor attached to the peripheral connector panel on the main cabinet is plugged into an AC power source and turned on.
- (4) Turn ON the AC POWER switch on each power supply unit (main supply first) and observe the

system power-up process as outlined on page 3-85.

NOTE: Although the expanded software has not yet been installed, the system should power up as normal. *If the system does not power up as outlined in the manual, contact Customer Support.*

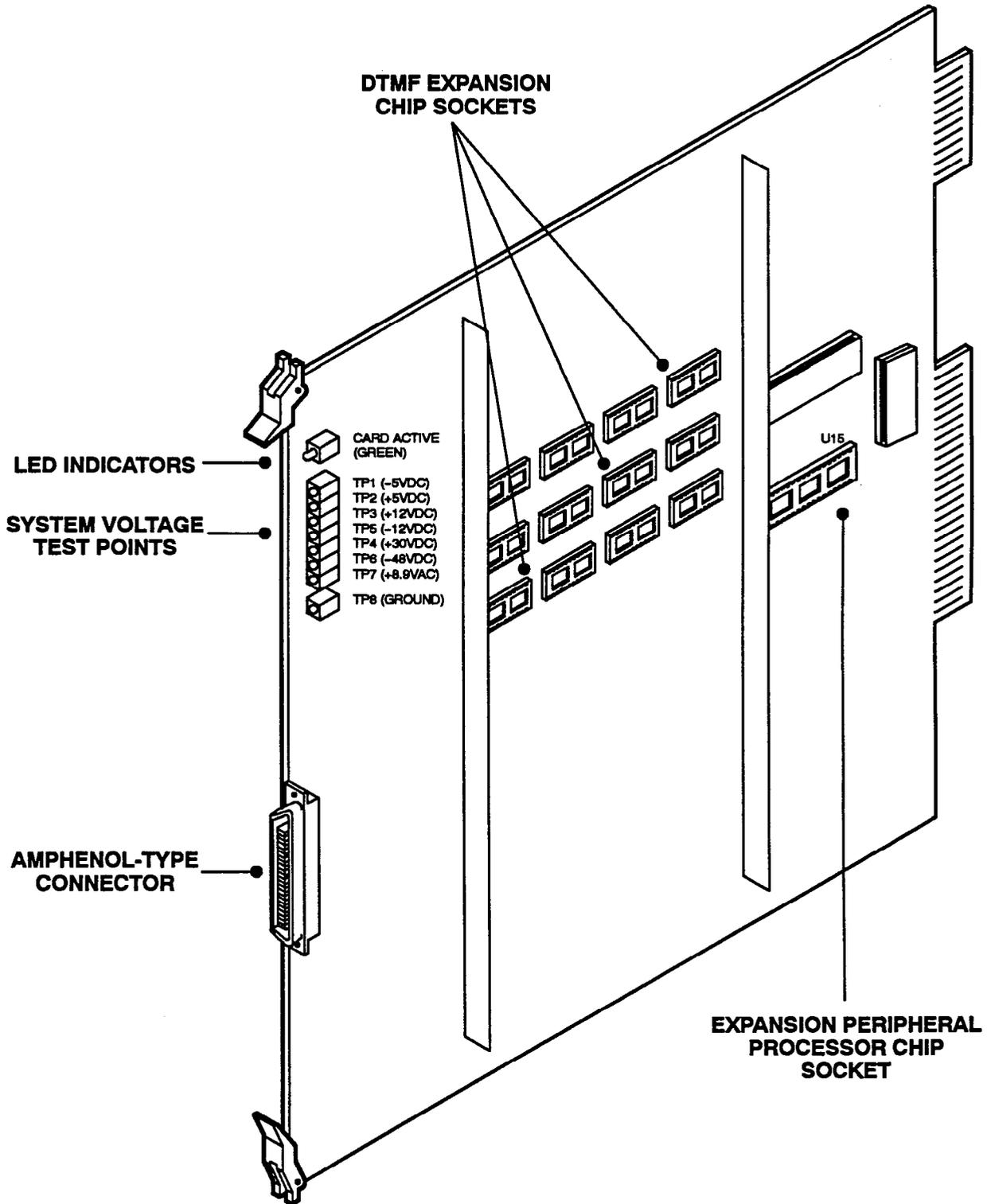
- (5) Measure the following system voltages on the EXP. A digital voltmeter of $\pm 0.5\%$ accuracy is required. Insert the "common" voltmeter probe into the ground point (TP8) and insert the other probe into the desired voltage test point. (Refer to Figure 3-51 on page 3-86 for system voltage test point locations.)

TEST POINTS	VOLTAGE
TP 1 to TP 8	-5 $\pm 20\%$ VDC
TP 2 to TP 8	+5 $\pm 20\%$ VDC
TP 3 to TP 8	+12 $\pm 20\%$ VDC
TP 5 to TP 8	-12 $\pm 20\%$ VDC
TP 4 to TP 8	+30 $\pm 20\%$ VDC
TP 6 to TP 8	-48 $\pm 20\%$ VDC
TP 7 to TP 8	9 $\pm 20\%$ VAC

NOTE: The AC ring voltage (VRING) measured on the EXP is $\frac{1}{10}$ the actual power supply ring voltage of 90VAC.

- (6) *If the voltages are within tolerance, proceed to step 11. If the voltages are out of tolerance:*
 - a. Turn OFF the *expansion AC POWER* switch.
 - b. Take out the EXP and check for shorted components.
 - c. Re-insert the card, turn ON the *expansion AC POWER* switch, and check the voltages again.
 - d. If still out of tolerance, turn OFF the *expansion AC POWER* switch and replace the defective EXP.
- (7) Turn OFF the *expansion AC POWER* switch.
- (8) After installing the EXP, optional signaling devices, night transfer equipment, etc. may be connected to the EXP terminal block at any time.

FIGURE 3-52. EXPANSION (EXP) CARD



Digital Keypad Cards (DKSCs)

6.45 Each DKSC comes equipped with one Digital Signal Processor (DSP) for shared speakerphone resources. If desired, a second DSP can be installed to provide additional speakerphone resources. Refer to SPECIFICATIONS, page 2-17, for more information.

6.46 Install the cards as described below. The part number is listed in REPLACEMENT PARTS. Refer to Figure 3-53 on page 3-90 for an illustration.

NOTE: When inserting or removing the Matrix Card, Expansion Card, and/or the computer cards, the system power must be turned off to prevent damage to the cards. However, station and trunk cards can be inserted or removed with power on. (After inserting a T1 Card, wait ten seconds before inserting any other card.)

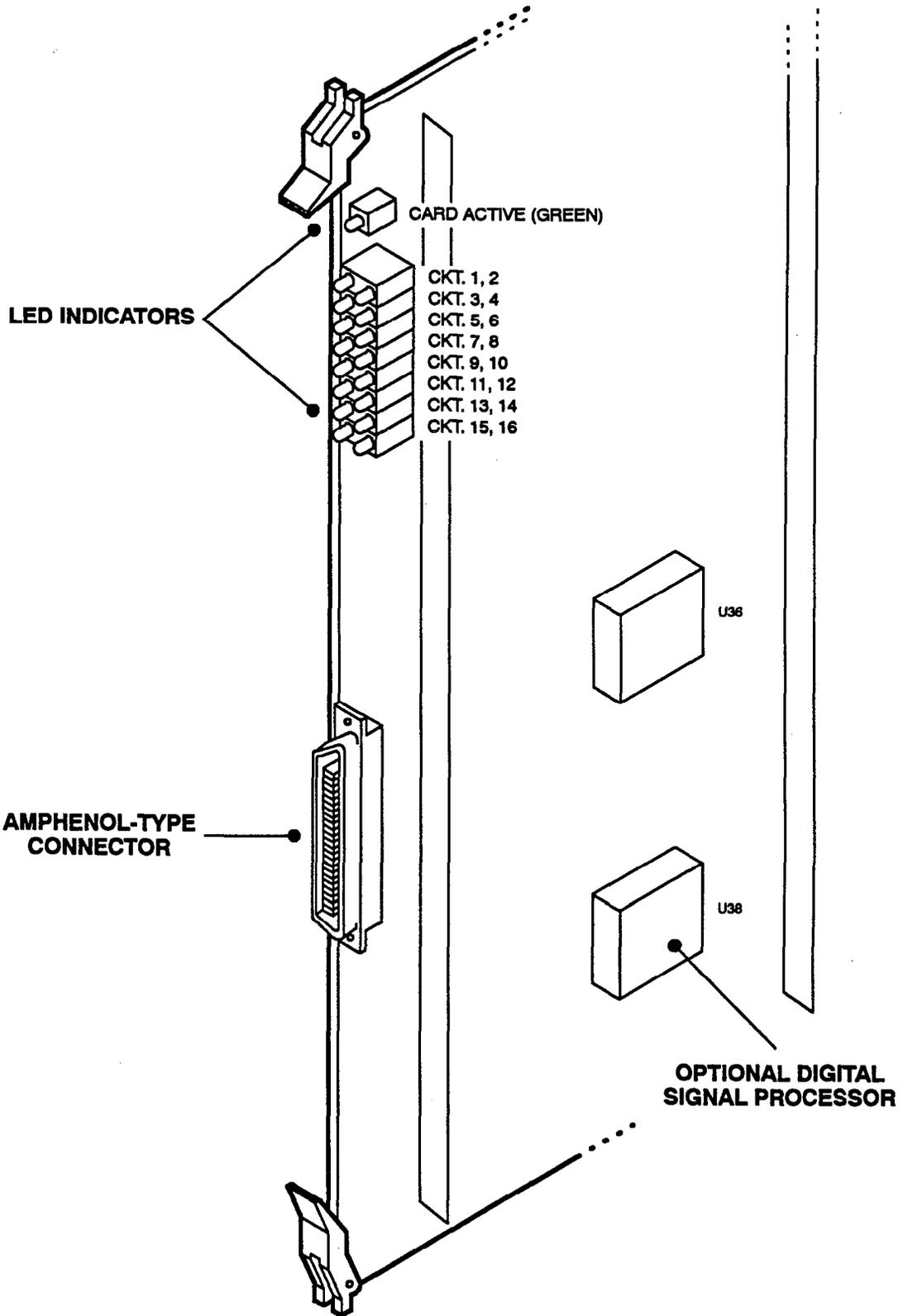
- (1) *If the optional DSP is to be installed:*
 - a. Place each DKSC on a clean, flat, anti-static, non-conductive surface.
 - b. Carefully install the optional DSP in socket U38. (See Figure 3-53 on page 3-90.) The notch (or small dot in the corner) indicating

pin 1 on each DSP must match the notch of the outline silkscreened on the card.

- (2) Check to see that all components on the cards are seated securely in their sockets and that no pins are bent.
- (3) Install the DKSCs one at a time in the slots to be used for digital keysets. The component sides of the cards must *face right*. Any type of card may be installed in any slot, and slots may be skipped, if desired. However, to facilitate installation and programming, it is recommended that the cards be installed to match one of the default configurations as closely as possible. (Refer to page 2-18 for information on default configurations.)

NOTE: When powered up, the system configures the software to match one of the default card configurations. If the actual cards installed do not exactly match the selected configuration, adjustments must be made in database programming. Circuit 1.1 is preset for the primary attendant (a KSC circuit). If changing card types (e.g., changing from an SLC to a DKSC), refer to the programming procedures on page 5-171 and to the information on pages 3-7 to 3-9.

FIGURE 3-53. DIGITAL KEYSER CARD (DKSC)



Keypad Cards (KSCs and KSC-Ds)

6.47 Install the cards as described below. Part numbers are listed in REPLACEMENT PARTS. Refer to Figure 3-54 on page 3-92 for an illustration.

NOTE: When inserting or removing the Matrix Card, Expansion Card, and/or the computer cards, the system power must be turned off to prevent damage to the cards. However, station and trunk cards can be inserted or removed with power on. (After inserting a T1 Card, wait ten seconds before inserting any other card.)

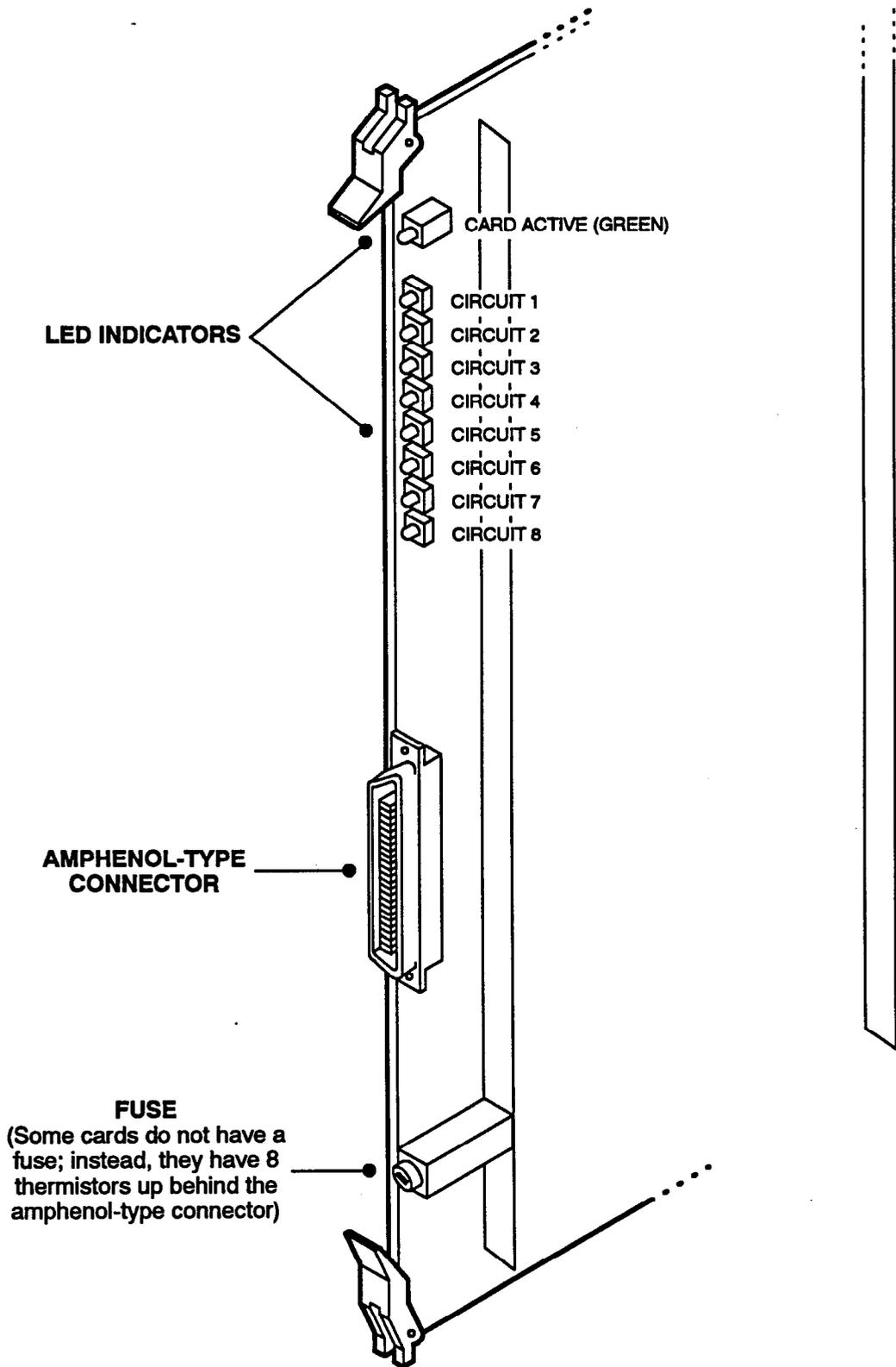
- (1) *For all KSCs that will have any 8-line IMX AIM keysets installed:* Check the part number and label silkscreened on the card. To install 8-line IMX AIM keysets *two to a circuit*, the new "dual-circuit" version Keypad Card (KSC-D) must be used (see REPLACEMENT PARTS for the part number). To install 8-line IMX AIM keysets *one to a circuit*, either the KSC or the KSC-D can be used.
- (2) Check to see that all components on the cards are seated securely in their sockets and that no pins are bent.
- (3) Check the fuses. Some KSCs have a 2A, 250V, AGC 2 (fast-acting) fuse. KSC-Ds and newer

version KSCs have eight self-correcting thermistors (one for each circuit) instead of the fuse. If a short circuit causes a thermistor to open, it will automatically close when the short is removed.

- (4) Install the KSCs and/or KSC-Ds one at a time in the slots to be used for analog keypad, analog DSS/BLF Unit, and Attendant Computer Console connections. The component sides of the cards must *face right*. Any type of card may be installed in any slot, and slots may be skipped, if desired. However, to facilitate installation and programming, it is recommended that the cards be installed to match one of the default configurations as closely as possible. (Refer to page 2-18 for information on default configurations.)

NOTE: When powered up, the system configures the software to match one of the default card configurations. If the actual cards installed do not exactly match the selected configuration, adjustments must be made in database programming. Circuit 1.1 is preset for the primary attendant (a KSC circuit). If changing card types (e.g., changing from an SLC to a KSC), refer to the programming procedures on page 5-171 and to the information on pages 3-7 to 3-9.

FIGURE 3-54. KEYSSET CARD (KSC or KSC-D)



Single-Line Cards (SLCs) and Inward Dialing Cards (IDCs)

6.48 Install the cards as described below. Part numbers are listed in REPLACEMENT PARTS. Refer to Figures 3-55 and 3-56 on pages 3-94 and 3-95 for illustrations.

NOTE: When inserting or removing the Matrix Card, Expansion Card, and/or the computer cards, the system power must be turned off to prevent damage to the cards. However, station and trunk cards can be inserted or removed with power on. (After inserting a T1 Card, wait ten seconds before inserting any other card.)

- (1) *For each circuit on all IDCs:* On older-version IDCs, make sure the AC ENABLE jumper strap is installed (either on the card or at the block) for off-premises extensions and AC-ringing on-premises equipment. The strap must be removed for DID trunks and DC-ringing on-premises equipment. Newer-version IDCs have a 3-pin RING SELECT jumper strap that must be placed in the AC/OPX position (over the bottom two pins) or the DC/DID position (over the top two pins).

NOTE: When setting the jumper straps on either version card, note the unique ordering of the IDC circuits as shown in Figure 3-56 on page 3-95.

- (2) Check to see that all components on the cards are seated securely in their sockets and that no pins are bent.
- (3) Check the fuses:
 - Some SLCs have a fuse that cannot be replaced in the field (see page 2-17 for more information). Newer version SLCs have a self-correcting thermistor instead of the fuse.

- Each IDC has 16 specially designed fuses that cannot be replaced in the field (see page 2-20 for more information).

- (4) Install the cards one at a time. Any type of card may be installed in any slot, and slots may be skipped, if desired. However, to facilitate installation and programming, it is recommended that the cards be installed to match one of the default configurations as closely as possible. (Refer to page 2-18 for information on default configurations.)

NOTE: When powered up, the system configures the software to match one of the default card configurations. If the actual cards installed do not exactly match the selected configuration, adjustments must be made in database programming. Circuit 1.1 is preset for the primary attendant (a KSC circuit). If changing card types (e.g., changing from a KSC to an SLC), refer to the programming procedures on page 5-171 and to the information on pages 3-7 to 3-9.

- *For SLCs:* Install SLCs in the slots to be used for AC-ringing single-line set and AC playback device connections. The component sides of the cards must *face right*.
- *For IDCs:* Install IDCs in the slots to be used for DID trunk, off-premises extension, single-line set, and playback device connections. The component sides of the cards must *face right*.

NOTE: If installing off-premises extensions, refer to page 3-31 before installing any IDCs.

FIGURE 3-55. SINGLE-LINE CARD (SLC)

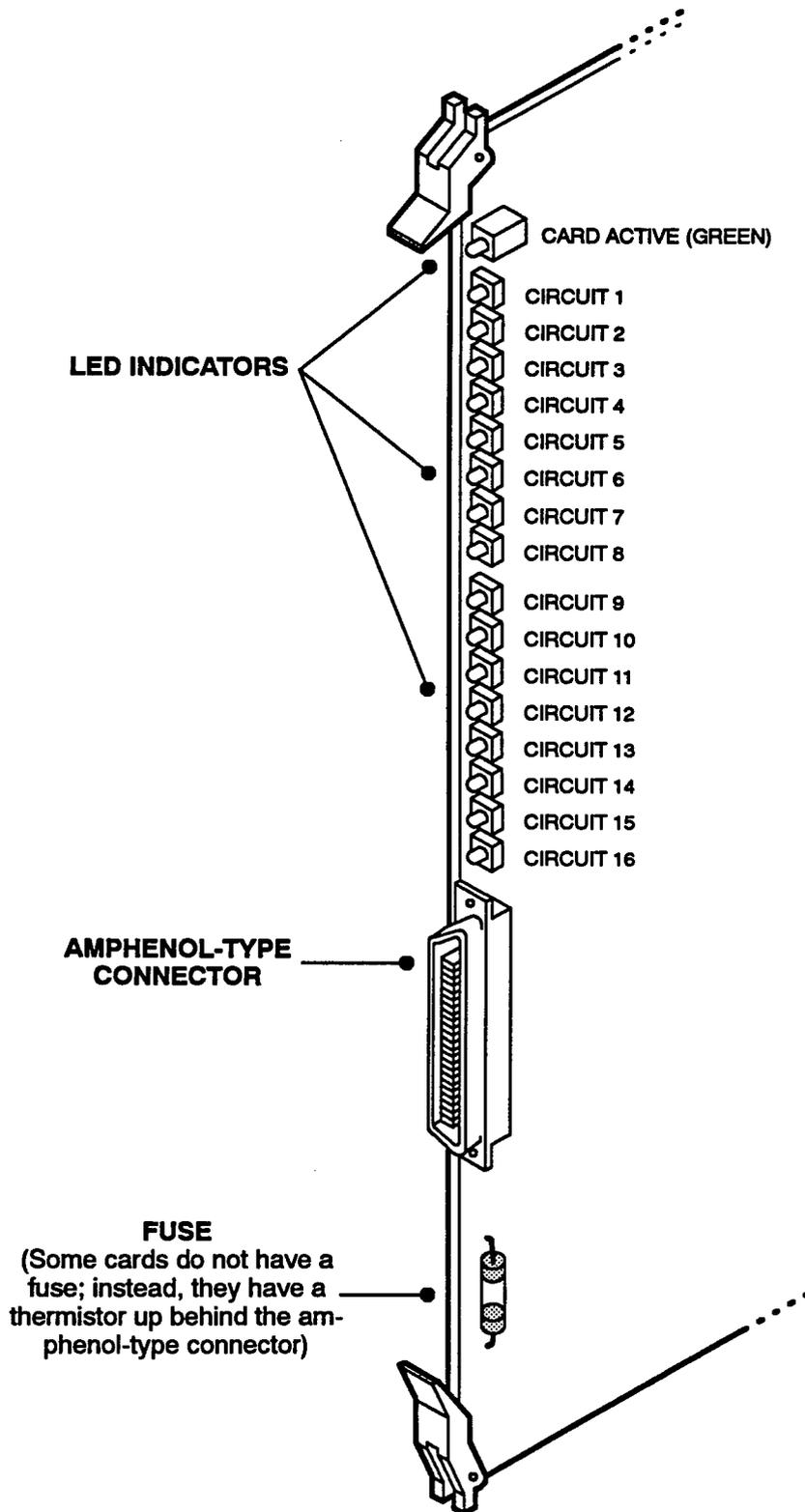
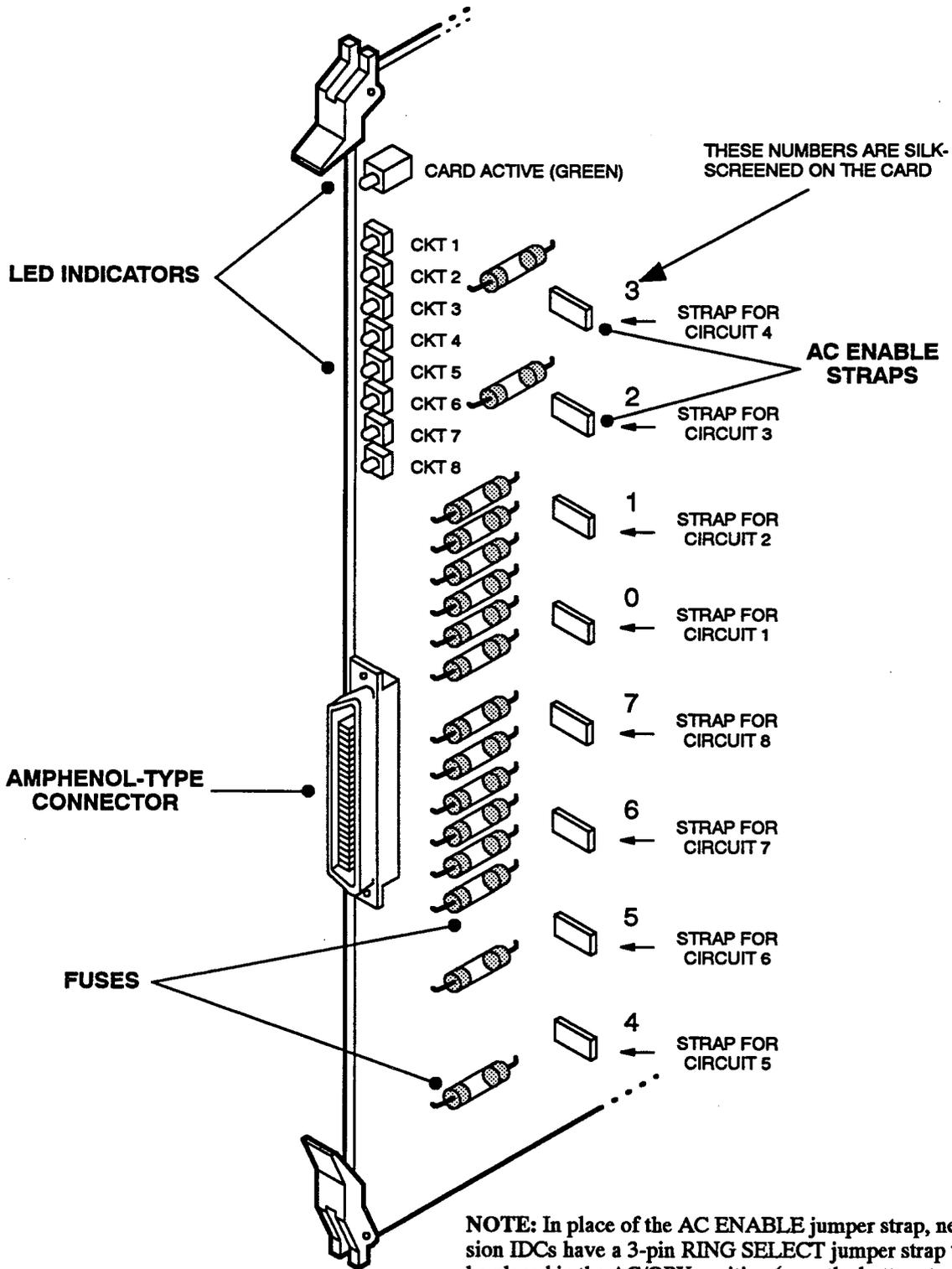


FIGURE 3-56. INWARD DIALING CARD (IDC)



NOTE: In place of the AC ENABLE jumper strap, newer-version IDCs have a 3-pin RING SELECT jumper strap that must be placed in the AC/OPX position (over the bottom two pins) or the DC/DID position (over the top two pins).

Loop/Ground Start Cards (LGCs) and Loop Start Cards (LSCs)

6.49 Install each LGC and LSC as described below (see REPLACEMENT PARTS for the part number). Refer to Figures 3-57 and 3-58 on pages 3-97 and 3-98 for illustrations.

NOTE: When inserting or removing the Matrix Card, Expansion Card, and/or the computer cards, the system power must be turned off to prevent damage to the cards. However, station and trunk cards can be inserted or removed with power on. (After inserting a T1 Card, wait ten seconds before inserting any other card.)

- (1) Check to see that all components on the card are seated securely in their sockets and that no pins are bent.
- (2) Check the fuses. There are 16 specially designed fuses on each LGC and LSC that cannot be replaced in the field (see page 2-19 for more information).
- (3) *For LGCs Only:* Depending on the type of CO trunk to be installed on each individual LGC circuit, place the associated two jumper straps in

the proper loop start (LS) or ground start (GS) position.

NOTE: When setting the straps, note the unique ordering of the LGC circuits as shown in Figure 3-57. For each LGC circuit, *both* straps must be in the proper (LS or GS) position. If the strap settings are mixed, or if one or both of the straps is missing, the circuit will not function properly.

- (4) Install the LGCs and LSCs one at a time with the components *facing right*. They may be installed in any slot, and slots may be skipped, if desired. However, to facilitate installation and programming, it is recommended that the cards be installed to match one of the default configurations as closely as possible. (Refer to page 2-18 for information on default configurations.)

NOTE: When powered up, the system configures the software to match one of the default card configurations. If the actual cards installed do not exactly match the selected configuration, adjustments must be made in database programming. If changing card types (e.g., changing from an SLC to an LGC), refer to the programming procedures on page 5-171 and to the information on pages 3-7 through 3-9.

FIGURE 3-57. LOOP/GROUND START CARD (LGC)

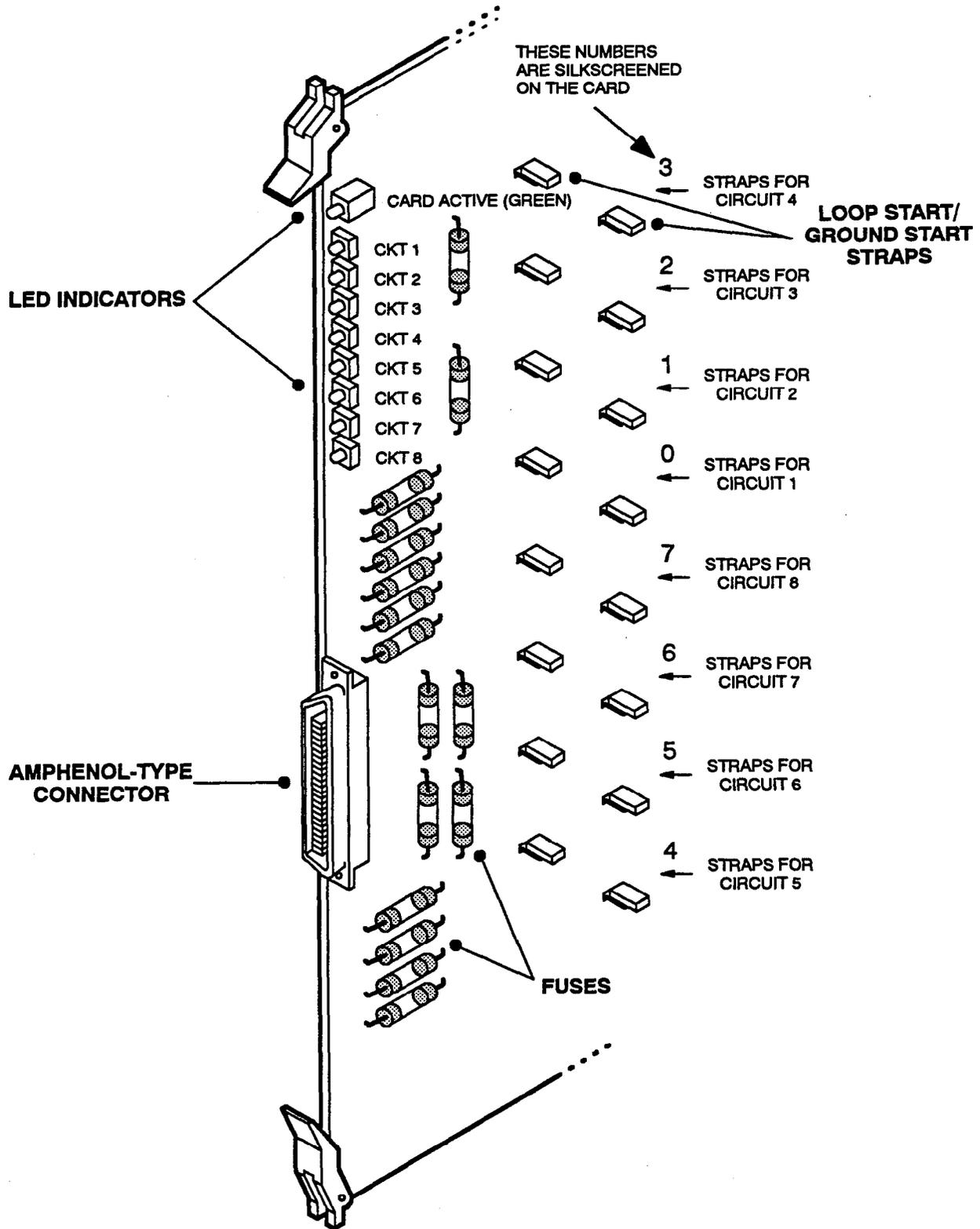
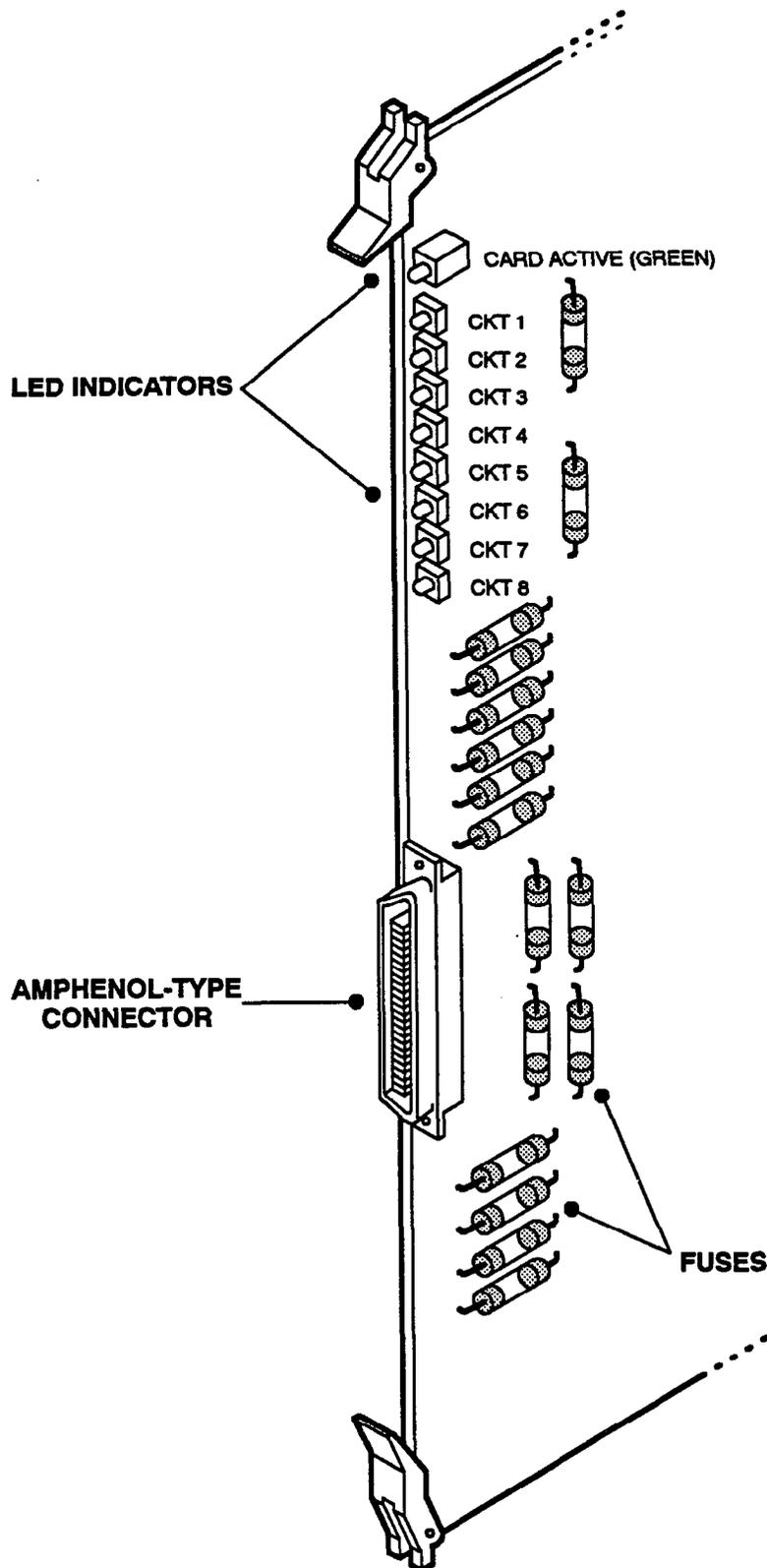


FIGURE 3-58. LOOP START CARD (LSC)



E&M Cards (EMCs)

6.50 Install each EMC as described below (see REPLACEMENT PARTS for the part number). Refer to Figure 3-59 on page 3-100 for an illustration.

NOTE: When inserting or removing the Matrix Card, Expansion Card, and/or the computer cards, the system power must be turned off to prevent damage to the cards. However, station and trunk cards can be inserted or removed with power on. (After inserting a T1 Card, wait ten seconds before inserting any other card.)

- (1) Check to see that all components on the card are seated securely in their sockets and that no pins are bent.
- (2) Check the fuses. There are 24 specially designed fuses on each EMC that cannot be replaced in the field (see page 2-21 for more information).
- (3) Depending on the type of E&M trunk to be installed on each individual EMC circuit, place the associated jumper plugs in the proper "signaling

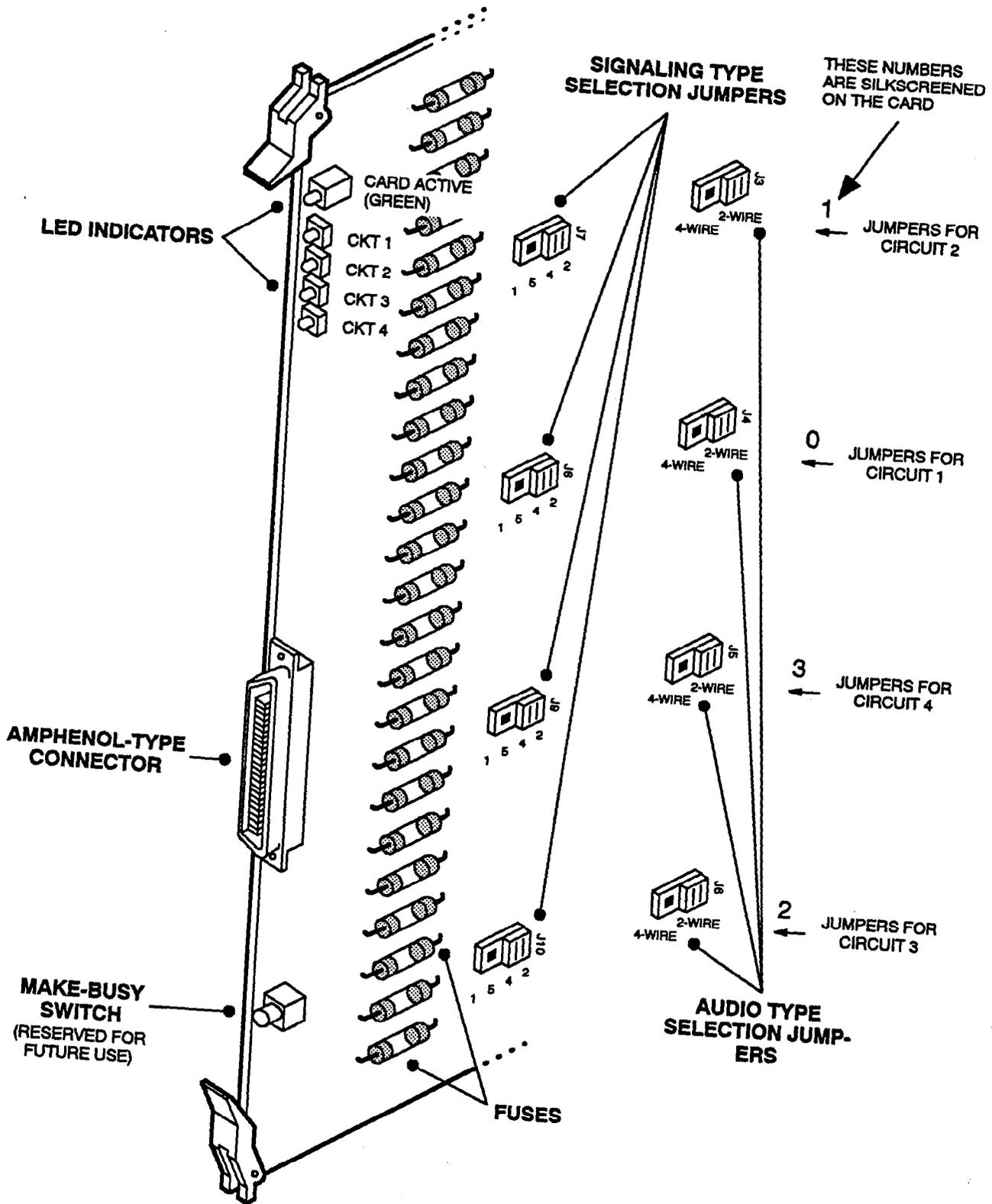
type" (1, 2, 4, or 5) and "audio type" (2-wire or 4-wire) positions.

NOTE: When setting the jumper plugs, note the unique ordering of the EMC circuits as shown in Figure 3-59.

- (4) Install the EMCs one at a time with the components *facing right*. They may be installed in any slot, and slots may be skipped, if desired. However, to facilitate installation and programming, it is recommended that the cards be installed to match one of the default configurations as closely as possible. (Refer to page 2-18 for information on default configurations.)

NOTE: When powered up, the system configures the software to match one of the default card configurations. If the actual cards installed do not exactly match the selected configuration, adjustments must be made in database programming. If changing card types (e.g., changing from an LGC to an EMC), refer to the programming procedures on page 5-171 and to the information on pages 3-7 through 3-9.

FIGURE 3-59. E&M CARD (EMC)



T1 Cards (T1Cs)

6.51 Install each T1C as described below (see REPLACEMENT PARTS for the part number). Refer to Figure 3-60 on page 3-102 for an illustration.

NOTE: Like the other station and trunk cards, T1 Cards can be inserted or removed with the system power turned on, as long as the T1 span is not connected to the card. However, *after inserting a T1 Card while the power is on*, wait at least ten seconds before inserting any other card. Also, *before removing a T1 Card while power is on*, first press the make-busy switch on the card and allow the system to "busy out" the T1 span, then unplug the T1 span from the connector on the card (see page 2-23 for more information on the make-busy switch).

- (1) *If installing the optional on-board Channel Service Unit (CSU)*, follow these steps:

NOTE: The on-board CSU can now be purchased directly from Inter-Tel using part number 440.3004.

- a. Carefully plug the CSU into the large socket provided on the card (see Figure 3-60).
- b. Place the DSX/CSU jumper plug in the CSU (J18) position.
- c. Depending on the distance to the nearest public network T1 repeater, place the line build-out (LBO) attenuation jumper plug in the appropriate position: 15dB (J21) for 0-1599 feet, 7.5dB (J20) for 1600-2999 feet, or 0dB (J19) for 3000-6000 feet.

If the optional on-board CSU is not installed, place the DSX/CSU jumper plug in the DSX (J17) position.

- (2) Check the part number of the component installed in socket U45 (see Figure 3-60).

If the component is labeled with number LXP600, a jumper plug must be installed in location J32.

If the component is labeled with number LXP602, a jumper plug must be installed in location J33.

- (3) Check to make sure the remaining jumper straps and plugs are installed in the following locations on the card (see Figure 3-60 for card orientation):

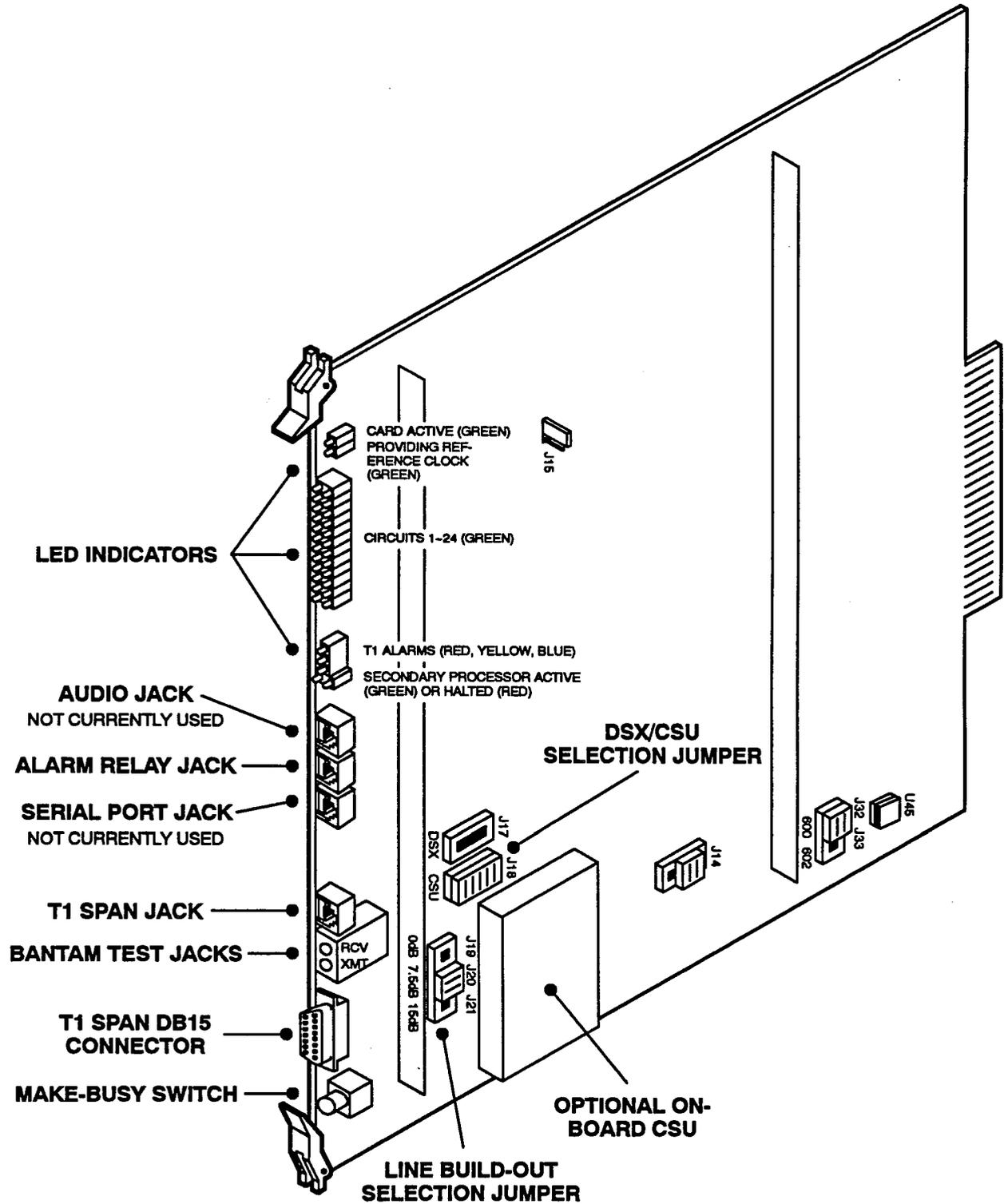
<u>JUMPER PINS</u>	<u>STRAP/PLUG LOCATION</u>
J14	Over pins 2-5
J15	Over the top two pins

- (4) Check to see that all components on the card are seated securely in their sockets and that no pins are bent.
- (5) Install the T1Cs one at a time (waiting at least ten seconds between installations if the system power is on) with the components *facing right*. The cards may be installed in any slot, and slots may be skipped, if desired.

NOTE: When powered up, the system configures the software to match one of the default card configurations (see page 2-18). If the actual cards installed do not exactly match the selected configuration, adjustments must be made in database programming. If changing card types (e.g., changing from an LGC to a T1C), refer to the programming procedures on page 5-171 and to the information on pages 3-7 through 3-9.

- (6) After installing the T1Cs, optional T1 alarm signaling devices may be connected to the cards at any time. Refer to page 3-37 for more information.

FIGURE 3-60. T1C CARD (T1C)



**J. CHECK THE TELECOMMUNICATION
CIRCUIT CARD INSTALLATION**

6.52 After all of the circuit cards have been installed in both the main equipment cabinet and the expansion cabinet, check the installation by performing the following steps.

NOTE: If, on expanded systems, the expanded system software is not already installed on the hard disk drive, the LEDs on the cards in the expansion cabinet will not light as described below. If not already done, install the expanded software as described on page 3-146 before performing the steps below.

- (1) Ensure that the programming monitor attached to the peripheral connector panel is plugged into an AC power source and turned on.
- (2) Turn ON the AC POWER switch on each power supply unit (main supply first, if not already on) and observe the system power-up process as outlined in step 8 on page 3-85.
- (3) After the power-up process is complete, check the top (green) LED on each DKSC, KSC, KSC-D, SLC, IDC, LGC, LSC, EMC, and T1C installed in the system. *If the top LED on every card is lit, proceed to step 4. If not, follow these steps:*
 - a. Remove all station and trunk cards that do not have a lit green LED and check them for shorted or loose components, bent pins, etc.

NOTE: *DO NOT* remove the Matrix Card or the Expansion Card with the system power turned on.
 - b. Re-insert the cards one at a time and check the top LED again. *If the LED is not lit after 15 seconds, replace the defective card.*
- (4) Measure the following voltages on the Matrix Card and the Expansion Card. A digital voltmeter of $\pm 0.5\%$ accuracy is required. Insert the "common" voltmeter probe into the ground point (TP8) and insert the other probe into the desired voltage test point. (Refer to Figure 3-51 on page 3-86 and Figure 3-52 on page 3-88 for system voltage test point locations.)

TEST POINTS	VOLTAGE
TP 1 to TP 8	-5 ± 0.4 VDC
TP 2 to TP 8	+5.1 ± 0.5 VDC
TP 3 to TP 8	+12.5 ± 0.5 VDC
TP 5 to TP 8	-12 ± 1.1 VDC
TP 4 to TP 8	+30.5 ± 0.9 VDC
TP 6 to TP 8	-49 ± 7.0 VDC
TP 7 to TP 8	8.9 ± 1.3 VAC

NOTE: The AC ring voltage (VRING) measured on the MXC and EXP Card is $\frac{1}{10}$ the actual power supply ring voltage of 90VAC.

- (5) Referring to Figure 3-25 on page 3-42, measure the following voltages on the back of the main and expansion Telecom Motherboards. Use ground as a reference.

VOLTAGE	TOLERANCE
PWR ALARM (+4.7VDC)	± 0.5 VDC
CPCP (+5.2VDC to +5.8VDC)	± 0.15 VDC
CPCN (-0.1VDC to -0.7VDC)	± 0.15 VDC
PWR GOOD (+4.7VDC)	± 0.15 VDC

NOTE: As long as the CPCP measurement is at least 0.1V *higher* than the actual +5V measurement and the CPCN measurement is at least 0.1V *lower* than the actual ground measurement, the voltages are within tolerance.

- (6) *If the voltages are within tolerance, proceed to the next section. If any of the voltages are out of tolerance, isolate the defective card(s) by following these steps:*
 - a. While monitoring the out-of-tolerance voltage, remove the station and trunk cards one at a time.
 - b. *If the voltage returns to an acceptable level, replace the defective card(s).*

If the voltage remains out of tolerance, contact Customer Support.

CAUTION

DO NOT attempt to adjust the power supply voltages without first contacting Customer Support. Damage caused by unauthorized voltage adjustment is not covered by the warranty.

**K. COMPLETE THE EQUIPMENT CABINET
INSTALLATION**

6.53 Complete the equipment cabinet installation as follows:

- (1) *If any of the telecommunication cables (including any line cords or ribbon cables used for T1) are being dropped from the ceiling, rather than being routed up from the floor, install the two cable brackets (included with the system) on the back of the main equipment cabinet. The cable bracket can be installed on either the left or the right side (screw holes are provided on both sides). Then secure the telecommunication cables to the cable bracket with a cable tie.*

NOTE: The expansion cabinet also comes with a cable bracket that can be installed on the back of the expansion cabinet for the same purpose.

- (2) *For the main cabinet, route the corresponding telecommunication cables (with attached female amphenol-type connectors or modular jack/DB15 connectors) in through the bottom rear of the cabinet, through the telecom cable tray, and out the front.*

For the expansion cabinet, route the corresponding telecommunication cables (with attached female amphenol-type connectors or modular jack/DB15 connectors) in through the bottom rear of the expansion cabinet, through the telecom cable tray, and out the front.

- (3) Connect each labeled female amphenol-type connector to the 50-pin male connector on the corresponding card. For T1 trunks, connect each labeled line cord or ribbon cable to the T1 jack or DB15 connector on the corresponding T1 Card.

NOTE: Before connecting any T1 spans to the T1 Cards in the equipment cabinet, always make sure the system power is turned on. All T1 spans should always be disconnected from their cards before turning the system power on or off. They should also be disconnected before pressing the reset switch on the HDLC Card.

- (4) Secure each cable to the equipment cabinet or the expansion cabinet with a cable tie, leaving enough slack so that the card can be removed or replaced if necessary.
- (5) Replace the front door(s) and rear panel(s) on the cabinet(s).

7. STATION INSTALLATION

7.1 Digital keysets are connected to Digital Keypad Cards. Analog keysets, analog DSS/BLF Units, and Attendant Computer Consoles are connected to Keypad Cards. ESLs, SLs, single-line DTMF sets, and playback devices are connected to Single-Line Cards and/or Inward Dialing Cards.

CAUTION

Connecting a station instrument to the wrong type of card can damage the instrument.

NOTE: For information on installing the GX and GMX station instruments, refer to appendixes A and B in the back of this manual.

A. IMX 416/832 DIGITAL KEYPAD INSTALLATION

7.2 Before installing the digital keysets, unpack each one and check for damage. If items are damaged or missing, contact Customer Support. Each keypad should have the following:

- Baseplate
- One six-foot, three-pair line cord
- One handset
- One four-conductor coiled handset cord
- Slide-out directory card (IMX version)
- Extra feature key templates

Optional Liquid Crystal Display (LCD)

7.3 All Executive Digital Keypads are equipped with LCDs. Standard Digital Keypads are available in both display and non-display models. Non-display keypads can be converted to display keypads by installing an LCD Kit (part number 828.1211) as outlined below.

7.4 To convert a non-display Standard Digital Keypad to a display keypad, install the LCD Kit as outlined in the following steps (refer to Figure 3-61 on page 3-106):

- (1) Unpack the LCD kit. There should be a clear plastic display window, an LCD unit, a ribbon cable, and four small Phillips-head screws.
- (2) Remove the line cord and handset cord from the keypad. Then loosen the four screws on the bottom of the keypad.
- (3) Carefully open the keypad to expose the control board. To fully open the keypad, disconnect the following wires from the keypad control board:

line (J2), microphone (J4), handset (J5), and, if equipped, data port (J3). See Figure 3-61.

- (4) Disconnect the speaker wires (J6) from the keypad control board.
- (5) Remove the single screw securing the control board and carefully flip the control board back to expose the inside of the faceplate top housing.
- (6) Remove the dummy cover from the display opening in the top housing of the faceplate by pushing on the cover from the front of the keypad. (On some models, it may also be necessary to remove tape that is securing the dummy cover from the inside.)
- (7) From the inside of the faceplate top housing, insert the top edge of the clear plastic window into the display opening and slide the window up into place.
- (8) Remove the covering from the LCD unit and install as follows:

- a. *If not already connected*, slide open the bar of the clamp connector on the back of the LCD unit, insert one end of the ribbon cable into the connector, and close the bar.



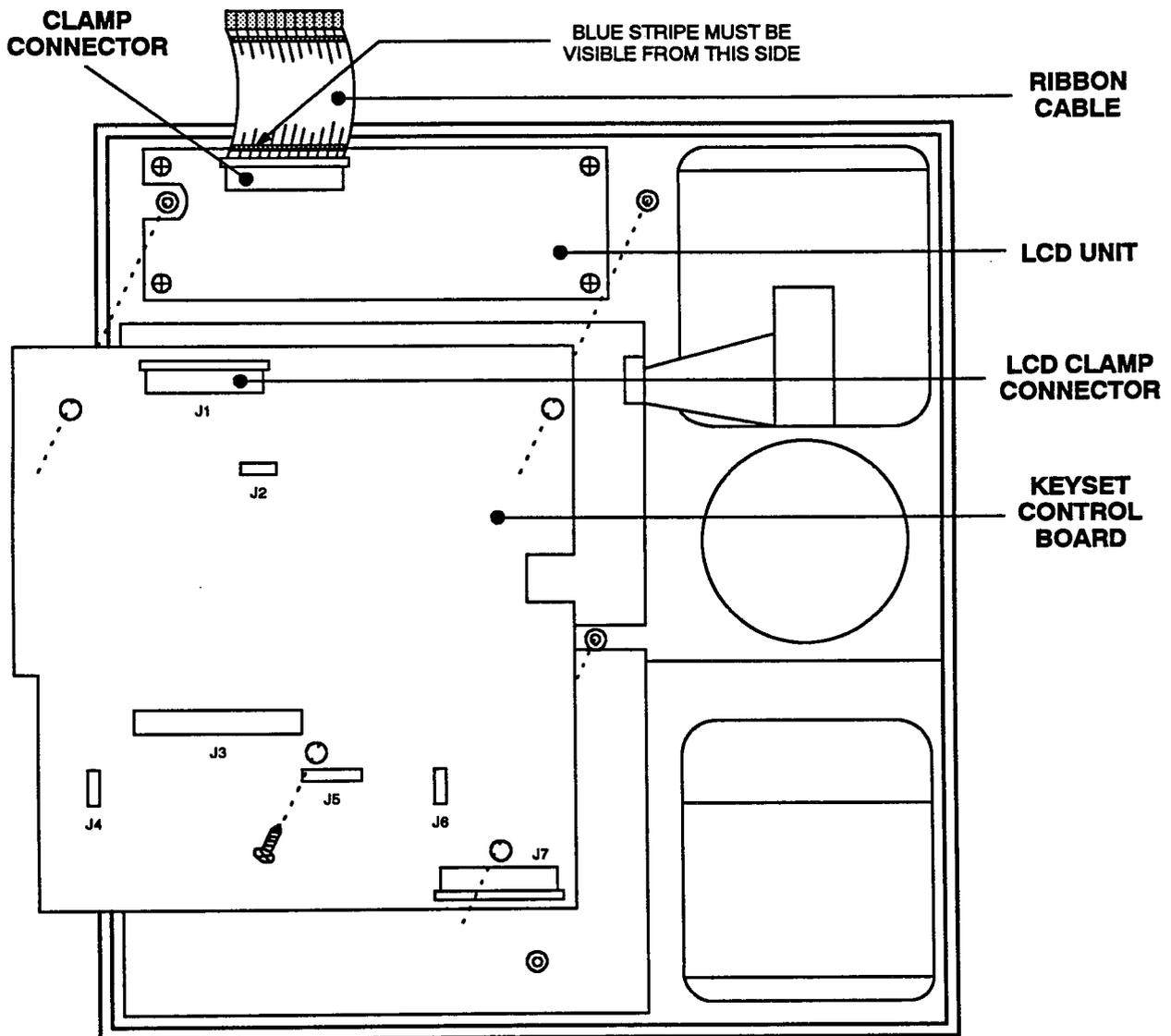
NOTE: The blue stripe on the near end of the ribbon cable should be visible from the back side of the LCD unit (see Figure 3-61). Also, ensure that the metal strips on the end of the ribbon cable are fully seated and properly aligned in the connector.

- b. Position the LCD unit on the clear plastic window so that the screw holes in the LCD unit align with the screw holes in the faceplate top housing. Install the four Phillips-head screws to hold the LCD unit in place.
- c. Leaving the free end of the LCD ribbon cable exposed, flip the control board back over, place it in its original position, and re-insert the single screw that held it in place.
- d. Slide open the bar of the LCD clamp connector (J1) on the control board (see Figure 3-61), insert the free end of the ribbon cable into the connector, and close the bar.

NOTE: The blue stripe on the free end of the ribbon cable should face down toward the keypad control board. Also, ensure that the metal strips on the end of the ribbon cable are

- fully seated and properly aligned in the connector.
- (9) Reconnect the line (J2), microphone (J4), handset (J5), speaker (J6), and, if equipped, data port (J3) wires to the keyset control board.
- (10) Ensure that the ribbon cable connecting the keyset control board (J7) to the board in the bottom of the faceplate housing is still fully seated and properly aligned.
- (11) Reattach the back of the keyset.
- (12) To ensure that the LCD unit and keyset control board are properly connected and functioning, perform the keyset self-test as described on page 3-107.

FIGURE 3-61. STANDARD DIGITAL KEYSET LCD INSTALLATION



FACEPLATE HOUSING (INSIDE VIEW)

Digital Keypad Installation

7.5 Install all digital keysets as follows:

- (1) Before mounting the modular jack assembly and connecting the keypad, measure the voltage on the YELLOW terminal of the modular jack assembly with respect to the BLACK terminal. (The "common" probe of the voltmeter is placed on the BLACK terminal.) It must measure a positive voltage. If a negative voltage is measured, check the cabling for a reversed pair.

CAUTION

If tip and ring are reversed, the keypad will not function.

- (2) Mount the modular jack assembly on the wall.
- (3) Attach the coiled handset cord to the handset and to the handset jack on the bottom of the keypad. Place the handset on hook.
- (4) Plug one end of the line cord into the wall-mounted modular jack assembly. Plug the other end into the line cord jack on the bottom of the keypad.

NOTE: To aid in installation/troubleshooting, display keysets show their station circuit number, extension number, and assigned user name for several seconds when power is turned on and the line cord is first plugged in. This display also appears after a system reset, and whenever the line cord is removed and replaced while power is on. The station identification displays for several seconds, then the keypad changes to the appropriate display, depending on its current status.

- (5) Perform the digital keypad self-test:
 - a. While pressing the asterisk (*) and pound (#) keys, unplug and replace the keypad line cord.
 - b. Release the keys. The keypad rings momentarily. (Display keysets show a dark display — all pixels lit.)
 - c. Lift and replace the handset. The keypad rings momentarily. (Display keysets show a blank display — no pixels lit.)
 - d. Lift and replace the handset. The keypad rings momentarily and all LED-equipped keys light. (Display keysets show DKTS SELF TEST LED MATRIX.) If any of the LEDs do not light, return the keypad for repair.

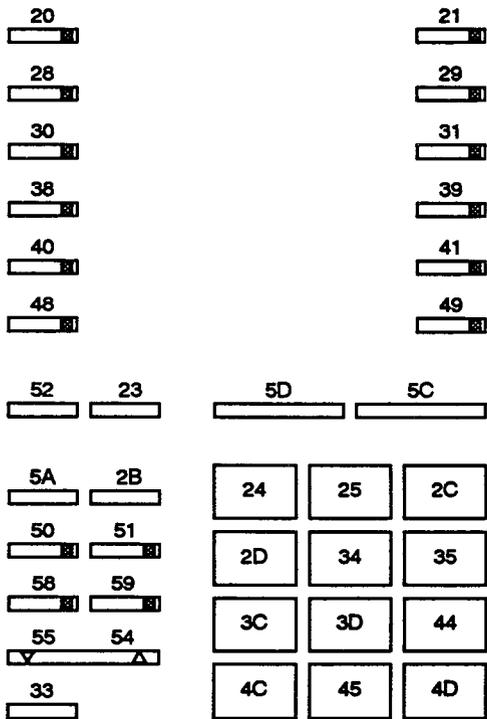
- e. Lift and replace the handset. The keypad rings momentarily and all of the LEDs go out. (Display keysets show DKTS SELF TEST KEY MATRIX 00.)
- f. One at a time, press each of the keys on the keypad in any order. If the key is functioning properly, a key tone (or a DTMF tone for Executive keypad keys) is heard and, on display keysets, a specific code is shown. (The proper code for each key is diagrammed in Figure 3-62 on the next page.) If the signal is not heard or the displayed code is incorrect, the key is faulty; return the keypad for repair.
- g. Lift and replace the handset. The speaker tones are broadcast over the speakerphone speaker. (Display keysets show DKTS SELF TEST SPEAKER TONES.)
- h. Lift and replace the handset. Tones of various volume levels, from softest to loudest, are broadcast over the speakerphone speaker. (Display keysets show DKTS SELF TEST SPEAKER VOLUME.)
- i. Lift the handset, then press and release the hookswitch. The handset tones are broadcast over the handset receiver. (Display keysets show DKTS SELF TEST HANDSET TONES.)
- j. Place the handset back in its cradle. The keypad rings momentarily and it takes approximately five seconds for the keypad to return to normal operation. (Display keysets show DKTS SELF TEST COMPLETED! for several seconds. Then, as described in the NOTE to step 6, the keypad's identification displays for several seconds.)

NOTE: If the keypad watchdog timer fails, the DKTS SELF TEST COMPLETED! display is followed by a DKTS SELF TEST WATCHDOG ERROR display and eight short bursts of ring tone. Replace the defective keypad.

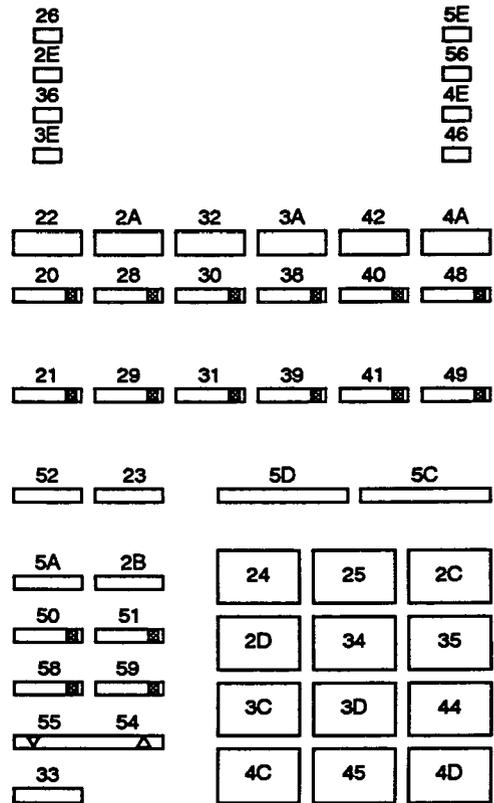
- k. Replace the keypad if faulty.
- (6) Replace the existing slide-out directory card on the bottom of the keypad with the IMX directory card included in the keypad's box.
- (7) The keypad ring tone can be changed by performing the steps described in the FEATURES section on page 4-48.
- (8) *If necessary*, replace the keypad's paper template with one labeled to match the programmed feature keys.

FIGURE 3-62. DIGITAL KEYSSET SELF-TEST KEY MATRIX

STANDARD DIGITAL KEYSSET



EXECUTIVE DIGITAL KEYSSET



Wall Mounting Digital Keysets

7.6 To mount the keyset on a wall:

- (1) Remove the keyset baseplate from the top half of the back of the keyset.
- (2) Rotate the baseplate 180° and attach it to the bottom half of the back of the keyset.

NOTE: If a PCDPM is already installed inside the baseplate, first open the keyset and reroute the PCDPM-to-keyset interface cable through the knockout in the bottom half of the keyset (see Figure 3-63 on page 3-111).

- (3) Using a ruler, mark the location of the keyset mounting holes on the wall. (The centers of the two perpendicular mounting holes on the back of the keyset are four inches apart.)
- (4) Drive a screw into the center of each mounting hole marking. Allow the head of the screw to protrude approximately ¼ inch.
- (5) In order to hold the handset in place while the keyset is wall-mounted, slide the reversible cradle hook out, rotate it 180°, and reinsert it.
- (6) Position the keyset mounting holes over the screws and slide the keyset into position on the wall. (If necessary, adjust the screws to ensure that the keyset is held firmly in place.)

Optional Headsets

7.7 Refer to SPECIFICATIONS, page 2-27, for headset requirements. To attach a headset to a keyset:

- (1) Remove the coiled handset cord from the handset jack on the bottom of the keyset. Leave the handset in the cradle.
- (2) Insert the headset modular plug into the jack. Plug in the headset power source, if used.
- (3) If the headset has an on/off switch, turn on the headset.
- (4) On the keyset, press SPCL and enter the Headset Enable feature code (default value is 315).
- (5) *To disable the headset*, press SPCL and enter the Headset Disable feature code (default value is 316). Then unplug the headset and reconnect the handset.

Optional Personal Computer Data Port Modules (PCDPMs)

7.8 For off-hook voice announce receive capability, and to allow an optional digital DSS/BLF Unit and/or an optional Modem Data Port Module to be installed, any digital keyset may be equipped with an optional PC Data Port Module (part no. 550.3014).

7.9 Install the PC Data Port Module as outlined below. For diagrams of the installation, see Figures 3-63 and 3-64 on pages 3-111 and 3-112.

- (1) Unplug the keyset line cord from its modular jack on the back of the keyset.
- (2) Remove the keyset baseplate.
- (3) On the back of the keyset, use a pair of cutting pliers to remove the plastic knockout covering the PC Data Port Module connector (J3) on the keyset control board (see Figures 3-63).

NOTE: Be careful not to let the plastic knockout fall inside the keyset. If the keyset will be wall mounted, use the knockout in the bottom half of the keyset instead (see Figure 3-63).

- (4) *If not already installed*, attach one end of the PCDPM-to-keyset interface cable to the connector on the back of the PCDPM.
- (5) Align the PC Data Port Module over the four posts protruding from the inside of the baseplate and insert the screws (do not over tighten).
- (6) Plug the free end of the PCDPM-to-keyset interface cable into connector J3 on the keyset control board (where the plastic knockout was previously removed).

NOTE: Use a pencil (eraser end) or other suitable rod-like instrument to press each end of the cable connector into connector J3. Apply pressure until the connector clicks securely into place, one end at a time.

- (7) *If a DSS/BLF Unit will be attached to the PC Data Port Module:*
 - a. Attach one end of a PCDPM-to-DSS interface cable (or PCDPM-to-RS232C interface cable) to the RS-232-C connector (J2) on the module, as shown in Figure 3-63. (The other end of the cable will later be attached to the DSS/BLF Unit after it is installed.)

NOTE: Pin 1 of the cable (indicated by the stripe on the edge of the cable) must correspond to pin 1 on the RS-232-C connector (indicated by the notch silkscreened on the module).

- b. Plug the AC transformer cable into the power connector (P1) on the module.

NOTE: PCDPMs do *not* require AC transformers when they are used for off-hook voice announce only or have attached MDPMs. For a diagram of AC transformer requirements, see Figure 2-2 on page 2-29.

- c. Plug the main AC transformer unit into an available AC power source. **DO NOT** use the outlet for the equipment cabinet.

If a Modem Data Port Module will be attached to the PC Data Port Module, plug the appropriate end of the PCDPM-to-MDPM interface cable into the SL Module connector (J1) on the mod-

ule. (The other end of the cable will later be attached to the Modem Data Port Module after it is installed.)

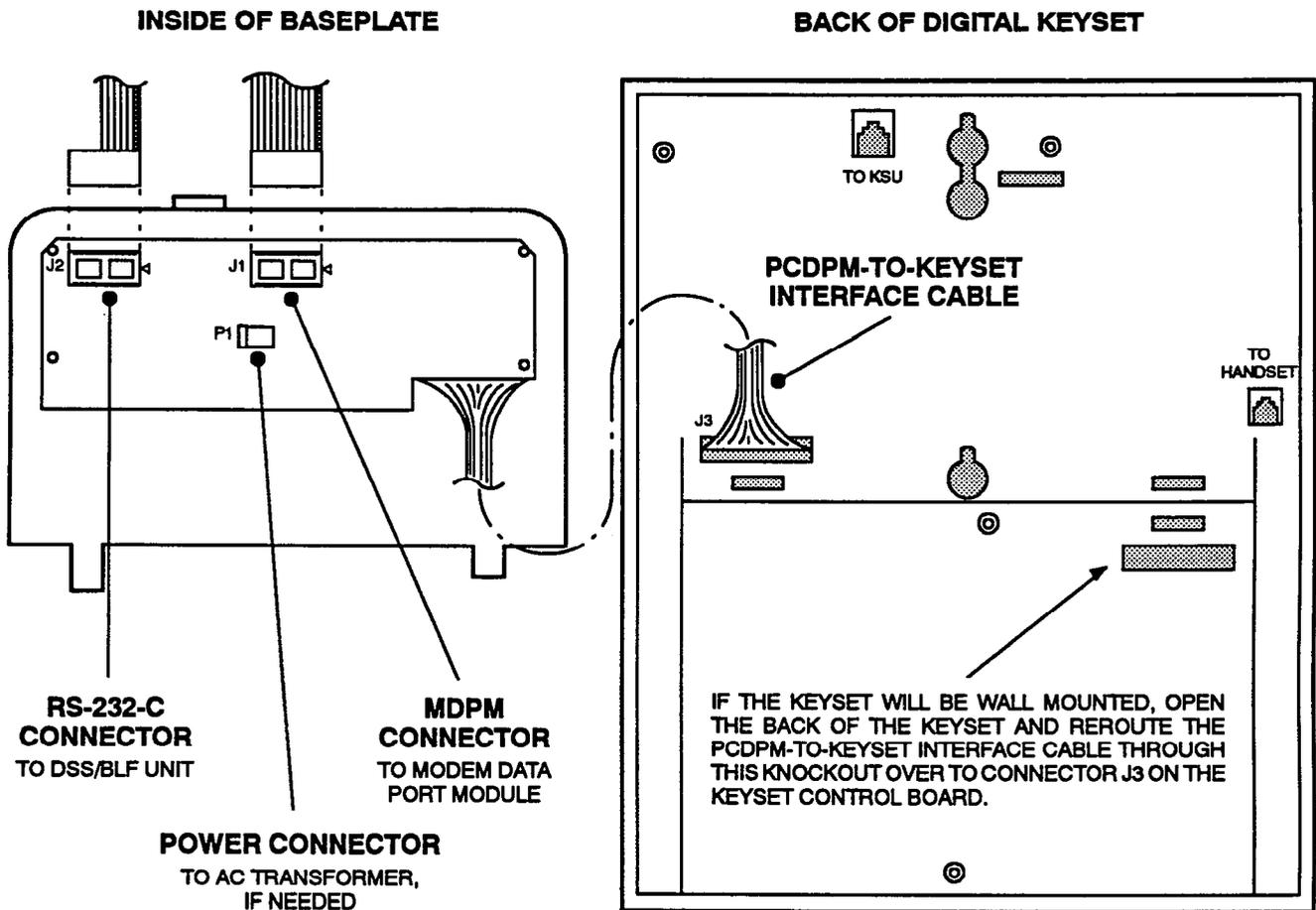
NOTE: Pin 1 of the cable (indicated by the stripe on the edge of the cable) must correspond to pin 1 on the SL Module connector (indicated by the notch silkscreened on the module).

- (8) Reattach the baseplate.

- (9) *If a Modem Data Port Module will be attached to the PC Data Port Module, refer to the instructions on page 3-113.*

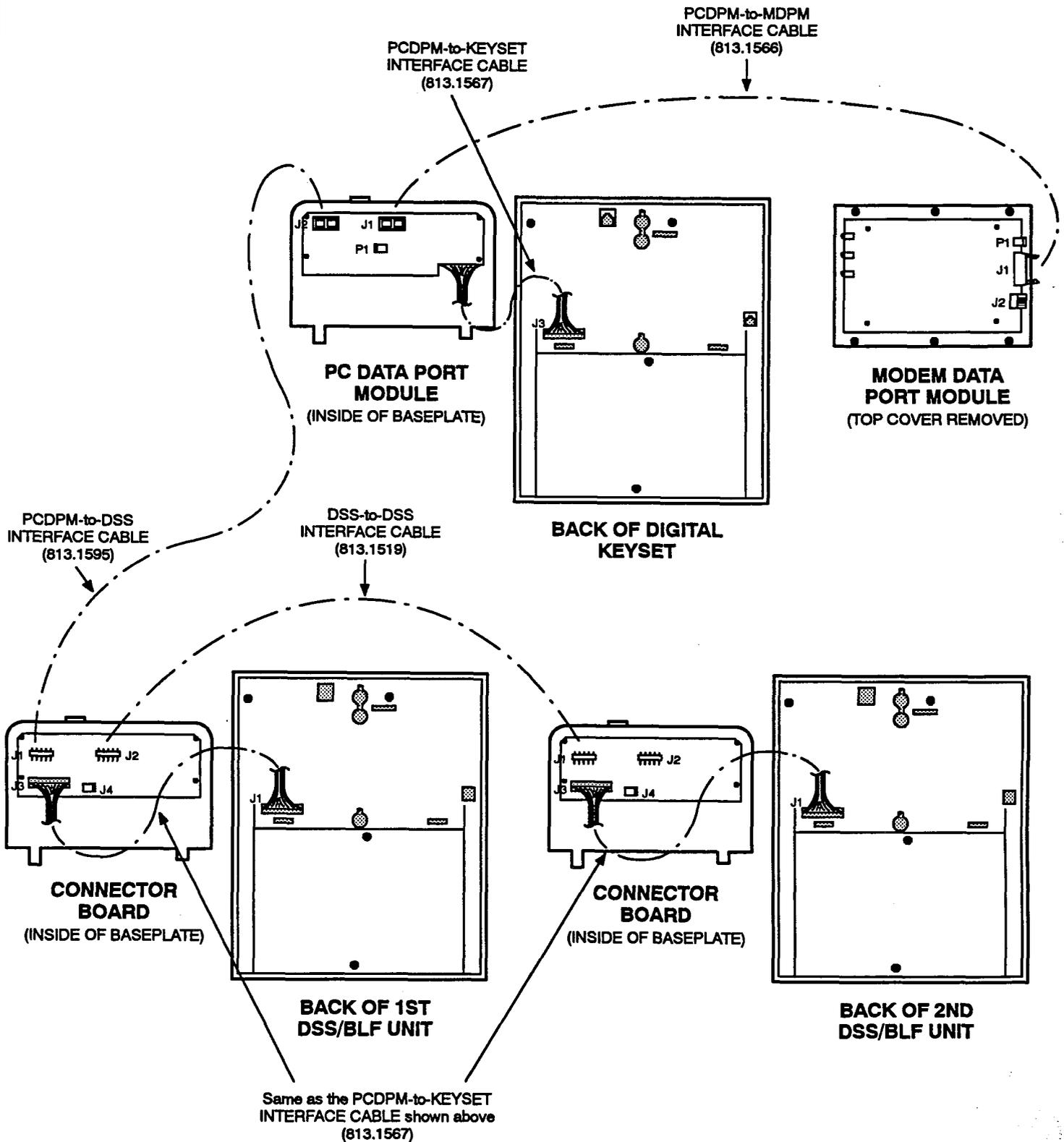
If a Modem Data Port Module will not be attached to the PC Data Port Module, reconnect the keyset line cord.

FIGURE 3-63. DIGITAL PC DATA PORT MODULE (PCDPM) INSTALLATION



NOTE: PCDPMs require AC transformers when they are connected to DSS/BLF Units only. PCDPMs do *not* require AC transformers when they are used for off-hook voice announce only or have attached MDPMs. For a diagram of AC transformer requirements, refer to Figure 2-2 on page 2-29.

FIGURE 3-64. SAMPLE DIGITAL PCDPM CABLE CONNECTIONS



Optional Modem Data Port Modules (MDPMs)

7.10 Digital keysets equipped with PC Data Port Modules may be equipped with optional Modem Data Port Modules (part no. 550.3015). The MDPM contains a four-conductor modular jack that can be used to connect a data device (such as a personal computer with a direct-connect modem) or a single-line set to the keyset.

7.11 The data device can be used by the associated keyset(s) to communicate with remote data equipment over voice channels being used for CO or intercom calls. The data device's modem must be externally powered (or capable of operating on 20mA of loop current) and have an RJ11 CO trunk interface.

7.12 The data device can be activated by the associated keyset(s) or by an auto-dial modem. (For more details and an explanation of transferring the data connection, refer to page 4-101 in FEATURES). The data device is disconnected whenever one of the following occurs: the modem attached to the keyset disconnects from the call, the called modem disconnects from the call, or the data connection is transferred to the keyset's primary voice path and the call is disconnected.

7.13 Install the Modem Data Port Module and attach the data device as outlined below. For diagrams of the

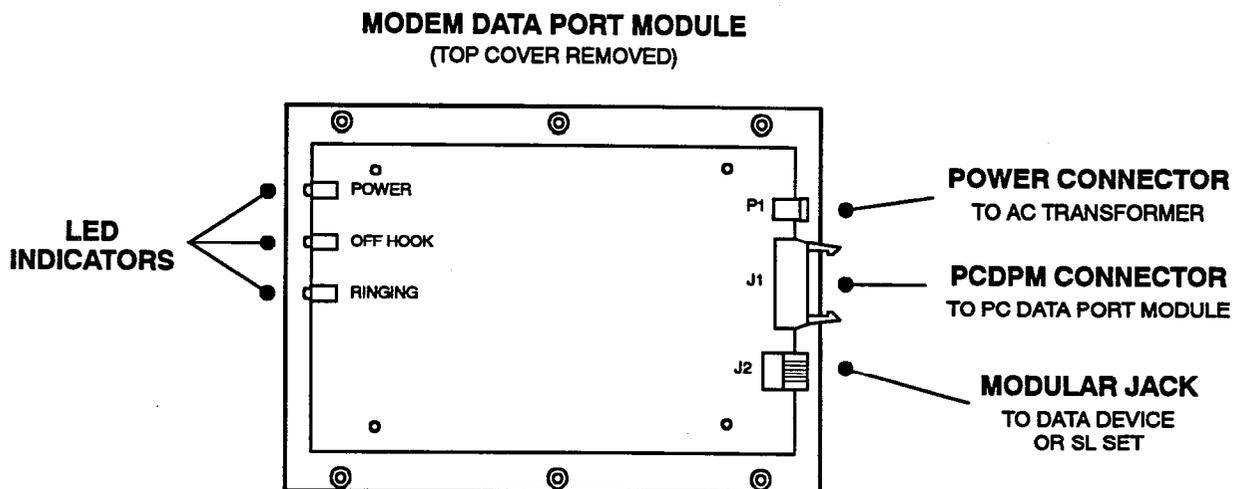
installation, see Figure 3-64 on page 3-112 and see Figure 3-65 below.

- (1) Ensure that the keyset line cord is unplugged from its modular jack on the back of the keyset.
- (2) Plug the free end of the PCDPM-to-MDPM interface cable into connector J1 on the Modem Data Port Module. (The other end of the cable was previously attached to the PC Data Port Module; see page 3-109.)
- (3) Insert the modem line cord (which would normally be connected to a CO jack) into the modular jack (J2) on the Modem Data Port Module.
- (4) Plug the AC transformer cable into the power connector (P1) on the Modem Data Port Module.

NOTE: MDPMs always require their own separate AC transformers. For a diagram of AC transformer requirements, refer to Figure 2-2 on page 2-29.

- (5) Plug the main AC transformer unit into an available AC power source. *DO NOT* use the outlet for the equipment cabinet.
- (6) Reconnect the keyset line cord.

FIGURE 3-65. DIGITAL MODEM DATA PORT MODULE (MDPM) INSTALLATION



B. IMX 416/832 ANALOG KEYSSET INSTALLATION

7.14 Before installing the IMX 24/12/8-line analog keysets, unpack each one and check for damage. If items are damaged or missing, contact Customer Support. Each keyset should have the following:

- Baseplate
- Extra key caps
- One six-foot, three-pair line cord
- One handset
- One four-conductor coiled handset cord
- Slide-out directory card

Optional Liquid Crystal Display (LCD) Installation

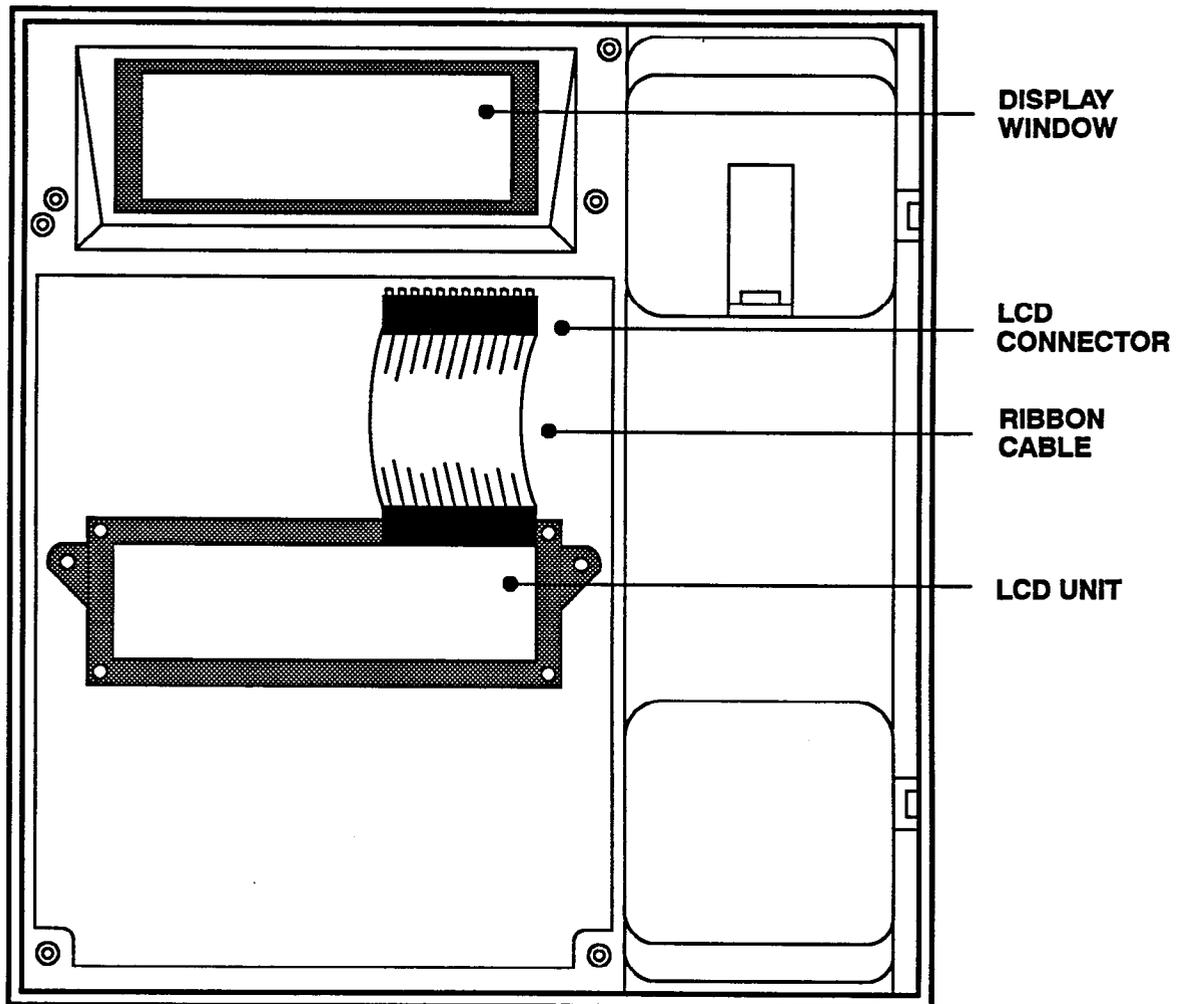
7.15 All AIM keysets (24-line, 12-line, and 8-line) come equipped with LCDs. Standard 24-line and 12-line keysets can be converted to display keysets by installing an optional LCD Kit as follows (see REPLACEMENT PARTS for the part number).

- (1) Unpack the LCD Kit. There should be a clear plastic display window, an LCD unit, a foam pad, a ribbon cable, and two small Phillips-head screws.
- (2) Remove the keyset baseplate by removing the retaining screw, pressing on the bottom edge of the baseplate to release the tab, and pulling the plate off.
- (3) Remove the line cord and handset cord from the keyset. Then remove the four screws on the bottom of the keyset.
- (4) Carefully open the keyset to expose the back of the keyboard that has the LCD connector. (Refer to Figure 3-66 on page 3-115.) To fully open the keyset, the microphone and hookswitch wires

(and Data Port Module wires, if attached) need to be disconnected from the keyboard.

- (5) Remove the cover from the display opening in the top housing of the keyset by releasing the tabs from the inside of the housing and pushing out the cover.
- (6) From the front of the keyset, insert one end of the clear plastic window in the display opening, with the painted side of the black edging facing the inside of the keyset. Then slightly bend the window, insert the other end into the opening, and ease the window into place.
- (7) Remove the covering from the LCD and install as follows:
 - a. Insert one end of the ribbon cable into the black connector on the LCD unit. Ensure that the metal strips on the ribbon cable make contact with the metal tabs in the black connector.
 - b. With the LCD facing up, insert the other end of the ribbon cable into the black connector on the back of the keyboard. (Refer to Figure 3-66.)
 - c. Place the foam pad over the plastic window so that the opening in the pad matches the window.
 - d. Position the LCD on the plastic window so that the screw holes in the LCD unit and in the keyset housing are aligned. Check that the foam padding does not show through the window. Install the screws to hold the LCD in place.
- (8) Reassemble the keyset. (Before closing the two halves of the keyset, remember to reconnect the hookswitch and microphone control wires. Also, if installed, reconnect the Data Port Module wires.)

FIGURE 3-66. IMX 24/12-LINE KEYSET LCD INSTALLATION



IMX 24/12/8-Line Keypad Installation

7.16 Install all IMX analog keysets as follows:

- (1) Before mounting the modular jack assembly and connecting the keypad, measure the voltage on the RED terminal of the modular jack assembly with respect to the GREEN terminal. (The "common" probe of the voltmeter is placed on the GREEN terminal.) It must measure +30VDC (± 2.0 VDC). If -30VDC is measured, check the cabling for a reversed pair.

CAUTION

If the power pair (W/BL, BL/W) is reversed, installing a keypad will open the fuse (or associated thermistor) on the KSC or KSC-D. If the card has a fuse, this affects operation of all keysets, DSS/BLF Units, and Attendant Computer Consoles connected to that card.

- (2) Mount the modular jack assembly on the wall.
- (3) Remove the keypad baseplate by removing the retaining screw, pressing on the bottom edge (12-line and 24-line keysets) or the top edge (8-line keysets) of the baseplate to release the tab, and pulling the plate off.
- (4) *For 8-line IMX AIM keysets that are being installed two to a circuit:* On the back of the keypad (see Figure 3-67 on page 3-119), first place the baud rate selection jumper strap (J9) in the 2400 position (over the left two pins). Then place the circuit selection switch (S1) in the appropriate A (bottom) or B (top) position, depending on how the keypad's circuit will be designated in database programming. (See also page 2-28 for special line cord requirements.)

NOTE: When 8-line IMX AIM keysets are installed two to a circuit, the circuit number is separated into two parts (A and B) in database programming (e.g., circuit 4.6A and 4.6B). Also, "B" circuit 8-line IMX AIM keysets do not have extension numbers until assigned one in database programming. If the switch selection does not match the programming selection, the keypad, when installed, will display CONFLICTING A/B SWITCH SETTING and all of the LEDs will flash.

For 8-line IMX AIM keysets that are being installed one to a circuit: On the back of the keypad (see Figure 3-67 on page 3-119), first place the baud rate selection jumper strap (J9) in the 1200 position (over the right two pins). Then place the

circuit selection switch (S1) in the A (bottom) position.

- (5) Attach the coiled handset cord to the handset and to the handset jack on the right side of the bottom of the keypad. Place the handset on hook.
- (6) Plug one end of the line cord into the wall-mounted modular jack assembly. Plug the other end into the jack near the upper-left corner on the bottom of the keypad.

NOTE: To aid in installation and troubleshooting, display keysets show their station circuit number, extension number, and assigned user name for five seconds when power is turned on and the line cord is first plugged in. This display also appears after a system reset, and whenever the line cord is removed and replaced while power is on. The station identification displays for five seconds, then the keypad changes to the appropriate display, depending on its current status.

- (7) Perform the keypad self-test:

All Non-AIM Keysets:

- a. While pressing the asterisk (*) and pound (#) keys, unplug and replace the keypad line cord.
- b. Release the keys. The keypad rings momentarily. (Display keysets show KTS SELF-TEST HOOKSWITCH.)
- c. Lift and replace the handset to test the hook-switch. The LED-equipped keys light and the keypad rings momentarily. (Display keysets show KTS SELF-TEST LEDs.) If any of the LEDs do not light, return the keypad for repair.
- d. Lift and replace the handset. The keypad rings momentarily and all of the LEDs go out. (Display keysets show KTS SELF-TEST KEYS.)
- e. Press keys in the following order. A progress tone is heard and the keypad rings momentarily if the key is functioning properly. If the signals are not heard, the key was either pressed out of order or is faulty. Return the keypad for repair if any key is faulty.

12-Line and 24-Line (non-AIM) Keysets:

1. The call keys, IC/CO speed-dial (SD) keys, and station programmable keys from left to right: 1, 2, 3, 4, SD1, SD6, 5, 6, 7, 8, SD2, SD7, 9, 10, ..., 21, 22, 23, and 24.

NOTE: When testing a 12-line keyset, a hookflash must be performed for each missing station programmable key (13-24). To do this, lift and replace the handset each time a missing key (13-24) is to be pressed.

2. Feature keys in this order: REDIAL, SYS SPD, ANSWER, OUTGOING, SPKR, CNF, MUTE, FWD, DATA, DND, IC, MSG, HOLD, XFR, PAGE, QUE, MUSIC, and SPCL.
 3. Keypad keys in the following order: 1-9, *, 0, and #.
- 8-Line (non-AIM) Keysets:*
1. The call keys and station programmable keys from left to right: 1, 2, 3, 4, 5, 6, 7, and 8.
 2. Feature keys in this order: SPKR, IC, FWD, MSG, MUTE, CNF, DND, PAGE, ANSWER, OUTGOING, HOLD, XFR, QUE, and SPCL.
 3. Keypad keys in the following order: 1-9, *, 0, and #.
- f. After all the keys have been tested, it takes about ten seconds for the keyset to return to normal operation. (Display keysets show KTS SELF-TEST DONE for about five seconds. Then, the keyset's identification, as described in the NOTE to step 6 on page 3-116, displays for about five seconds.)

g. Replace the keyset if faulty.

AIM Keysets (24-line, 12-line, and 8-line):

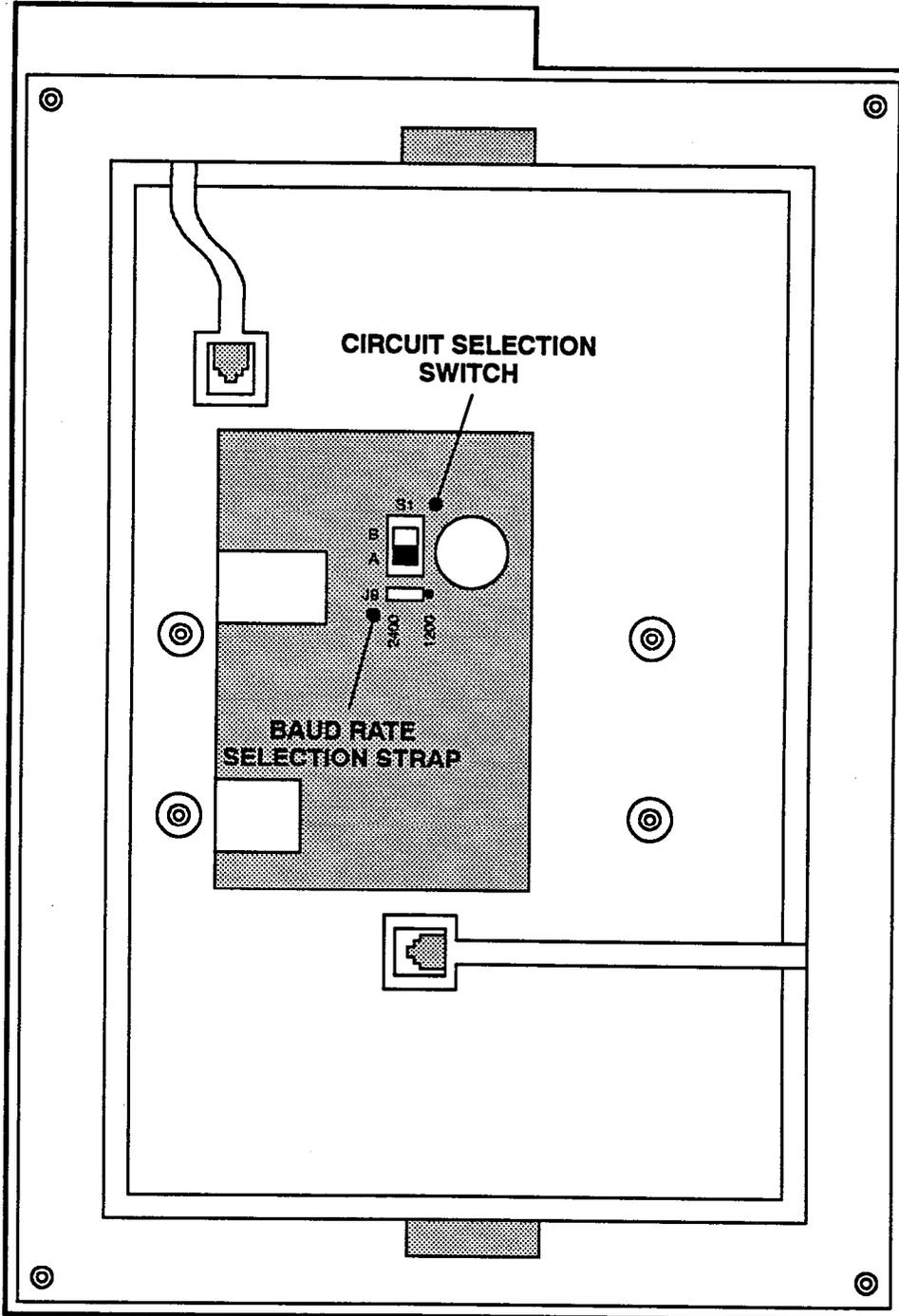
- a. While pressing the asterisk (*) and pound (#) keys, unplug and replace the keyset line cord.
- b. Release the keys. The keyset rings momentarily. (Display shows a dark display — all pixels lit.)
- c. Lift and replace the handset. The keyset rings momentarily. (Display shows a blank display — no pixels lit.)
- d. Lift and replace the handset. The keyset rings momentarily and all LED-equipped keys light. (Display shows KTS SELF-TEST LED MATRIX.) If any of the LEDs do not light, return the keyset for repair.
- e. Lift and replace the handset. The keyset rings momentarily and all of the LEDs go out.

(Display shows KTS SELF-TEST KEY MATRIX.)

- f. One at a time, press each of the keys on the keyset in any order. A progress tone (or a DTMF tone for keypad keys) is heard if the key is functioning properly. If the signals are not heard, the key is faulty. Return the keyset for repair if any key is faulty.
- g. Lift and replace the handset. The audio integrated module tones are broadcast over the speakerphone speaker. (Display shows KTS SELF-TEST AIM TONES.)
- h. Lift and replace the handset. Audio integrated module tones of various volume levels, from softest to loudest, are broadcast over the speakerphone speaker. (Display shows KTS SELF-TEST AIM TONE VOLUME.)
- i. Lift and replace the handset. Tones of various volume levels, from softest to loudest, are broadcast over the speakerphone speaker. (Display shows KTS SELF-TEST AIM SPK VOLUME.)
- j. Lift the handset, then press and release the hookswitch. Tones of various volume levels, from softest to loudest, are broadcast over the handset receiver. (Display shows KTS SELF-TEST AIM HS VOLUME.)
- k. Press and release the hookswitch. A continuous tone is broadcast over the handset receiver using the primary voice path. (Display shows KTS SELF-TEST AIM XMT/RCV PRI.)
- l. Press and release the hookswitch. (If testing an 8-line IMX AIM keyset, proceed to the next step.) A continuous tone is broadcast over the handset receiver using the secondary voice path. (Display shows KTS SELF-TEST AIM XMT/RCV SEC.)
- m. Press and release the hookswitch. The handset transmitter is connected to the handset receiver via the primary voice path. (Display shows KTS SELF-TEST HOT HANDSET PRI.)
- n. While speaking into the handset transmitter, determine that sidetone is being received over the handset receiver.
- o. Press and release the hookswitch. (If testing an 8-line IMX AIM keyset, proceed to step q.) The handset transmitter is connected to

- the handset receiver via the secondary voice path. (Display shows KTS SELF-TEST HOT HANDSET SEC.)
- p. While speaking into the handset transmitter, determine that sidetone is being received over the handset receiver.
 - q. Press and release the hookswitch. The speakerphone microphone is connected to the handset receiver. (Display shows KTS SELF-TEST SPKRPHONE MIC.)
 - r. While speaking into the speakerphone microphone (or rubbing a finger over the opening to the microphone), determine that the sound is being broadcast over the handset receiver.
- s. Place the handset back in its cradle. The keyset rings momentarily and it takes about ten seconds for the keyset to return to normal operation. (Display shows KTS SELF-TEST COMPLETED for about five seconds. Then, the keyset's identification, as described in the NOTE to step 6 on page 3-116, displays for about five seconds.)
 - t. Replace the keyset if faulty.
- (8) Replace the baseplate and the retaining screw.
 - (9) The keyset ring tone can be changed by performing the steps described in the FEATURES section on page 4-48.
 - (10) *If necessary*, change the keycaps to match the way the keyset will be programmed to work.

FIGURE 3-67. BOTTOM OF 8-LINE DUAL-CIRCUIT IMX AIM KEYSSET



Wall Mounting IMX 24/12/8-Line Keysets

7.17 To mount the keyset on a wall:

- (1) Remove the keyset baseplate by removing the retaining screw, pressing on the bottom edge (12-line and 24-line keysets) or the top edge (8-line keysets) of the baseplate to release the tab, and pulling the plate off.

NOTE: To facilitate easy removal of the baseplate, the retaining screw on some keyset models has been placed on the bottom of the keyset in one of the holes used for the optional Data Port Module (the hole nearest the identification label). When mounting the keysets on a wall, remove the screw and use it to secure the baseplate to the bottom of the keyset.

- (2) Rotate the baseplate so that the mounting holes are at the top. Then position the plate in the desired location on the wall.
- (3) Mark the location of the keyset mounting holes on the wall. Set the baseplate aside.
- (4) Drive a screw into the center of each mounting hole marking. Allow the head of the screw to protrude approximately $\frac{1}{4}$ inch.
- (5) Replace the baseplate on the keyset with the mounting holes at the top.
- (6) In order to hold the handset in place while the keyset is wall-mounted:
 - a. Remove the clear plastic extension number tab located underneath the handset.
 - b. Locate the middle slot and slide the reversible cradle hook out, turn it over so that the hook is facing up, and reinsert it.
 - c. Replace the extension number tab.
- (7) Position the mounting holes of the baseplate over the screws and slide the keyset into position on the wall.

Optional Headsets

7.18 Refer to SPECIFICATIONS, page 2-27, for headset requirements. To attach a headset to a keyset:

- (1) Remove the coiled handset cord from the handset jack on the base of the keyset. Leave the handset in the cradle.
- (2) Insert the headset modular plug into the jack. Plug in the headset power source, if used.
- (3) Press the SPCL key and enter the Headset Enable feature code (default value is 315), using the keyset keypad.
- (4) To disable the headset, press SPCL and enter the Headset Disable feature code (default value is 316). Unplug the headset and reconnect the handset.

Optional Handset Amplifiers

7.19 Users may wish to have a handset amplifier installed. Typically, the amplifier is an external unit that is placed between the keyset and the handset (refer to page 2-28 for specifications).

7.20 To install such an amplifier:

- (1) Unplug the coiled handset cord from the keyset.
- (2) Plug the coiled handset cord into the amplifier jack labeled HANDSET.
- (3) Plug the amplifier line cord (coming from the jack labeled TELEPHONE) into the keyset handset jack.
- (4) Plug the amplifier power supply cord into an AC outlet.
- (5) The handset volume can be increased or decreased, using the thumbwheel located on the amplifier. Verify that the amplifier is functioning correctly by placing a call and adjusting the volume from low to high.

Optional Data Port Module

7.21 All IMX 12-line and 24-line keysets may be equipped with optional Data Port Modules (refer to REPLACEMENT PARTS for the part number). The Data Port Module contains a four-conductor modular jack that can be used to connect *either* a data device (such as a personal computer with a direct-connect modem) *or* an LRA and an external signaling device (such as a loud bell, horn, flashing light, etc.) to the keyset.

7.22 Install the Data Port Module as outlined below. For a diagram, see Figure 3-68 on page 3-122.

- (1) Remove the keyset baseplate by removing the retaining screw, pressing on the bottom edge of the baseplate to release the tab, and pulling the plate off.
- (2) Unplug the line cord from its modular jack.
- (3) Remove the 10-pin shorting plug located on the keyset control card.

NOTE: The back cover of the keyset does not need to be removed in order to reach the shorting plug.

- (4) Save the shorting plug by taping it to the bottom cover of the keyset or to the inside of the baseplate. The plug must be replaced if the Data Port Module is later removed.
- (5) Align the Data Port Module over the appropriate screw holes (see Figure 3-68) on the back cover of the keyset and insert the screws (do not over tighten).
- (6) Plug the Data Port Module cable into the pins on the keyset control card (where the shorting plug was previously located). Make sure the cable connector is securely seated.
- (7) Place jumper straps SP1, SP2, SP3, and SP4 on the Data Port Module in the appropriate posi-

tions. Depending on how the Data Port Module will be used, refer to one of the two possible settings outlined in Figure 3-68.

- (8) *If connecting a modem-equipped data device, refer to paragraphs 7.23 through 7.25.*

If connecting a loud ringing adapter and an external signaling device, refer to paragraphs 7.26 through 7.28.

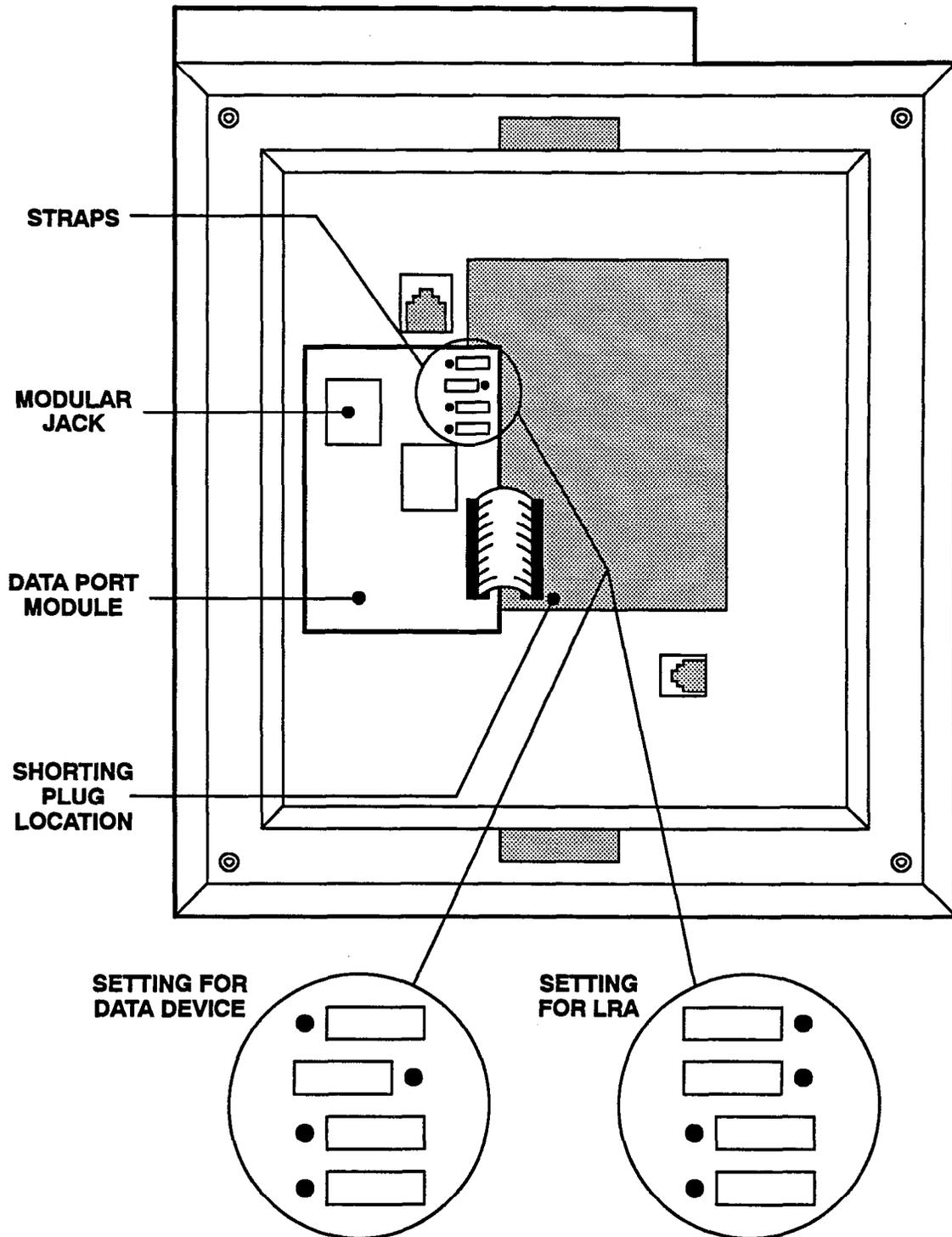
7.23 To connect a modem-equipped data device: The optional Data Port Module can be used to connect a data device (such as a personal computer) equipped with a direct-connection modem to a keyset. The data device can be used with the keyset to communicate with remote data equipment over voice channels being used for CO or intercom calls. The data device's modem must be externally powered (or capable of operating on 20mA of loop current) and have an RJ11 CO trunk interface.

7.24 The data device can be activated using the keyset or an auto-dial modem. (For more details and an explanation of monitoring or transferring the data connection, refer to page 4-101 in FEATURES). The data device is disconnected whenever one of the following occurs: the modem attached to the keyset disconnects from the call, the called modem disconnects from the call, or the data connection is transferred to the keyset's primary voice path and the call is disconnected.

7.25 Install the data device as follows:

- (1) Insert the modem line cord (which would normally be connected to a CO jack) into the modular jack on the keyset's Data Port Module.
- (2) Ensure that the jumper straps on the Data Port Module are set to the proper *data device* positions. Refer to Figure 3-68.
- (3) Plug the keyset line cord into the keyset's modular jack and reattach the baseplate.

FIGURE 3-68. IMX KEYSSET DATA PORT MODULE INSTALLATION



7.26 To connect a Loud Ringing Adapter (LRA):
The optional Data Port Module can be used to connect external signaling equipment such as loud bells, horns, flashing lights, etc. to a keyset. This application is useful in areas where the normal ring tone of the keyset cannot be heard, such as warehouses and loading docks. The signaling device follows the normal ringing patterns of the keyset.

NOTE: Since handsfree intercom calls may be difficult to hear in noisy areas, keysets with LRAs installed should be programmed for handsfree disable so that users are alerted to incoming intercom calls by continuous double ring tones. (Refer to FEATURES, page 4-55.)

7.27 An electromechanical LRA device is placed between the keyset Data Port Module and the external signaling equipment to provide the necessary interface relay. Refer to page 2-28 for LRA device specifications and recommendations. A diagram of a typical set-up is shown in Figure 3-69 below.

7.28 Install the LRA as follows:

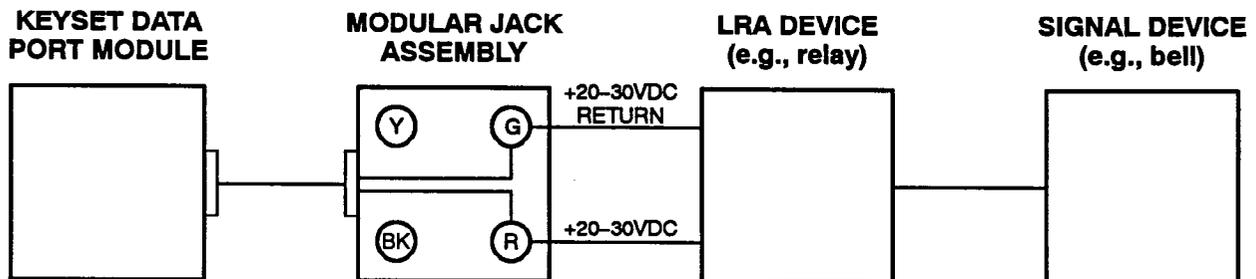
- (1) Using 24AWG wire, connect the LRA device input (coil circuit) to the RED and GREEN wires

on a modular jack assembly. Some devices require that polarity be observed between the LRA input and the modular jack.

NOTE: In order for the LRA device to operate properly, the maximum resistance from the modular jack to the LRA should be kept under 100 ohms.

- (2) Attach a mod-to-mod line cord to the modular jack assembly and to the modular jack on the keyset's Data Port Module.
- (3) Ensure that the jumper straps on the Data Port Module are set in the proper *LRA* positions. Refer to Figure 3-68 on the previous page.
- (4) Connect the LRA device output (contacts) to the signaling device according to the manufacturer's instructions. Use the appropriate gauge wire for handling the current/voltage rating of the signaling device.
- (5) Plug the keyset line cord into the modular jack on the back of the keyset and reattach the baseplate.

FIGURE 3-69. IMX KEYSSET LRA SET-UP



NOTE: Each time the keyset rings, the Data Port Module provides 20-26mA of loop current to the LRA. This causes the LRA contacts to close and activates the signaling device. The LRA is not affected by the ring tone or the ringer volume of the keyset. The LRA must be capable of operating on 20mA current (approximately 20VDC).

C. GMX-416/832 ANALOG KEYSSET INSTALLATION

7.29 Before installing keysets, unpack each one and check for damage. If items are damaged or missing, contact Customer Support. Each keyset should have the following:

- Baseplate
- Extra key caps
- One six-foot, three-pair line cord
- One handset
- One four-conductor coiled handset cord
- Slide-out directory card

Optional Liquid Crystal Displays (LCDs)

7.30 All Inter-Tel/DVK keysets (24-line, 12-line, and 8-line) are available in both standard and display models. Standard keysets can be converted to display keysets by installing the appropriate LCD Kit as outlined below and on page 3-126.

7.31 Inter-Tel/DVK 24-Line Keysets: To convert a standard Inter-Tel/DVK 24-line keyset to a display keyset, install the *large* LCD Kit (part no. 828.1166) as outlined in the following steps:

- (1) Unpack the LCD kit. There should be a clear plastic display window, an LCD unit, a ribbon cable, and two small Phillips-head screws.
- (2) Remove the keyset baseplate to expose the control board that has the LCD connector. (Refer to Figure 3-70 on the next page.)

(3) Remove the cover from the display opening in the top housing of the keyset by releasing the tabs from the inside and pushing the cover out.

(4) From the inside of the keyset, insert one of the top corners of the clear plastic window into the side of the display opening.

NOTE: The small lips on the end of the window should face to the inside of the keyset housing. Also, the window is beveled on the top and the bottom so that it will fit flush in only one direction.

(5) While slightly bending the window, insert the other top corner into the other side of the display opening, and slide the window up until it snaps into place.

(6) Remove the covering from the LCD unit and install as follows:

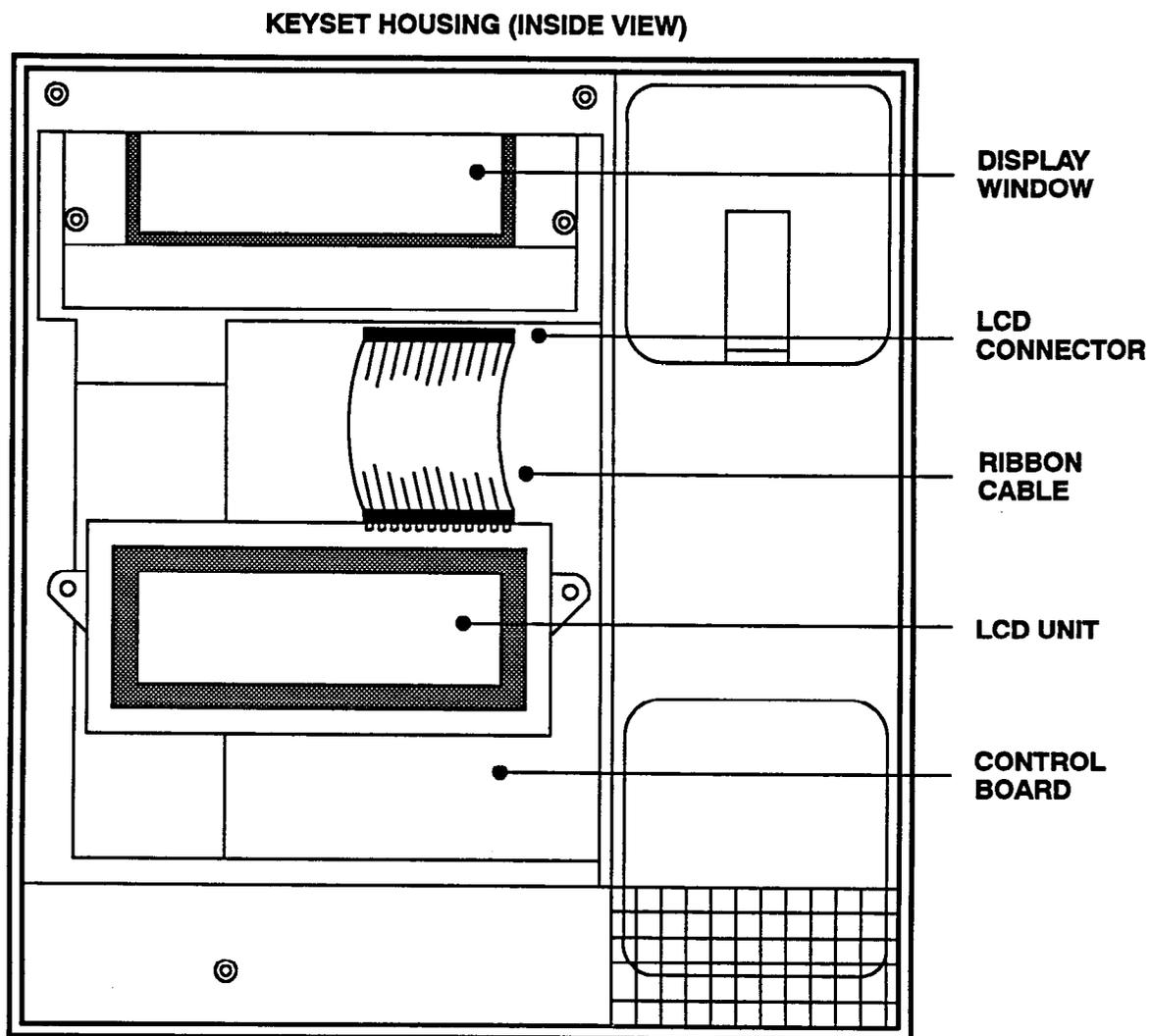
a. Insert one end of the ribbon cable into the black connector on the LCD unit. Ensure that the metal strips on the ribbon cable make contact with the metal tabs in the black connector.

b. With the LCD unit facing up, insert the other end of the ribbon cable into the black connector on the control board (see Figure 3-70).

c. Turn the LCD unit over and position it on the plastic window so that the screw holes in the LCD unit align with the screw holes in the keyset housing. Install the two Phillips-head screws to hold the LCD unit in place.

(7) Replace the keyset baseplate.

FIGURE 3-70. INTER-TEL/DVK 24-LINE KEYSSET "LARGE" LCD INSTALLATION



7.32 Inter-Tel/DVK 12-Line and 8-Line Keysets:
To convert a standard Inter-Tel/DVK 12-line or 8-line keyset to a display keyset, install the *small* LCD Kit (part no. 828.1165) as outlined in the following steps:

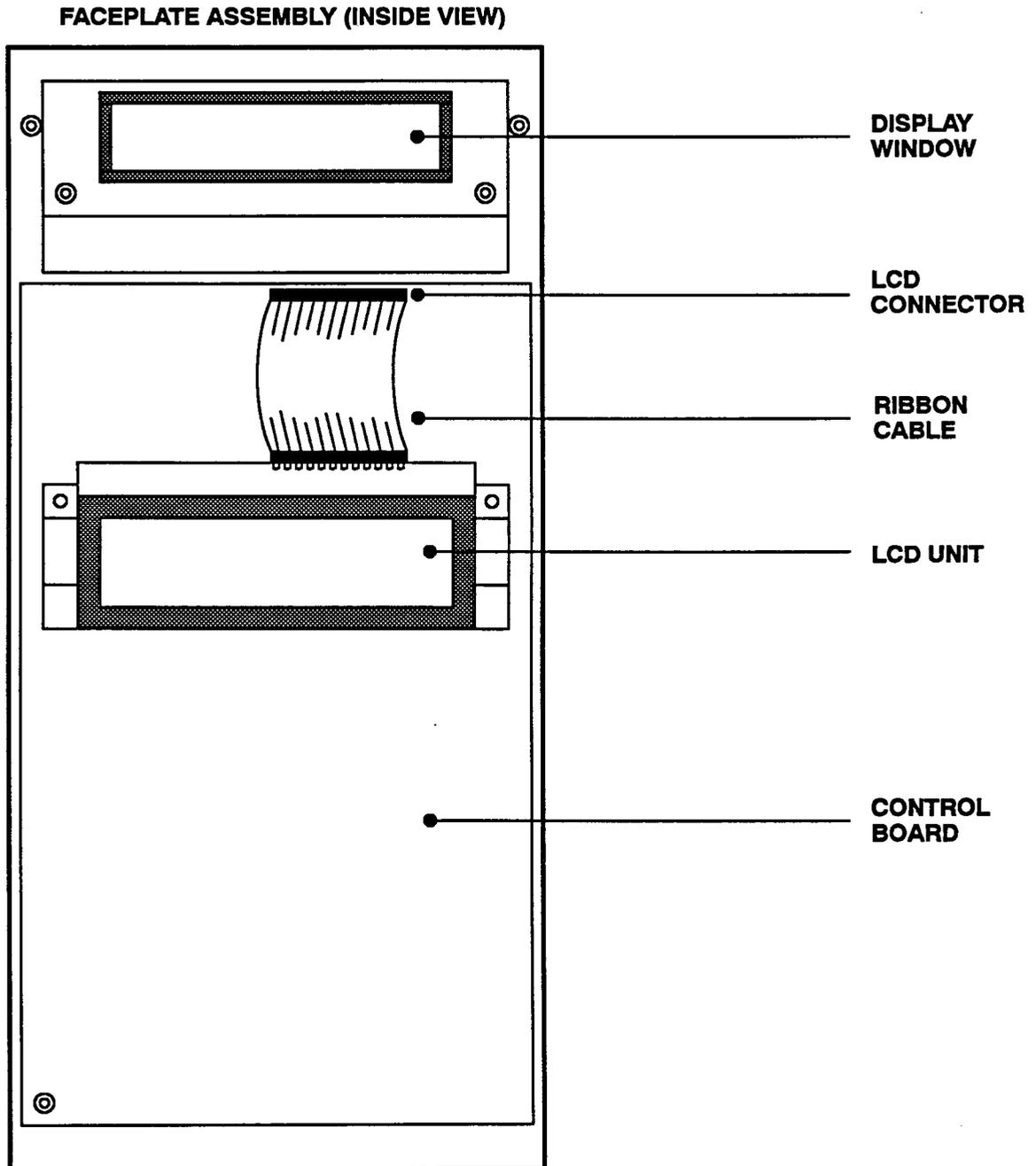
- (1) Unpack the LCD kit. There should be a clear plastic display window, an LCD unit, a ribbon cable, and two small Phillips-head screws.
- (2) Remove the keyset baseplate to expose the control board that has the LCD connector. (Refer to Figure 3-71 on the next page.)
- (3) Remove the line cord, handset cord, and speaker wires from their connectors on the control board.
- (4) On the back of the keyset, remove the two screws that secure the faceplate assembly to the keyset housing.
- (5) From the front of the keyset, release the tabs that secure the top edge of the faceplate assembly to the keyset housing.
- (6) Starting with the right side, carefully lift the entire faceplate assembly away from the keyset housing.

NOTE: There is a small tab protruding from the front, lower-left corner of the faceplate assembly into the keyset housing. Be careful not to break this tab when removing the faceplate assembly.
- (7) Remove the cover from the display opening in the top of the faceplate assembly by releasing the tabs from the inside and pushing the cover out.
- (8) From the inside of the faceplate assembly, insert one of the top corners of the clear plastic window into the side of the display opening.

NOTE: The small lips on the end of the window should face to the inside of the faceplate assembly. Also, the window is beveled on the top and the bottom so that it will fit flush in only one direction.

- (9) While slightly bending the window, insert the other top corner into the other side of the display opening, and slide the window up until it snaps into place.
- (10) Remove the covering from the LCD unit and install as follows:
 - a. Insert one end of the ribbon cable into the black connector on the LCD unit. Ensure that the metal strips on the ribbon cable make contact with the metal tabs in the black connector.
 - b. With the LCD unit facing up, insert the other end of the ribbon cable into the black connector on the control board (see Figure 3-71).
 - c. Turn the LCD unit over and position it on the plastic window so that the screw holes in the LCD unit align with the screw holes in the faceplate assembly. Install the two Phillips-head screws to hold the LCD unit in place.
- (11) Carefully replace the entire faceplate assembly back in the keyset housing and replace the screws that hold it in place.
- (12) Reconnect the line cord, handset cord, and speaker wires to their connectors on the control board.
- (13) Replace the keyset baseplate.

**FIGURE 3-71. INTER-TEL/DVK 12/8-LINE KEYSSET "SMALL" LCD
INSTALLATION**



Keypad Installation

7.33 Install all Inter-Tel/DVK keysets as follows:

NOTE: For information on installing the GX and GMX keysets, see appendixes A and B in the back of this manual.

- (1) Before mounting the modular jack assembly and connecting the keypad, measure the voltage on the RED terminal of the modular jack assembly with respect to the GREEN terminal. (The "common" probe of the voltmeter is placed on the GREEN terminal.) It must measure +30VDC (± 2.0 VDC). If -30VDC is measured, check the cabling for a reversed pair.

CAUTION

If the power pair (W/BL, BL/W) is reversed, installing a keypad will open the fuse (or associated thermistor) on the KSC-D. If the card has a fuse, this affects operation of all keysets, DSS/BLF Units, and Attendant Computer Consoles connected to that card.

- (2) Mount the modular jack assembly on the wall.
- (3) Remove the keypad baseplate to expose the control board.
- (4) Attach the coiled handset cord to the handset and to the handset jack (J6) on the bottom of the keypad. Place the handset on hook.
- (5) Plug one end of the line cord into the wall-mounted modular jack assembly. Plug the other end into the line cord jack (J1) on the bottom of the keypad.

NOTE: To aid in installation and troubleshooting, display keysets show their station circuit number, extension number, and assigned user name for five seconds when power is turned on and the line cord is first plugged in. This display also appears after a system reset, and whenever the line cord is removed and replaced while power is on. The station identification displays for five seconds, then the keypad changes to the appropriate display, depending on its current status.

- (6) Perform the Inter-Tel/DVK keypad self-test:
 - a. While pressing the asterisk (*) and pound (#) keys, unplug and replace the keypad line cord.
 - b. Release the keys. The keypad rings momentarily. (Display keysets show a dark display — all pixels lit.)
 - c. Lift and replace the handset. The keypad rings momentarily. (Display keysets show a blank display — no pixels lit.)
 - d. Lift and replace the handset. The keypad rings momentarily and all LED-equipped keys light. (Display keysets show KTS SELF-TEST LED MATRIX.) If any of the LEDs do not light, return the keypad for repair.
 - e. Lift and replace the handset. The keypad rings momentarily and all of the LEDs go out. (Display keysets show KTS SELF-TEST KEY MATRIX.)
 - f. One at a time, press each of the keys on the keypad in any order. A progress tone (or a DTMF tone for keypad keys) is heard if the key is functioning properly. If the signals are not heard, the key is faulty. Return the keypad for repair if any key is faulty.
 - g. Lift and replace the handset. The audio integrated module tones are broadcast over the speakerphone speaker. (Display keysets show KTS SELF-TEST AIM TONES.)
 - h. Lift and replace the handset. Audio integrated module tones of various volume levels, from softest to loudest, are broadcast over the speakerphone speaker. (Display keysets show KTS SELF-TEST AIM TONE VOLUME.)
 - i. Lift and replace the handset. Tones of various volume levels, from softest to loudest, are broadcast over the speakerphone speaker. (Display keysets show KTS SELF-TEST AIM SPK VOLUME.)
 - j. Lift the handset, then press and release the hookswitch. Tones of various volume levels, from softest to loudest, are broadcast over the handset receiver. (Display keysets show KTS SELF-TEST AIM HS VOLUME.)
 - k. Press and release the hookswitch. A continuous tone is broadcast over the handset receiver using the primary voice path. (Display keysets show KTS SELF-TEST AIM XMT/RCV PRI.)
 - l. Press and release the hookswitch. A continuous tone is broadcast over the handset receiver using the secondary voice path. (Display keysets show KTS SELF-TEST AIM XMT/RCV SEC.)
 - m. Press and release the hookswitch. The handset transmitter is connected to the handset re-

ceiver via the primary voice path. (Display keysets show KTS SELF-TEST HOT HANDSET PRI.)

- n. While speaking into the handset transmitter, determine that sidetone is being received over the handset receiver.
 - o. Press and release the hookswitch. The handset transmitter is connected to the handset receiver via the secondary voice path. (Display keysets show KTS SELF-TEST HOT HANDSET SEC.)
 - p. While speaking into the handset transmitter, determine that sidetone is being received over the handset receiver.
 - q. Press and release the hookswitch. The speakerphone microphone is connected to the handset receiver. (Display keysets show KTS SELF-TEST SPKRPHONE MIC.)
 - r. While speaking into the speakerphone microphone (or rubbing a finger over the opening to the microphone), determine that the sound is being broadcast over the handset receiver.
 - s. Place the handset back in its cradle. The keyset rings momentarily and it takes about ten seconds for the keyset to return to normal operation. (Display keysets show KTS SELF-TEST COMPLETED for about five seconds. Then, the keyset's identification, as described in the NOTE to step 5 on page 3-128, displays for about five seconds.)
 - t. Replace the keyset if faulty.
- (7) Replace the baseplate.
 - (8) The keyset ring tone can be changed by performing the steps described in the FEATURES section on page 4-48.
 - (9) *If necessary*, change the keycaps to match the way the keyset will be programmed to work.

Wall Mounting Keysets

7.34 To mount the keyset on a wall:

- (1) Remove the keyset baseplate.
- (2) Rotate the baseplate so that the mounting holes are at the top. Then position the plate in the desired location on the wall.
- (3) Mark the location of the keyset mounting holes on the wall. Set the baseplate aside.
- (4) Drive a screw into the center of each mounting hole marking. Allow the head of the screw to protrude approximately $\frac{1}{4}$ inch.
- (5) Replace the baseplate on the keyset with the mounting holes at the top.
- (6) Position the mounting holes of the baseplate over the screws and slide the keyset into position on the wall.

Optional Headsets

7.35 Refer to SPECIFICATIONS, page 2-31, for headset requirements. To attach a headset to a keyset:

- (1) Remove the coiled handset cord from the handset jack on the bottom of the keyset. Leave the handset in the cradle.
- (2) Insert the headset modular plug into the jack. Plug in the headset power source, if used.
- (3) If the headset has an on/off switch, turn on the headset.
- (4) On the keyset, press the SPCL key and enter the headset enable feature code (default value is 315).
- (5) *To disable the headset*, press SPCL and enter the headset disable feature code (default value is 316). Unplug the headset and reconnect the handset.

Optional Data Port Modules

7.36 All Inter-Tel/DVK keysets may be equipped with optional Data Port Modules (refer to REPLACEMENT PARTS for the part number). The Data Port Module contains a four-conductor modular jack that can be used to connect *either* a data device (such as a personal computer with a direct-connect modem) *or* an LRA and an external signaling device (such as a loud bell, horn, flashing light, etc.) to the keyset.

7.37 Install the Data Port Module as outlined below. For a diagram, see Figure 3-72 on page 3-131.

- (1) Remove the keyset baseplate.
- (2) Unplug the line cord from its modular jack.
- (3) Remove the 10-pin shorting plug located on the keyset control board.
- (4) Save the shorting plug by taping it to the inside of the baseplate. The plug must be replaced if the Data Port Module is later removed.
- (5) Align the Data Port Module over the three posts protruding from the inside of the baseplate and insert the screws (do not over tighten).
- (6) Plug the Data Port Module cable into the pins on the keyset control board (where the shorting plug was previously located). Make sure the cable connector is securely seated.
- (7) Place jumper straps SP1, SP2, SP3, and SP4 on the Data Port Module in the appropriate positions. Depending on how the Data Port Module will be used, refer to one of the two possible settings outlined in Figure 3-72.

- (8) *If connecting a modem-equipped data device, refer to paragraphs 7.38 through 7.40.*

If connecting a loud ringing adapter and an external signaling device, refer to paragraphs 7.41 through 7.43.

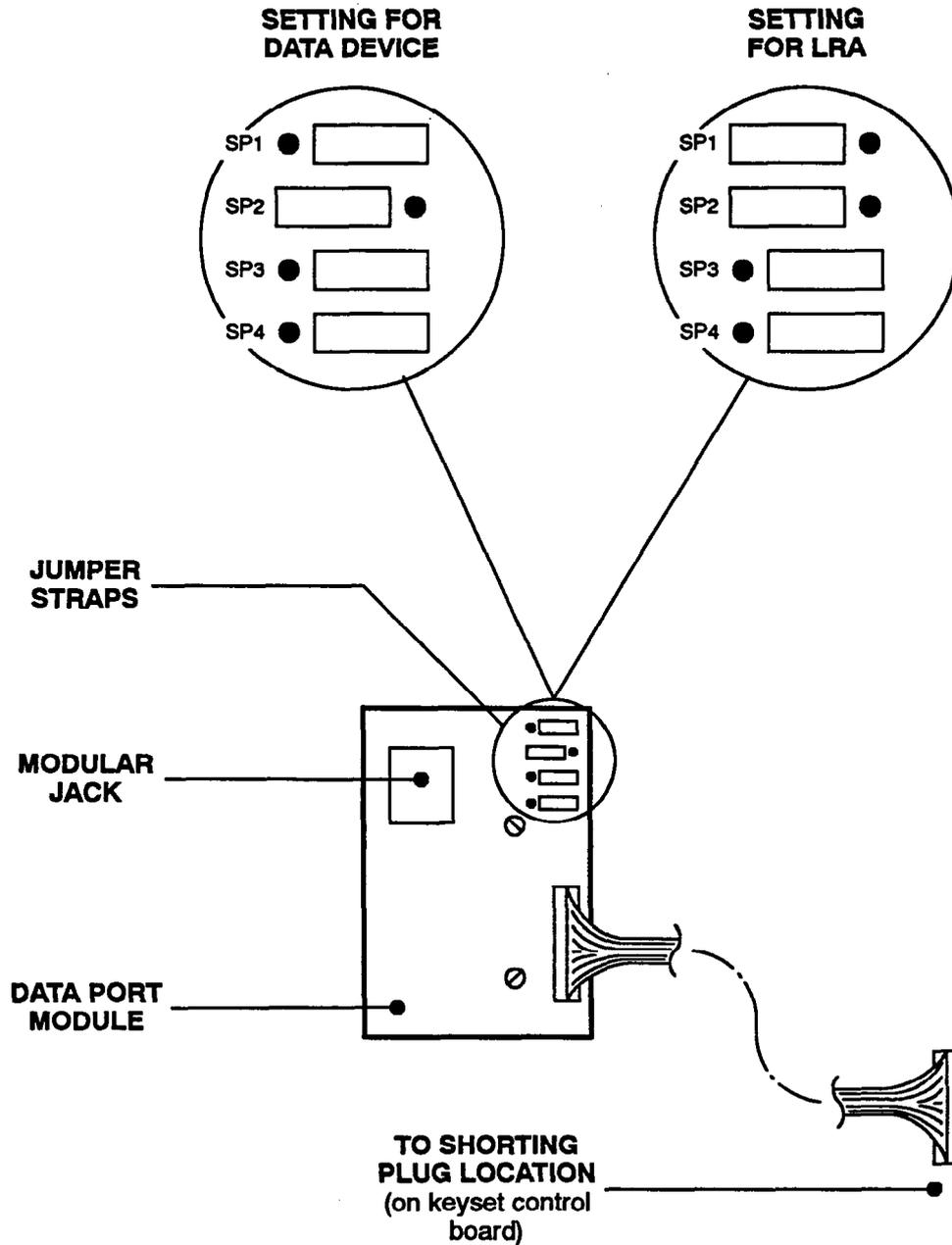
7.38 **To connect a modem-equipped data device:** The optional Data Port Module can be used to connect a data device (such as a personal computer) equipped with a direct-connection modem to a keyset. The data device can be used with the keyset to communicate with remote data equipment over voice channels being used for CO or intercom calls. The data device's modem must be externally powered (or capable of operating on 20mA of loop current) and have an RJ11 CO trunk interface.

7.39 The data device can be activated using the keyset or an auto-dial modem. (For more details and an explanation of monitoring or transferring the data connection, refer to page 4-101 in FEATURES). The data device is disconnected whenever one of the following occurs: the modem attached to the keyset disconnects from the call, the called modem disconnects from the call, or the data connection is transferred to the keyset's primary voice path and the call is disconnected.

7.40 Install the data device as follows:

- (1) Insert the modem line cord (which would normally be connected to a CO jack) into the modular jack on the keyset's Data Port Module.
- (2) Ensure that the jumper straps on the Data Port Module are set to the proper *data device* positions. Refer to Figure 3-72.
- (3) Plug the keyset line cord into the keyset's modular jack and reattach the baseplate.

FIGURE 3-72. INTER-TEL/DVK DATA PORT MODULE INSTALLATION



7.41 To connect a Loud Ringing Adapter (LRA):
The optional Data Port Module can be used to connect external signaling equipment such as loud bells, horns, flashing lights, etc. to a keyset. This application is useful in areas where the normal ring tone of the keyset cannot be heard, such as warehouses and loading docks. The signaling device follows the normal ringing patterns of the keyset.

NOTE: Since handsfree intercom calls may be difficult to hear in noisy areas, keysets with LRAs installed should be programmed for handsfree disable so that users are alerted to incoming intercom calls by continuous double ring tones. (Refer to FEATURES, page 4-55.)

7.42 An electromechanical LRA device is placed between the keyset Data Port Module and the external signaling equipment to provide the necessary interface relay. Refer to page 2-31 for LRA device specifications and recommendations. A diagram of a typical set-up is shown in Figure 3-73 below.

7.43 Install the LRA as follows:

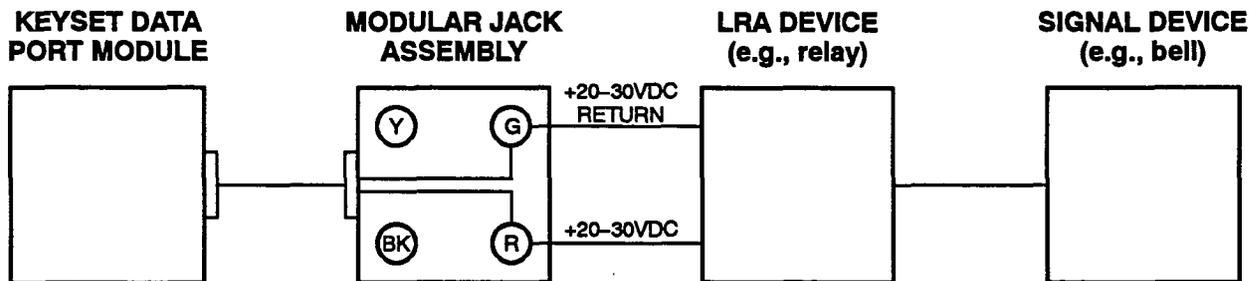
- (1) Using 24AWG wire, connect the LRA device input (coil circuit) to the RED and GREEN wires

on a modular jack assembly. Some devices require that polarity be observed between the LRA input and the modular jack.

NOTE: In order for the LRA device to operate properly, the maximum resistance from the modular jack to the LRA should be kept under 100 ohms.

- (2) Attach a mod-to-mod line cord to the modular jack assembly and to the modular jack on the keyset's Data Port Module.
- (3) Ensure that the jumper straps on the Data Port Module are set in the proper LRA positions. Refer to Figure 3-73 on the previous page.
- (4) Connect the LRA device output (contacts) to the signaling device according to the manufacturer's instructions. Use the appropriate gauge wire for handling the current/voltage rating of the signaling device.
- (5) Plug the keyset line cord into the modular jack on the back of the keyset and reattach the baseplate.

FIGURE 3-73. INTER-TEL/DVK LRA SET-UP



NOTE: Each time the keyset rings, the Data Port Module provides 20-26mA of loop current to the LRA. This causes the LRA contacts to close and activates the signaling device. The LRA is not affected by the ring tone or the ringer volume of the keyset. The LRA must be capable of operating on 20mA current (approximately 20VDC).

D. IMX 416/832 DIGITAL DSS/BLF UNIT INSTALLATION

7.44 Up to 50 digital keysets can be equipped with up to four digital Direct Station Selection/Busy Lamp Field (DSS/BLF) Units each. Each single DSS/BLF Unit has 60 keys for directly accessing up to 60 numbers. The numbers can be station extension numbers, hunt group pilot numbers, or other system features.

NOTE: The system can have as many as 50 keyset circuits equipped with DSS/BLF Units. For example, there could be a maximum of 50 digital keysets (i.e., DKSC circuits) equipped with up to four digital DSS/BLF Units each. Or, there could be a maximum of 50 KSC or KSC-D circuits equipped with one analog DSS/BLF Unit each. Or, there could be any combination of the two using up to 50 keyset circuits.

7.45 Digital DSS/BLF Units are physically attached to and programmed to be used with specific digital keysets. The units are powered by their own AC transformer and do not require a DKSC circuit that is separate from the keyset's circuit. If necessary, all 16 keysets connected to the same Digital Keyset Card can be equipped with up to four digital DSS/BLF Units each.

NOTE: Digital keysets cannot be equipped with analog DSS/BLF Units. Likewise, analog keysets cannot be equipped with digital DSS/BLF Units.

7.46 Unpack and inspect the DSS/BLF Units before installing them.

7.47 Install each digital DSS/BLF Unit as outlined below. For diagrams of the installation, see Figures 3-64 and 3-74 on pages 3-112 and 3-134.

- (1) Remove the baseplate on the back of the DSS/BLF Unit.
- (2) On the connector board located in the baseplate, plug the free end of the PCDPM-to-DSS interface cable into the main RS-232-C connector (J1). (The other end of the cable was previously attached to the PC Data Port Module on the corresponding keyset; see also Figure 3-64 on page 3-112.)
- (3) Plug the AC transformer cable into the power connector (J4) on the baseplate connector board. (The transformer will later be plugged into an AC power source.)

NOTE: DSS/BLF Units always require their own separate AC transformers. For a diagram of AC transformer requirements, refer to Figure 2-2 on page 2-29.

(4) To attach a second DSS/BLF Unit to the first unit (see Figure 3-64 on page 3-112):

- a. Plug one end of a DSS-to-DSS interface cable into the secondary RS-232-C connector (J2) on the baseplate connector board in the first unit.
- b. Remove the baseplate on the back of the second DSS/BLF Unit.
- c. Plug the other end of the DSS-to-DSS interface cable into the main RS-232-C connector (J1) on the baseplate connector board in the second unit.
- d. Plug the AC transformer cable into the power connector (J4) on the baseplate connector board in the second unit. (The transformer will later be plugged into an AC power source.)

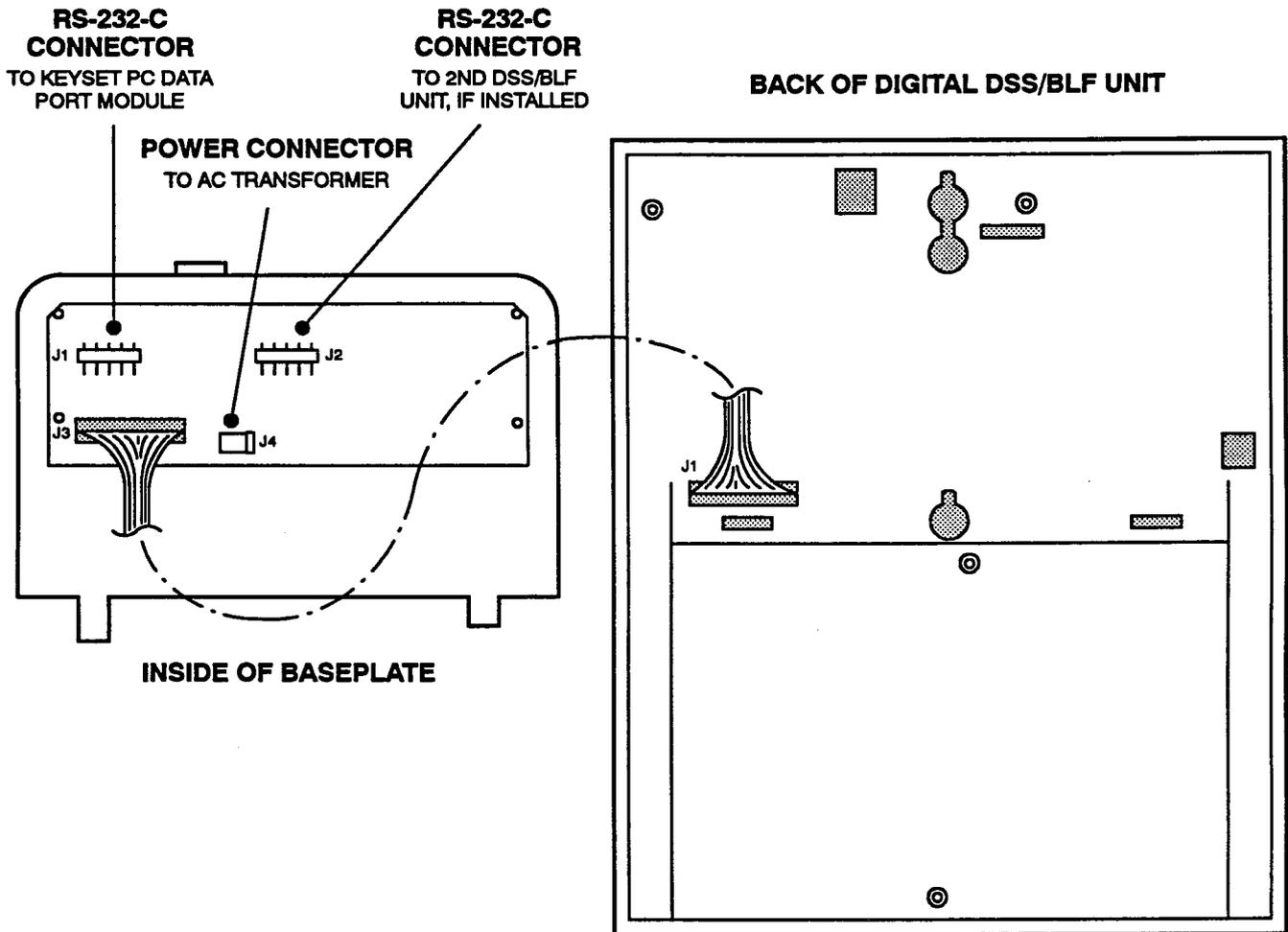
NOTE: If multiple DSS/BLF Units are installed, each individual unit must be equipped with its own AC transformer. In addition, the PC Data Port Module on the corresponding keyset must be equipped with its own AC transformer.

(5) To attach a third or fourth unit, repeat step 4.

(6) Perform the DSS/BLF Unit self-test:

- a. While holding down the first two keys in row one (extension numbers 100 and 101 in the default database), plug the main AC transformer unit into an available AC power source. (*DO NOT* use the outlet for the equipment cabinet.) All the keys should light up. If an LED does not light, unplug the AC transformer unit and plug it in while holding down the first two keys in row one (ext. 100 and 101). If the test fails again, replace the DSS/BLF Unit.
- b. Press each key individually (in any order) to remove the lit status. When finished, all keys should be unlit. If an LED does not go out, unplug the AC transformer unit and repeat steps a and b. If the test fails again, replace the DSS/BLF Unit. After all the keys have been tested, it takes approximately five seconds for the DSS/BLF Unit to return to normal operation.
- c. Replace the baseplate on the back of the DSS/BLF Unit.

FIGURE 3-74. BACK OF DIGITAL DSS/BLF UNIT



**E. IMX 416/832 ANALOG DSS/BLF UNIT
INSTALLATION**

7.48 Up to 50 IMX Direct Station Selection/Busy Lamp Field (DSS/BLF) Units can be installed on the IMX 416/832 System. A Keypad Card (KSC or KSC-D) can support up to four analog units. Each DSS/BLF Unit has 60 keys for directly accessing up to 60 numbers. The numbers can be station extension numbers, hunt group pilot numbers, or other system features.

NOTE: The system can have as many as 50 keypad circuits equipped with DSS/BLF Units. For example, there could be a maximum of 50 KSC or KSC-D circuits equipped with one analog DSS/BLF Unit each. Or, there could be a maximum of 50 digital keysets (i.e., DKSC circuits) equipped with up to four digital DSS/BLF Units each. Or, there could be any combination of the two using up to 50 keypad circuits.

7.49 As with keysets, IMX DSS/BLF Units require three-pair cabling. After they are installed, the DSS/BLF Units must be assigned in database programming to be used along with designated keysets. As many of the units as desired can be assigned to one keypad.

NOTE: Analog keysets cannot be equipped with digital DSS/BLF Units. Likewise, digital keysets cannot be equipped with analog DSS/BLF Units.

7.50 Unpack and inspect the DSS/BLF Units before installing them. Each DSS/BLF Unit is shipped with a 7-foot line cord.

7.51 Install each IMX DSS/BLF Unit as follows:

CAUTION

If the power pair (W/BL, BL/W) is reversed, installing a DSS/BLF Unit will open the fuse (or associated thermistor) on the KSC or KSC-D. If the card has a fuse, this affects operation of all keysets, DSS/BLF Units, and Attendant Computer Consoles connected to that card.

- (1) Before connecting the DSS/BLF Unit to the appropriate Keypad Card, measure the voltage on the RED terminal of the modular jack assembly with respect to the GREEN terminal. (The "common" probe of the voltmeter is placed on the GREEN terminal.) It must measure +30VDC (± 2.0 VDC). If -30VDC is measured, check the cabling for a reversed pair.
- (2) Mount the modular jack assembly on the wall.
- (3) Perform the DSS/BLF Unit self-test:
 - a. Plug the line cord into the modular jack assembly.
 - b. While holding down the key at the top of column one and the key at the top of column two, plug the line cord into the KSU jack on the bottom of the DSS/BLF Unit. All the keys should light up. If an LED does not light, remove and replace the line cord. If the test fails again, replace the DSS/BLF Unit.
 - c. Press each key individually (in any order) to remove the lit status. When finished, all keys should be unlit. If an LED does not go out, remove and replace the line cord and repeat steps b and c. If the test fails again, replace the DSS/BLF Unit. After all the keys have been tested, it takes approximately 10 seconds for the DSS/BLF Unit to return to normal operation.

F. GMX-416/832 ANALOG DSS/BLF UNIT INSTALLATION

7.52 Up to 50 single or tandem Direct Station Selection/Busy Lamp Field (DSS/BLF) Units can be installed on the system. A Keypad Card can support up to four units. Each single DSS/BLF Unit has 60 keys for directly accessing up to 60 numbers. The numbers can be either station extension numbers or hunt group pilot numbers. The numbers can be station extension numbers, hunt group pilot numbers, or other system features.

7.53 As with keysets, DSS/BLF Units require three-pair cabling. After they are installed, the DSS/BLF Units must be assigned in database programming to be used along with designated keysets. As many of the units as desired can be assigned to one keyset.

NOTE: For information on installing the GX and GMX DSS/BLF Units, refer to appendixes A and B in the back of this manual.

7.54 Unpack and inspect the DSS/BLF Units before installing them. Each DSS/BLF Unit is shipped with a 7-foot line cord.

7.55 Install each Inter-Tel/DVK DSS/BLF Unit as follows:

- (1) *If installing a tandem unit, connect a second modular jack assembly in parallel with the existing modular jack assembly. One jack will be used for the first DSS/BLF Unit, while the other jack will be used for the second DSS/BLF Unit.*
- (2) Before connecting the DSS/BLF Unit to the appropriate Keypad Card, measure the voltage on the RED terminal of the modular jack assembly with respect to the GREEN terminal. (The "common" probe of the voltmeter is placed on the GREEN terminal.) It must measure +30VDC (± 2.0 VDC). If -30VDC is measured, check the cabling for a reversed pair.

CAUTION

If the power pair (W/BL, BL/W) is reversed, installing a DSS/BLF Unit will open the fuse (or associated thermistor) on the KSC-D. If the card has a fuse, this affects operation of all keysets, DSS/BLF Units, and Attendant Computer Consoles connected to that card.

- (3) Mount the appropriate modular jack assembly on the wall.

- (4) Remove the four screws on the bottom of the DSS/BLF Unit and remove the bottom cover.

- (5) Locate the strap (J2) in the lower-right corner of the control board (see Figure 3-75 on page 3-137).

- (6) *If the unit will be using the programmed key arrangement for DSS/BLF 1, place the strap in the DSS1 position (over the right two pins). If the unit will be using the programmed key arrangement for DSS/BLF 2, place the strap in the DSS2 position (over the left two pins).*

NOTE: Tandem units should have one unit set for DSS1 and one unit set for DSS2. If tandem units have the same strap settings, there will be erroneous indications on the DSS/BLF Units and the keypad, and there may be errors throughout the system.

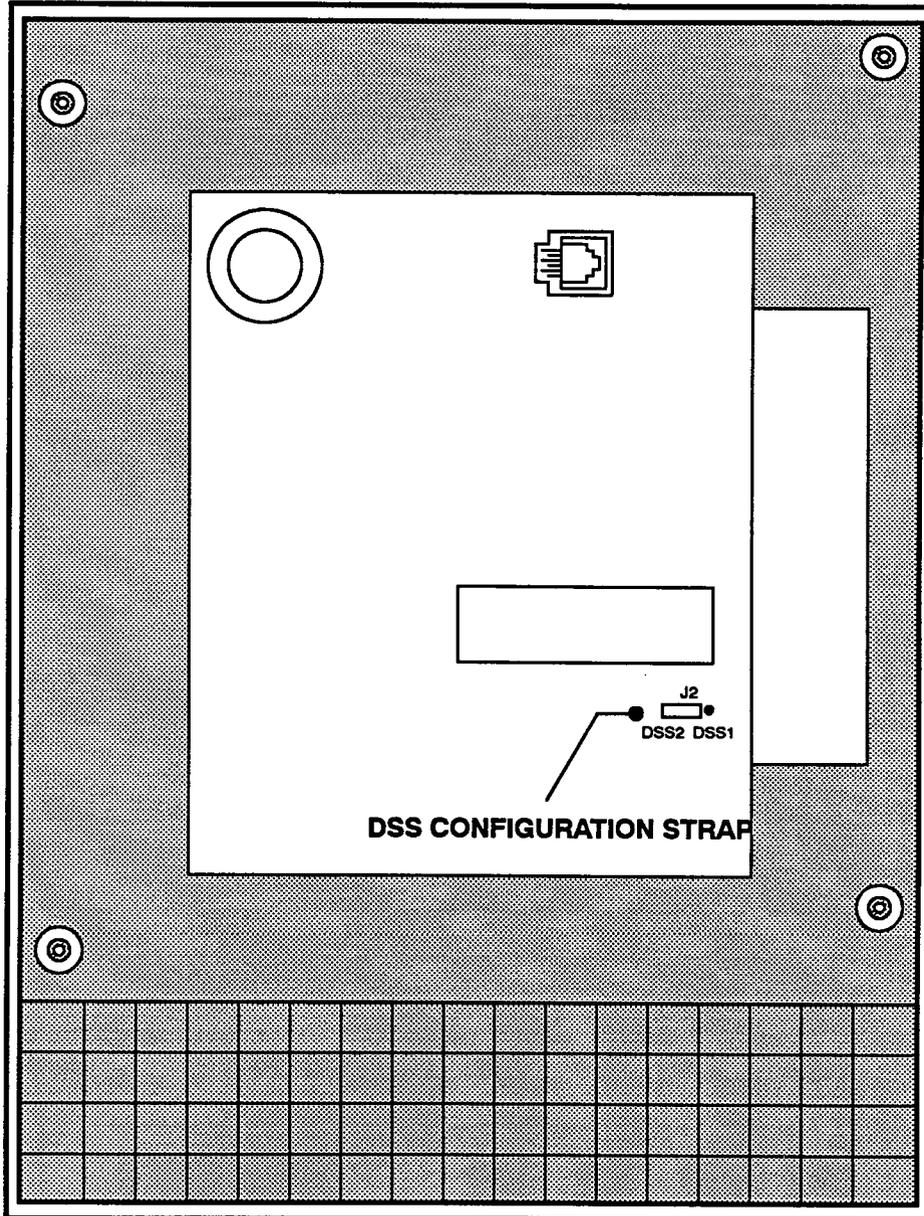
- (7) Perform the DSS/BLF Unit self-test:

- a. Plug one end of the line cord into the modular jack on the unit's control board.
- b. While holding down keys 100 and 110 (default), plug the other end of the line cord into the appropriate modular jack assembly. All the keys should light up. If an LED does not light, remove and replace the line cord while holding down keys 100 and 110 (default). If the test fails again, replace the DSS/BLF Unit.
- c. Press each key individually (in any order) to remove the lit status. When finished, all keys should be unlit. If an LED does not go out, remove and replace the line cord and repeat steps a and b. If the test fails again, replace the DSS/BLF Unit. After all the keys have been tested, it takes approximately 10 seconds for the DSS/BLF Unit to return to normal operation.
- d. Reassemble the DSS/BLF Unit.

G. ATTENDANT COMPUTER CONSOLE INSTALLATION

7.56 For complete information on the Attendant Computer Console, along with detailed installation and programming instructions, refer to the manual included with the console.

FIGURE 3-75. INTER-TEL/DVK DSS/BLF UNIT CONTROL BOARD



H. SINGLE-LINE SET AND PLAYBACK DEVICE INSTALLATION

Single-Line Sets

7.57 Single-line sets can be connected to either Single-Line Cards (SLCs) or Inward Dialing Cards (IDCs). If connected to SLCs, single-line sets must be equipped with AC ringers. If connected to IDCs, off-premises single-line sets must be equipped with AC ringers, while on-premises single-lines sets may be equipped with either AC or DC ringers. Jumper straps on the IDC circuits can be set for AC-ringing or DC-ringing. Refer to Figure 3-56 on page 3-95 for strap locations.

7.58 Enhanced Single-Line Sets (ESLSs) and Single-Line Instruments (SLIs): An internal jumper strap can be moved to set the ringer for AC or DC. (An AC ringer is required if the phone is used on an SLC or as an off-premises extension on an IDC.) Be sure the strap is set correctly for the installation; incorrect installation will cause damage to the phone. ESLs also have a selectable ring tone jumper strap (HI or LO) located on the control board.

NOTE: IDCs do not support message waiting applications. If single-line sets with message waiting lamps are installed on IDCs, the lamps will not function.

7.59 Industry-standard single-line DTMF sets: If equipped with AC ringers, they may be installed on either SLCs or IDCs. If equipped with DC ringers, they must be installed on IDCs (and they must be used on-premises).

Playback Devices

7.60 Playback devices can be used in place of single-line sets on SLC or IDC circuits. These devices answer an incoming call, play a recorded message, and automatically disconnect from the call. They are installed like single-line sets, using the same cabling and modular jack assemblies. If the playback device responds to AC ring signals and is installed on an IDC circuit, the circuit must be strapped for AC ringing; if the device responds to DC ring signals, the jumper strap must be set for DC ringing. (Refer to Figure Figure 3-56 on page 3-95.) A playback device uses the extension number that is associated with its station circuit.

7.61 Playback devices may be used with hunt groups to speed call processing. Hunt groups can have two types of special stations: announcement stations and overflow stations. Either type of station can be equipped with a station instrument that operates as a regular station or with a playback device that answers the call, then

disconnects to transfer it back to the hunt group. Refer to FEATURES, page 4-17, for more information.

7.62 With the *Extended* and *Extended plus T1 and E&M* software packages, playback devices may also be used in conjunction with the automated attendant feature. In this situation, the playback device answers the call and plays a prerecorded message. After the message, the caller is disconnected from the automated attendant and hears pure system dial tone. During or after the message, the caller may dial an extension number or a hunt group pilot number. Refer to FEATURES, page 4-12, for more information.

NOTE: For optimal performance, it is recommended that voice mail units and automated attendant playback devices be installed on IDC circuits rather than SLC circuits.

Single-Line Set And Playback Device Installation

7.63 Inspect the ESLs and SLIs before installing them. If any parts are damaged or missing, contact Customer Support.

7.64 To install a single-line set or a playback device:

(1) *If installing an ESLS or SLI:*

- a. Remove the baseplate and open the phone to expose the control board.

NOTE: The back cover of the ESLs does not have to be opened to reach the straps.

- b. Place the AC/DC jumper strap in the desired position. Also, on ESLs, place the HI/LO (selectable ring tone) jumper strap in the desired position. (Refer to Figures 3-76 and 3-77 on the following pages.)

NOTE: On ESLs, do not move the JMP3 jumper strap from the NORM position.

- c. Reassemble the phone.

(2) Before connecting a single-line set or playback device to the system, measure the voltage on the RED terminal of the modular jack assembly with respect to the GREEN terminal. (The common probe of the voltmeter is placed on the GREEN terminal.) It must measure -40VDC (± 2 VDC). If +40 is measured, check the cabling for a reversed pair.

(3) Mount the modular jack assembly on the wall.

(4) Plug one end of the line cord into the modular jack assembly and plug the other end into the jack on the single-line set or playback device.

- (5) To wall mount an ESLS or SLI, refer to the instructions given for wall mounting keysets on page 3-120.

FIGURE 3-76. SLI CONTROL BOARD

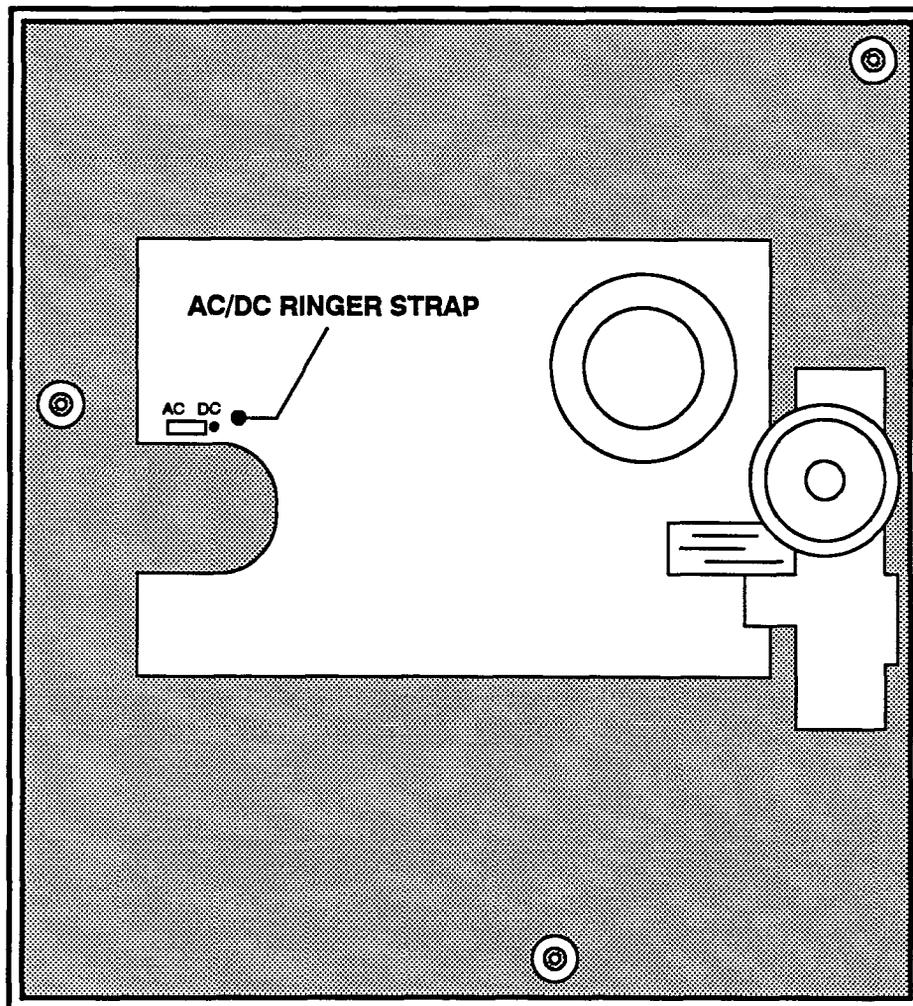
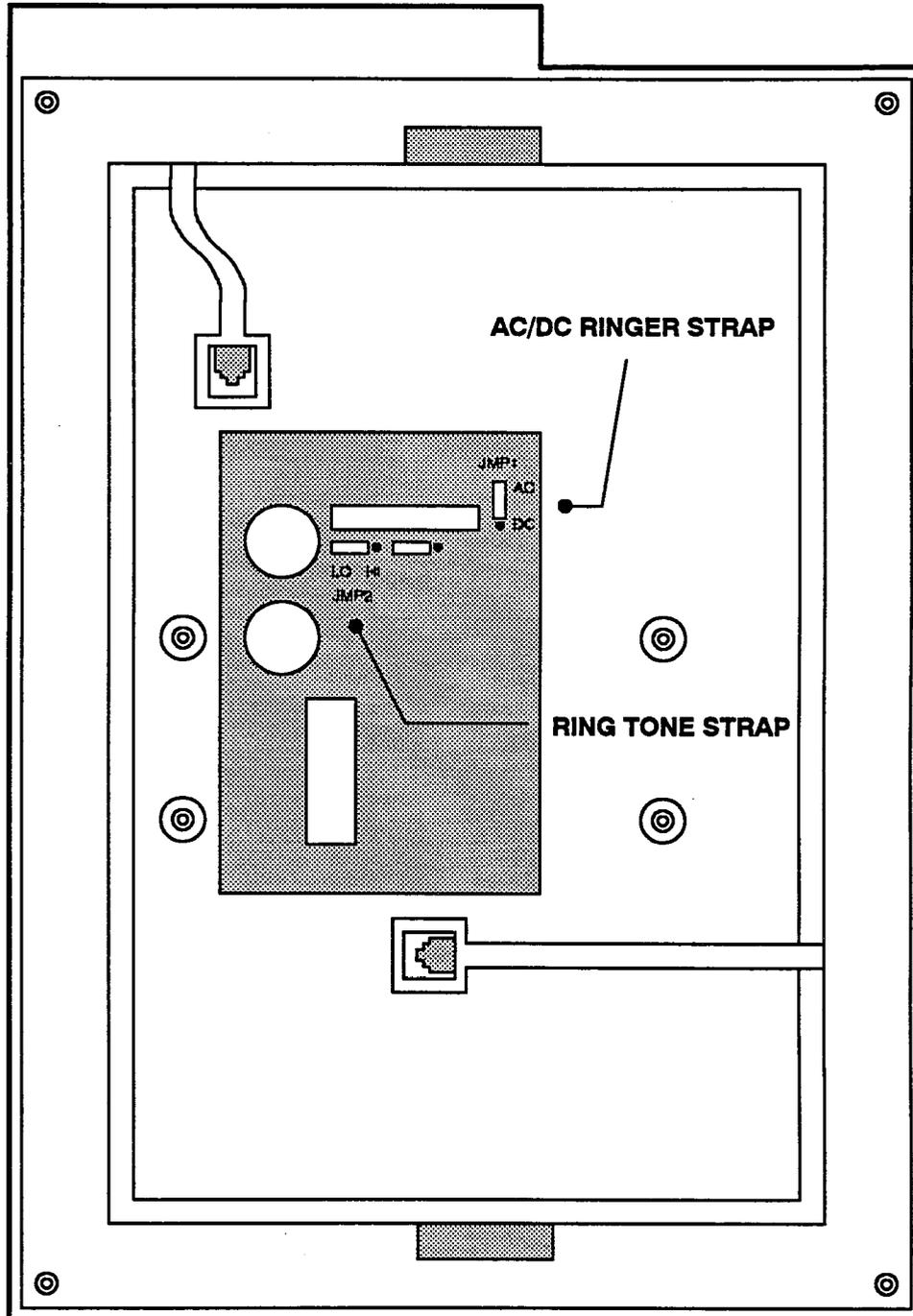


FIGURE 3-77. BOTTOM OF ESLS



8. SMDR/SMDA OUTPUT DEVICE INSTALLATION

8.1 The output device(s) for the Station Message Detail Recording (SMDR) and Station Message Detail Accounting (SMDA) features must meet the requirements and match the RS-232-C DB9 and/or DB25 pin-outs described in SPECIFICATIONS on page 2-36. The cables for the device(s) must not be longer than 50 feet (15 meters).

8.2 To connect an output device to the peripheral connector panel on the back of the equipment cabinet:

- (1) Match the baud rates on the output device and the port to which it will be attached (SERIAL 1 or SERIAL 2). Refer to page 2-37 for the proper baud rate settings.
- (2) Turn on the AC power to both the device and the system *before* connecting the DB9 or DB25 cable to the peripheral connector panel. This prevents any electrical surges from being transmitted by the interface.
- (3) Carefully connect the DB9 or DB25 interface cable from the device to the appropriate connector (SERIAL 1 or SERIAL 2) on the peripheral connector panel.
- (4) Using standard electrical tape, tape two ferrite split beads around the interface cable just below where the cable connects to the peripheral connector panel. (See Figure 3-4 on page 3-13 for an example of ferrite bead installation).

NOTE: Ferrite beads must be installed to meet Part 15 of FCC regulations. Refer to REPLACEMENT PARTS for the part number.

- (5) To set the parameters for the SMDR and SMDA outputs, refer to PROGRAMMING.

9. EXTERNAL PAGING EQUIPMENT INSTALLATION

9.1 Optional external paging equipment can be connected to an available SLC, LGC, or LSC circuit. Install the external paging equipment as follows:

NOTE: When installing external paging equipment on an LGC or LSC circuit, use a paging amplifier that provides talk battery. When installing external paging equipment on an SLC circuit, use a paging amplifier that *DOES NOT* provide talk battery.

CAUTION

Using a paging amplifier with talk battery on an SLC circuit will damage the card.

- (1) Cut a length of shielded speaker cable to run from the paging amplifier to the MDF back-board.
- (2) At the MDF, terminate one end of the cable onto tip and ring of an available SLC, LGC, or LSC circuit.
- (3) Connect the other end of the cable to the amplifier high-impedance input according to the manufacturer's instructions.
- (4) Connect the paging speaker(s) to the amplifier using speaker cable.
- (5) Plug in the amplifier's AC power cord. *DO NOT* use the outlet for the equipment cabinet or the auxiliary outlets on the back of the power supply.
- (6) Set the amplifier volume control to the lowest setting and turn on the amplifier.
- (7) From a station location, make a page by lifting the handset, pressing the PAGE key (or dialing 7 — the default Page feature code), and dialing a zone code that includes the external paging zone. Adjust the amplifier to the desired level while placing the page.

10. EXTERNAL MUSIC SOURCE INSTALLATION

10.1 If desired, up to two external music sources (Port 1 and Port 2) may be connected to the system. The first two pair of wires on the Matrix Card terminal block (see Figure 3-20 on page 3-32) are the inputs for the optional external music sources (radio, tape player, etc.). If two music sources are connected, keyset users have the option of having background music from either music source. For the Music-On-Hold feature, either music source (or silence, or tick-tones) can be assigned on a trunk group-by-trunk group basis. For more information, see SPECIFICATIONS, page 2-14.

NOTE: In some circumstances, there may be broadcast restrictions associated with the music. Check with the music's original distributor and/or the radio station for copyright and broadcast restrictions concerning background music and music-on-hold.

10.2 If using a radio as a music source, place it 5 to 10 feet away from the equipment cabinet to avoid RFI generated by the equipment cabinet. If the radio is placed more than 10 feet away from the equipment cabinet, use twisted-pair cable. For better reception, a radio with an external antenna is recommended.

10.3 To install the external music source:

- (1) On the Matrix Card, ensure that the appropriate music-on-hold (MOH) jumper strap (Port 1 or Port 2) is in the ON position (over the top two pins). When outside calls on trunk groups assigned to this port are placed on hold, the caller hears music.
- (2) Cut a 5- to 10-foot (1.5- to 3.0-meter) length of shielded speaker cable to run from the external music source to the Matrix Card terminal block.

(3) At the MDF, terminate one end of the cable onto the Port 1 pair (W/BL-BL/W) or the Port 2 pair (W/O-O/W) of the Matrix Card terminal block.

(4) **EITHER**, connect the other end of the cable to the speaker output terminals of the music source.

OR, if the music source has an earphone jack, attach an $\frac{1}{8}$ -inch mini phone plug (or other specified connector) to the other end of the cable, and plug it into the earphone jack on the music source.

NOTE: If the earphone jack is "padded" so that the optimal volume level cannot be reached, the **EITHER** procedure may be more effective.

(5) Plug in the AC power cord for the music source. **DO NOT** use the outlet for the equipment cabinet or the auxiliary outlets on the back of the power supply.

(6) Turn on the AC power to the music source.

(7) From a keyset:

EITHER, select a trunk and dial the telephone number of one of the other trunks to call back into the system. Put the call on hold to hear the music.

OR, place an intercom call to another station. Put the call on hold to hear the music.

(8) While listening to music-on-hold, adjust the volume on the music source to a level within the range of the automatic gain control circuit (slightly past the point where the volume level no longer increases). The optimal input level is 0.775VRMS (0dB).

(9) *If installing a second music source*, repeat these steps.

11. SETTING UP THE PC MOTHERBOARD

11.1 Prior to shipping the 416/832 System, the PC Motherboard is "set up" to work with the accompanying hard disk drive. Under normal circumstances, this system configuration setup does not have to be adjusted. However, if a new PC Motherboard or hard disk drive is installed in the system, the PC Motherboard setup should be checked as outlined below.

NOTICE

Depending on the specific BIOS used by the motherboard, the layout and editing functions of the setup screen (as shown in the box at the right) could vary somewhat. If so, make any necessary changes by following the actual instructions displayed on the monitor, rather than those outlined below.

11.2 To set up the PC Motherboard:

- (1) Turn OFF the AC POWER switch on each power supply unit (main supply first).
- (2) Remove the 7-pin system status panel (display) cable from the 4-pin and 2-pin connectors on the front edge of the HDLC Card.
- (3) Disable the "watchdog" timer by placing a jumper on (shorting) the 2-pin system status panel connector.
- (4) Ensure the programming monitor attached to the peripheral connector panel is plugged into an AC power source and turned on.
- (5) *If the PC Motherboard is equipped with the Phoenix Technologies Ltd. BIOS:*
 - a. Turn ON the *main* AC POWER switch. (The monitor displays the system memory check.)
 - b. *After* the memory check is complete, but *before* the Inter-Tel logo is displayed, press the CTRL, ALT, and ESC keys all at the same time. (The monitor displays the System Configuration Setup screen.)

NOTE: If the keys are pressed too early, wait a few seconds and try again. If the keys are pressed too late, turn OFF the AC POWER and start over.

- c. Excluding the Hard Disk C prompt, determine that the information displayed on the monitor matches what is shown in the following box.

Diskette A:	5.25 Inch, 1.2 MB
Diskette B:	Not Installed
Hard Disk C:	Type 2
Hard Disk D:	Not Installed
Base Memory:	640 KB
Extended Memory:	384 KB
Display:	MONO
Keyboard:	Not Installed
CPU Speed:	HIGH
Coprocessor:	Not Installed

- d. *If any of the information is incorrect*, use the up or down arrow keys to highlight the desired prompt, then use the left or right arrow keys to change the information. (To change the Base Memory and Extended Memory prompts, enter the desired numbers.)

NOTE: *If using a Seagate ST-225 hard disk drive*, the Hard Disk C prompt should read Type 2. *If using a Mini-Scribe Model 8425 hard disk drive*, the prompt should read Type 6. *If using a Quantum Pro-Drive 40AT, Conner CP3000, Conner CP341, or Seagate ST3120A*, the prompt should read Type 11.

- e. When all of the displayed information is correct, press the F10 feature key to save the displayed settings and exit the Configuration Setup screen, and then turn OFF the *main* AC POWER switch.

If the PC Motherboard is equipped with the older AMI BIOS (American Megatrends Inc. 286-BIOS, ©1989):

- a. Turn ON the *main* AC POWER switch. (The monitor displays the system memory check and then "Press if you want to run SETUP or DIAGS".)
- b. Press the DEL key. (The monitor displays the following operations.)

EXIT FOR BOOT
RUN CMOS SETUP
RUN DIAGNOSTICS

- c. Use the up or down arrow keys to highlight the RUN CMOS SETUP option and press the RETURN (or ENTER) key. (The monitor displays the CMOS Setup screen, which is similar to the Configuration Setup screen shown in the box above.)
- d. Excluding the Time, Date, and Hard Disk C prompts, determine that the information dis-

played on the monitor matches what is shown in the box on the box above.

- e. If any of the information is incorrect, use the up or down arrow keys to highlight the desired prompt, then use the PG UP or PG DN keys to change the information.

NOTE: If using a Seagate ST-225 hard disk drive, the Hard Disk C prompt should read Type 2. If using a Mini-Scribe Model 8425 hard disk drive, the prompt should read Type 6. If using a Quantum Pro-Drive 40AT, Conner CP3000, Conner CP341, or Seagate ST3120A, the prompt should read Type 11.

- f. When all of the displayed information is correct, press the ESC key to save the displayed settings and exit the CMOS Setup screen. (The monitor displays: "Write data into CMOS and exit (Y/N)?")
- g. Enter "y" (for yes), press RETURN, and then turn OFF the main AC POWER switch.

If the PC Motherboard is equipped with the new AMI BIOS (American Megatrends Inc. BIOS, ©1992):

- a. Turn ON the main AC POWER switch. (The monitor displays the system memory check and then "Hit , if you want to run SETUP".)
- b. Press the DEL key. (The monitor displays the main menu of options, as shown below.)

```
STANDARD CMOS SETUP
ADVANCED CMOS SETUP
AUTO CONFIGURATION WITH BIOS DEFAULTS
AUTO CONFIGURATION WITH POWER-ON DEFAULTS
CHANGE PASSWORD
AUTO DETECT HARD DISK
HARD DISK UTILITY
WRITE TO CMOS AND EXIT
DO NOT WRITE TO CMOS AND EXIT
```

- c. Use the down arrow key to highlight the AUTO CONFIGURATION WITH POWER-ON DEFAULTS option and press ENTER. (The monitor displays "Load Power-On Default Values from ROM Table (Y/N) ? N".)
- d. Enter "y" (for yes) and press ENTER twice. (The monitor again displays the main menu of options.)
- e. Use the up arrow key to highlight the STANDARD CMOS SETUP option and press EN-

TER twice. (The monitor displays the Standard CMOS Setup screen.)

- f. Excluding the Hard Disk C type, determine that the information displayed on the monitor matches what is shown in the box below. If any of the information is incorrect, use the up or down arrow keys to highlight the desired prompt, then use the PG UP or PG DN keys to change the information.

```
Date (mn/date/year): xx/xx/xx
Time (hour/min/sec): xx:xx:xx
Hard Disk C: Type : xx
Hard Disk D: Type : Not Installed
Floppy Drive A: : 1.25MB, 5.25"
Floppy Drive B: : Not Installed
Primary Display : Monochrome
Keyboard : Not Installed
```

NOTE: If using a Seagate ST-225 hard disk drive, the Hard Disk C prompt should read Type 2. If using a Mini-Scribe Model 8425, the prompt should read Type 6. If using a Quantum Pro-Drive 40AT, Conner CP3000, Conner CP341, or Seagate ST3120A, the prompt should read Type 11.

- g. When all of the displayed information is correct, press the ESC key to exit. (The monitor again displays the main menu of options.)
 - h. If using the new "M396F" (80386 SX, 40MHz) version PC Motherboard:
 - 1. Use the up or down arrow keys to highlight the ADVANCED CMOS SETUP option and press ENTER twice. (The monitor displays the Advanced CMOS Setup screen.)
 - 2. Set the Video Shadow RAM and BIOS Shadow RAM fields to Disabled.
 - 3. Press the ESC key to exit. (The monitor again displays the main menu of options.)
 - i. Use the down arrow key to highlight the WRITE TO CMOS AND EXIT option and press ENTER. (The monitor displays: "Write to CMOS and exit (Y/N) ? N".)
 - j. Enter "y" (for yes), press ENTER, and then turn OFF the main AC POWER switch.
- If the PC Motherboard is equipped with a BIOS other than AMI or Phoenix, make any necessary changes by following the actual instructions displayed on the monitor, or contact Customer Support for further assistance.

- (6) Re-enable the "watchdog" timer by removing the jumper (short) from the 2-pin system status panel connector.
- (7) Reconnect the 7-pin system status panel cable to the 4-pin and 2-pin connectors on the front edge of the HDLC Card.
- (8) Turn ON the AC POWER switches — main first. (The system download takes place and the monitor eventually displays the Inter-Tel logo and the words "416/832 Applications.")

12. INSTALLING THE SYSTEM SOFTWARE

12.1 The 416/832 System is shipped with the standard-size (416-port) system software already installed on the hard disk drive. As a back-up, seven floppy disks containing the standard-size system software are also included. The seven disks are labeled: Installation Disk (1), Applications Setup Disk (2), Applications Software Disk (3), Call Processing Software Disk (4), Database Disk - A & B (5), Database Disk - C (6), and Print Driver Software Disk (7). If the software is upgraded at a later time, a new set of disks and installation instructions will be provided.

NOTE: Standard-size (416-port) GMX systems have only one database disk and six disks total. Also, see page 5-4 in PROGRAMMING for stand-alone/remote software installation.

12.2 If an expansion cabinet is to be installed, the expanded (832-port) system software, which is shipped on eight floppy disks, must be installed in place of the standard-size software (as outlined in sections B and C on the following pages). The eight disks are labeled: Installation Disk (1), Applications Setup Disk (2), Applications Software Disk (3), Call Processing Software Disk (4), Database Disk - A (5), Database Disk - B (6), Database Disk - C (7), and Print Driver Software Disk (8).

NOTE: Expanded (832-port) GMX systems have only two database disks and seven disks total.

12.3 If necessary, the software disks can also be used to install software on a blank hard disk drive (as outlined in sections D and E on pages 3-150 to 3-153.)

NOTE: The hard disk drive included with each new 416/832 System is now configured with either MS-DOS 5.0, 6.0, or 6.2. When installed, the new system software automatically includes the command "device=c:\dos\setver.exe" in the *config.sys* file, which is required for proper MS-DOS 5.0/6.0/6.2 operation. If the software is installed on a system that still uses MS-DOS 3.3, an error message (stating an invalid *config.sys* command has been detected) is displayed during the power-up sequence. The message can be ignored; the software is compatible with all four versions of DOS.

A. UPGRADING A PREVIOUS SOFTWARE PACKAGE

12.4 To upgrade a previous software package with one of the new software packages described in this manual, follow the instructions included with the software upgrade kit.

B. CHANGING STANDARD-SIZE SYSTEM SOFTWARE WITH AN EXISTING DATABASE TO EXPANDED SYSTEM SOFTWARE

12.5 The 416/832 System is shipped with the standard-size system software already installed on the hard disk drive. If an expansion cabinet is to be installed, the expanded system software must be installed in its place. To do this with software that has an existing database that needs to be saved, follow these steps:

- (1) As a precaution, save the current system database as outlined in PROGRAMMING on page 5-168.
- (2) Turn OFF the AC POWER switch on each power supply unit (main supply first).

CAUTION

Do not attempt to shortcut the following steps by using an MS-DOS disk to boot the system; the software installation will be unsuccessful.

- (3) Remove the 7-pin system status panel (display) cable from the 4-pin and 2-pin connectors on the front edge of the HDLC Card. (Refer to page 3-74 for a drawing of the HDLC Card.)
- (4) Disable the "watchdog" timer by placing a jumper on (shorting) the 2-pin system status panel connector.
- (5) Ensure that the programming monitor attached to the peripheral connector panel is plugged into an AC power source and turned on.
- (6) Turn ON the *main* AC POWER switch. (The monitor displays the system memory check.)
- (7) *If the PC Motherboard is equipped with the Phoenix Technologies Ltd. BIOS:* After the memory check is complete, but *before* the first full screen is displayed, press the SPACE BAR twice. (The monitor displays the C drive programming prompt "C:\>".)

If the PC Motherboard is equipped with the AMI (American Megatrends Inc.) BIOS: After the memory check is complete and *while* the System Configuration box is displayed, but *before* the rest of the first full screen is displayed, press the SPACE BAR twice. (The monitor displays the C drive programming prompt "C:\>".)

NOTE: If the space bar is pressed too early or too late, the C:\> prompt is not displayed. Turn OFF the AC POWER and start over.

- (8) Insert the Installation Disk (disk 1) in the floppy disk drive.

- (9) At the C:\> prompt, enter "a:" and press the RETURN (or ENTER) key. (The monitor displays the A drive programming prompt "A:\>".)
- (10) At the A:\> prompt, enter "setup" and press RETURN. (The monitor displays the two installation options — full [F] or stand-alone/remote [S].)
- (11) Use the up or down arrow keys to highlight "F" and then press RETURN. (The monitor displays information concerning the setup program.)
- (12) After reading the information, press RETURN. (Depending on whether the system can recognize the type of monitor installed, the monitor either displays the determined hardware configuration or it displays a list of monitor types.)
- (13) *If the hardware configuration is displayed*, use the up or down arrow keys to highlight "No Change" and then press RETURN. (The monitor displays two database options — update [U] or install [I].)

If a list of monitor types is displayed:

- a. Use the up or down arrow keys to highlight "Hercules with high resolution monochrome display" and then press RETURN. (The monitor displays a list of keyboard types.)
 - b. Use the up or down arrow keys to highlight "United States keyboard" and then press RETURN. (The monitor displays a list of pointing devices.)
 - c. Use the up or down arrow keys to highlight "No mouse or other pointing device" and then press RETURN. (The monitor displays the selected hardware configuration.)
 - d. Use the up or down arrow keys to highlight "No Change" and then press RETURN. (The monitor displays two database options — update [U] or install [I].)
- (14) Use the up or down arrow keys to highlight "U" and then press RETURN. (The monitor displays a warning.)
 - (15) *If the current system database has been saved*, press RETURN. (The database conversion process begins and continues for several minutes. Then the files from the Installation Disk are copied onto the hard disk drive. When finished, the monitor displays "Insert the Applications Setup Disk (2) in the following drive".)

If there is not a back-up of the current system database, press the CTRL (control) key and the X key at the same time to abort the upgrade. Then save the system database and start the upgrade over.

NOTE: Under normal circumstances, the back-up copy of the database will not be needed. However, should a problem occur, the saved database can later be restored.

- (16) Remove the Installation Disk, then insert the Applications Setup Disk (disk 2) in the floppy disk drive and press RETURN. (The files from the Applications Setup Disk are copied onto the hard disk drive. When finished, the monitor displays "Insert the Applications Software Disk (3) in the following drive".)
- NOTE:** Do not change the displayed drive (A:).
- (17) Remove the Applications Setup Disk, then insert the Applications Software Disk (disk 3) in the floppy disk drive and press RETURN. (The files from the Applications Software Disk are copied onto the hard disk drive. When finished, the monitor displays "Insert the CP Software Disk (4) in the following drive".)
- (18) Remove the Applications Software Disk, then insert the Call Processing Software Disk (disk 4) in the floppy disk drive and press RETURN. (The files from the Call Processing Software Disk are copied onto the hard disk drive. When finished, the monitor displays "Insert the Printer Driver Disk (7) in the following drive".)
- (19) Remove the Call Processing Software Disk, then insert the Printer Driver Software Disk (disk 7) in the floppy disk drive and press RETURN. (A file from the Printer Driver Software Disk is copied onto the hard disk drive. When finished, the monitor displays: SETUP HAS NOW BEEN COMPLETED SUCCESSFULLY.)
- (20) Remove the Printer Driver Software Disk.
- (21) Turn OFF the *main* AC POWER switch.
- (22) Re-enable the "watchdog" timer by removing the jumper (short) from the 2-pin system status panel connector.
- (23) Reconnect the 7-pin system status panel cable to the 4-pin and 2-pin connectors on the front edge of the HDLC Card.
- (24) Turn ON the AC POWER switch on each power supply — main supply first. (Following the power-up diagnostics and the system download, the monitor eventually displays the Inter-Tel logo)

and the initial option screen — **DB Programming Setup.**

- (25) To access database programming, simply press the F3 key. Or, press ALT D to access the DB Programming pull-down menu and then select Programming Session by highlighting it (use the up or down arrow key, if necessary) and pressing RETURN. (The monitor displays a "Password Required" prompt.)
- (26) Enter the appropriate programming password and press RETURN. (The monitor displays the 416/832 Applications Menu.)
- (27) Check the database programming to ensure that the current system database has been retained. If it has not, reload the original system software (using the floppy disks provided with the original system), restore the saved database (using the back-up disk from step 1), then start the upgrade process over again.

C. CHANGING STANDARD-SIZE SYSTEM SOFTWARE WITHOUT AN EXISTING DATABASE TO EXPANDED SYSTEM SOFTWARE

12.6 The 416/832 System is shipped with the standard-size system software already installed on the hard disk drive. If an expansion cabinet is to be installed, the expanded system software must be installed in its place. To do this with software that does not have an existing database that needs to be saved, follow these steps:

- (1) Turn OFF the AC POWER switch on each power supply unit (main supply first).

CAUTION

Do not attempt to shortcut the following steps by using an MS-DOS disk to boot the system; the software installation will be unsuccessful.

- (2) Remove the 7-pin system status panel (display) cable from the 4-pin and 2-pin connectors on the front edge of the HDLC Card. (Refer to page 3-74 for a drawing of the HDLC Card.)
- (3) Disable the "watchdog" timer by placing a jumper on (shorting) the 2-pin system status panel connector.
- (4) Ensure that the programming monitor attached to the peripheral connector panel is plugged into an AC power source and turned on.
- (5) Turn ON the *main* AC POWER switch. (The monitor displays the system memory check.)

- (6) *If the PC Motherboard is equipped with the Phoenix Technologies Ltd. BIOS:* After the memory check is complete, but *before* the first full screen is displayed, press the SPACE BAR twice. (The monitor displays the C drive programming prompt "C:\>".)

If the PC Motherboard is equipped with the AMI (American Megatrends Inc.) BIOS: After the memory check is complete and *while* the System Configuration box is displayed, but *before* the rest of the first full screen is displayed, press the SPACE BAR twice. (The monitor displays the C drive programming prompt "C:\>".)

NOTE: If the space bar is pressed too early or too late, the C:\> prompt is not displayed. Turn OFF the AC POWER and start over.

- (7) Insert the Installation Disk (disk 1) in the floppy disk drive.
- (8) At the C:\> prompt, enter "a:" and press the RETURN (or ENTER) key. (The monitor displays the A drive programming prompt "A:\>".)
- (9) At the A:\> prompt, enter "setup" and press RETURN. (The monitor displays two installation options — full [F] or stand-alone/remote [S].)
- (10) Use the up or down arrow keys to highlight "F" and then press RETURN. (The monitor displays information concerning the setup program.)
- (11) After reading the information, press RETURN. (Depending on whether the system can recognize the type of monitor installed, the monitor either displays the determined hardware configuration or it displays a list of monitor types.)
- (12) *If the correct hardware configuration is displayed,* use the up or down arrow keys to highlight "No Change" and then press RETURN. (The monitor displays two database options — update [U] or install [I].)

If a list of monitor types is displayed:

- a. Use the up or down arrow keys to highlight "Hercules with high resolution monochrome display" and then press RETURN. (The monitor displays a list of keyboard types.)
- b. Use the up or down arrow keys to highlight "United States keyboard" and then press RETURN. (The monitor displays a list of pointing devices.)
- c. Use the up or down arrow keys to highlight "No mouse or other pointing device" and then press RETURN. (The monitor displays the selected hardware configuration.)

- d. Use the up or down arrow keys to highlight "No Change" and then press RETURN. (The monitor displays two database options — update [U] or install [I].)
- (13) Use the up or down arrow keys to highlight "I" and then press RETURN. (The monitor displays "WARNING!!! SETUP WILL DESTROY YOUR CURRENT DATABASE FILES".)
- (14) Press RETURN to continue. (The files from the Installation Disk are copied onto the hard disk drive. When finished, the monitor displays "Insert the Applications Setup Disk (2) in the following drive".)
- (15) Remove the Installation Disk, then insert the Applications Setup Disk (disk 2) in the floppy disk drive and press RETURN. (The files from the Applications Setup Disk are copied onto the hard disk drive. When finished, the monitor displays "Insert the Applications Software Disk (3) in the following drive".)
- NOTE: Do not change the displayed drive (A:).
- (16) Remove the Applications Setup Disk, then insert the Applications Software Disk (disk 3) in the floppy disk drive and press RETURN. (The files from the Applications Software Disk are copied onto the hard disk drive. When finished, the monitor displays "Insert the CP Software Disk (4) in the following drive".)
- (17) Remove the Applications Software Disk, then insert the Call Processing Software Disk (disk 4) in the floppy disk drive and press RETURN. (The files from the Call Processing Software Disk are copied onto the hard disk drive. When finished, the monitor displays "Insert the Appropriate Database Disk in the following drive".)
- (18) Remove the Call Processing Software Disk, then insert Database Disk - A (disk 5), Database Disk - B (disk 6), Database Disk - C (disk 7), or a customized database disk in the floppy disk drive and press RETURN. (The files from the database disk are copied onto the hard disk drive. When finished, the monitor displays "Insert the Printer Driver Disk (8) in the following drive".)
- NOTE: For more information on default database configurations A, B, and C (IMX systems only), refer to SPECIFICATIONS, page 2-18.
- (19) Remove the database disk, then insert the Printer Driver Software Disk (disk 8) in the floppy disk drive and press RETURN. (A file from the Printer Driver Software Disk is copied onto the hard disk drive. When finished, the monitor displays: SETUP HAS NOW BEEN COMPLETED SUCCESSFULLY.)
- (20) Remove the Printer Driver Software Disk.
- (21) Turn OFF the *main* AC POWER switch.
- (22) Re-enable the "watchdog" timer by removing the jumper (short) from the 2-pin system status panel connector.
- (23) Reconnect the 7-pin system status panel cable to the 4-pin and 2-pin connectors on the front edge of the HDLC Card.
- (24) Turn ON the AC POWER switch on each power supply — main supply first. (Following the power-up diagnostics and the system download, the monitor eventually displays the Inter-Tel logo and the initial option screen — DB Programming Setup.)
- (25) To access database programming, simply press the F3 key. Or, press ALT D to access the DB Programming pull-down menu and then select Programming Session by highlighting it (use the up or down arrow key, if necessary) and pressing RETURN. (The monitor displays a "Password Required" prompt.)
- (26) Enter the appropriate programming or password and press RETURN. (The monitor displays the 416/832 Applications Menu.)

D. INSTALLING STANDARD-SIZE SYSTEM SOFTWARE ON A BLANK HARD DISK DRIVE (IF NECESSARY)

12.7 If, for some reason, the hard disk drive installed in the equipment cabinet does not already have the system software installed, follow the procedure outlined below to install one of the standard-size system software packages.

NOTE: To install the system software, the hard disk drive must be properly formatted and must have MS-DOS 3.3, 5.0, 6.0, or 6.2 installed (if necessary, refer to Inter-Tel 256/832 Tech Tip No. 0001 for formatting instructions). If using a hard disk drive other than those sold specifically for use on the 416/832 System, the system may not operate properly.

- (1) Turn OFF the AC POWER switch.

CAUTION

Do not attempt to shortcut the following steps by using an MS-DOS disk to boot the system; the software installation will be unsuccessful.

- (2) Remove the 7-pin system status panel (display) cable from the 4-pin and 2-pin connectors on the front edge of the HDLC Card. (Refer to page 3-74 for a drawing of the HDLC Card.)
- (3) Disable the "watchdog" timer by placing a jumper on (shorting) the 2-pin system status panel connector.
- (4) Ensure that the programming monitor attached to the peripheral connector panel is plugged into an AC power source and turned on.
- (5) Turn ON the AC POWER switch. (The monitor displays the date prompt.)
- (6) At the date prompt, enter the correct date and press the RETURN (or ENTER) key. (The monitor displays the time prompt.)
- (7) At the time prompt, enter the correct time and press RETURN. (The monitor displays the C drive programming prompt "C>".)
- (8) At the C> prompt, enter "cd\dos" and press RETURN. (The monitor displays the C> prompt again.)
- (9) Insert the Installation Disk (disk 1) in the floppy disk drive.
- (10) At the C> prompt, enter "a:" and press RETURN. (The monitor displays the A drive programming prompt "A>".)
- (11) At the A> prompt, enter "setup" and press RETURN. (The monitor displays two installation options — full [F] or stand-alone/remote [S].)
- (12) Use the up or down arrow keys to highlight "F" and then press RETURN. (The monitor displays information concerning the setup program.)
- (13) After reading the information, press RETURN. (Depending on whether the system can recognize the type of monitor installed, the monitor either displays the determined hardware configuration or it displays a list of monitor types.)
- (14) *If the hardware configuration is displayed, use the up or down arrow keys to highlight "No Change" and then press RETURN. (The monitor displays the three (GMX) or four (IMX) default database options — A, B, C, or Personal.)*
If a list of monitor types is displayed:
 - a. Use the up or down arrow keys to highlight "Hercules with high resolution monochrome display" and then press RETURN. (The monitor displays a list of keyboard types.)
 - b. Use the up or down arrow keys to highlight "United States keyboard" and then press RETURN. (The monitor displays a list of pointing devices.)
 - c. Use the up or down arrow keys to highlight "No mouse or other pointing device" and then press RETURN. (The monitor displays the selected hardware configuration.)
 - d. Use the up or down arrow keys to highlight "No Change" and then press RETURN. (The monitor displays the three (GMX) or four (IMX) default database options — A, B, C, or Personal.)
- (15) Use the up or down arrow keys to highlight the desired default database option and then press RETURN. (The files from the Installation Disk are copied onto the hard disk drive. When finished, the monitor displays "Insert the Applications Setup Disk (2) in the following drive".)
NOTE: For more information on default database configurations A, B, and C (IMX systems only), refer to SPECIFICATIONS, page 2-18.
- (16) Remove the Installation Disk, then insert the Applications Setup Disk (disk 2) in the floppy disk drive and press RETURN. (The files from the Applications Setup Disk are copied onto the hard disk drive. When finished, the monitor displays "Insert the Applications Software Disk (3) in the following drive".)

NOTE: Do not change the displayed drive (A:).

- (17) Remove the Applications Setup Disk, then insert the Applications Software Disk (disk 3) in the floppy disk drive and press RETURN. (The files from the Applications Software Disk are copied onto the hard disk drive. When finished, the monitor displays "Insert the CP Software Disk (4) in the following drive".)
- (18) Remove the Applications Software Disk, then insert the Call Processing Software Disk (disk 4) in the floppy disk drive and press RETURN. (The files from the Call Processing Software Disk are copied onto the hard disk drive. When finished, the monitor displays "Insert the Appropriate Database Disk in the following drive".)
- (19) Remove the Call Processing Software Disk, then insert Database Disk - A & B (disk 5), Database Disk - C (disk 6), or a customized database disk in the floppy disk drive and press RETURN. (The files from the database disk are copied onto the hard disk drive. When finished, the monitor displays "Insert the Printer Driver Disk (7) in the following drive".)

NOTE: For more information on default database configurations A, B, and C (IMX systems only), refer to SPECIFICATIONS, page 2-18.

- (20) Remove the database disk, then insert the Printer Driver Software Disk (disk 7) in the floppy disk drive and press RETURN. (A file from the Print-

er Driver Software Disk is copied onto the hard disk drive. When finished, the monitor displays: SETUP HAS NOW BEEN COMPLETED SUCCESSFULLY.)

- (21) Remove the Printer Driver Software Disk.
- (22) Turn OFF the AC POWER switch.
- (23) Re-enable the "watchdog" timer by removing the jumper (short) from the 2-pin system status panel connector.
- (24) Reconnect the 7-pin system status panel cable to the 4-pin and 2-pin connectors on the front edge of the HDLC Card.
- (25) Turn ON the AC POWER switch. (Following the power-up diagnostics and the system download, the monitor eventually displays the Inter-Tel logo and the initial option screen — DB Programming Setup.)
- (26) To access database programming, simply press the F3 key. Or, press ALT D to access the DB Programming pull-down menu and then select Programming Session by highlighting it (use the up or down arrow key, if necessary) and pressing RETURN. (The monitor displays a "Password Required" prompt.)
- (27) Enter the appropriate programming or password and press RETURN. (The monitor displays the 416/832 Applications Menu.)

E. INSTALLING EXPANDED SYSTEM SOFTWARE ON A BLANK HARD DISK DRIVE (IF NECESSARY)

12.8 If, for some reason, the hard disk drive installed in the equipment cabinet does not already have the system software installed, follow the procedure outlined below to install the expanded software package.

NOTE: To install the system software, the hard disk drive must be properly formatted and must have MS-DOS 3.3, 5.0, 6.0, or 6.2 installed (if necessary, refer to Inter-Tel 256/832 Tech Tip No. 0001 for formatting instructions). If using a hard disk drive other than those sold specifically for use on the 416/832 System, the system may not operate properly.

- (1) Turn OFF the AC POWER switch on each power supply unit (main supply first).

CAUTION

Do not attempt to shortcut the following steps by using an MS-DOS disk to boot the system; the software installation will be unsuccessful.

- (2) Remove the 7-pin system status panel (display) cable from the 4-pin and 2-pin connectors on the front edge of the HDLC Card. (Refer to page 3-74 for a drawing of the HDLC Card.)
- (3) Disable the "watchdog" timer by placing a jumper on (shorting) the 2-pin system status panel connector.
- (4) Ensure that the programming monitor attached to the peripheral connector panel is plugged into an AC power source and turned on.
- (5) Turn ON the *main* AC POWER switch. (The monitor displays the date prompt.)
- (6) At the date prompt, enter the correct date and press the RETURN (or ENTER) key. (The monitor displays the time prompt.)
- (7) At the time prompt, enter the correct time and press RETURN. (The monitor displays the C drive programming prompt "C>".)
- (8) At the C> prompt, enter "cd\dos" and press RETURN. (The monitor displays the C> prompt again.)
- (9) Insert the Installation Disk (disk 1) in the floppy disk drive.
- (10) At the C> prompt, enter "a:" and press RETURN. (The monitor displays the A drive programming prompt "A>".)
- (11) At the A> prompt, enter "setup" and press RETURN. (The monitor displays two installation options — full [F] or stand-alone/remote [S].)
- (12) Use the up or down arrow keys to highlight "F" and then press RETURN. (The monitor displays information concerning the setup program.)
- (13) After reading the information, press RETURN. (Depending on whether the system can recognize the type of monitor installed, the monitor either displays the determined hardware configuration or it displays a list of monitor types.)
- (14) *If the hardware configuration is displayed, use the up or down arrow keys to highlight "No Change" and then press RETURN. (The files from the Installation Disk are copied onto the hard disk drive. When finished, the monitor displays "Insert the Applications Setup Disk (2) in the following drive".)*
If a list of monitor types is displayed:
 - a. Use the up or down arrow keys to highlight "Hercules with high resolution monochrome display" and then press RETURN. (The monitor displays a list of keyboard types.)
 - b. Use the up or down arrow keys to highlight "United States keyboard" and then press RETURN. (The monitor displays a list of pointing devices.)
 - c. Use the up or down arrow keys to highlight "No mouse or other pointing device" and then press RETURN. (The monitor displays the selected hardware configuration.)
 - d. Use the up or down arrow keys to highlight "No Change" and then press RETURN. (The files from the Installation Disk are copied onto the hard disk drive. When finished, the monitor displays "Insert the Applications Setup Disk (2) in the following drive".)
- (15) Remove the Installation Disk, then insert the Applications Setup Disk (disk 2) in the floppy disk drive and press RETURN. (The files from the Applications Setup Disk are copied onto the hard disk drive. When finished, the monitor displays "Insert the Applications Software Disk (3) in the following drive".)
NOTE: Do not change the displayed drive (A:).
- (16) Remove the Applications Setup Disk, then insert the Applications Software Disk (disk 3) in the floppy disk drive and press RETURN. (The files from the Applications Software Disk are copied onto the hard disk drive. When finished, the

- monitor displays "Insert the CP Software Disk (4) in the following drive".)
- (17) Remove the Applications Software Disk, then insert the Call Processing Software Disk (disk 4) in the floppy disk drive and press RETURN. (The files from the Call Processing Software Disk are copied onto the hard disk drive. When finished, the monitor displays "Insert the Appropriate Database Disk in the following drive".)
- (18) Remove the Call Processing Software Disk, then insert the Database Disk - A (disk 5), Database Disk - B (disk 6), Database Disk - C (disk 7), or a customized database disk in the floppy disk drive and press RETURN. (The files from the database disk are copied onto the hard disk drive. When finished, the monitor displays "Insert the Printer Driver Disk (8) in the following drive".)
- NOTE: For more information on default database configurations A, B, and C (IMX systems only), refer to SPECIFICATIONS, page 2-18.
- (19) Remove the database disk, then insert the Printer Driver Software Disk (disk 8) in the floppy disk drive and press RETURN. (A file from the Printer Driver Software Disk is copied onto the hard disk drive. When finished, the monitor displays: SETUP HAS NOW BEEN COMPLETED SUCCESSFULLY.)
- (20) Remove the Printer Driver Software Disk.
- (21) Turn OFF the *main* AC POWER switch.
- (22) Re-enable the "watchdog" timer by removing the jumper (short) from the 2-pin system status panel connector.
- (23) Reconnect the 7-pin system status panel cable to the 4-pin and 2-pin connectors on the front edge of the HDLC Card.
- (24) Turn ON the AC POWER switch on each power supply — main supply first. (Following the power-up diagnostics and the system download, the monitor eventually displays the Inter-Tel logo and the initial option screen — DB Programming Setup.)
- (25) To access database programming, simply press the F3 key. Or, press ALT D to access the DB Programming pull-down menu and then select Programming Session by highlighting it (use the up or down arrow key, if necessary) and pressing RETURN. (The monitor displays a "Password Required" prompt.)
- (26) Enter the appropriate programming or password and press RETURN. (The monitor displays the 416/832 Applications Menu.)

13. PARKING THE HEADS ON MFM-TYPE HARD DISK DRIVES

13.1 Before powering down the system when using an MFM-type hard disk drive, always, "park the heads" on the hard disk drive using the following procedure. This moves the heads off of the hard disk and helps to prevent damage to the disk when the system is powered back up.

NOTE: IDE-type (Quantum Pro-Drive 40AT) hard disk drives are equipped with "self-parking" heads. Do not attempt to park the heads on a hard disk drive that has self-parking heads.

- (1) Exit to DOS by performing these steps:
 - a. While the Inter-Tel logo and initial option screen is displayed, press the SHIFT, CTRL (control), and X keys all at the same time. (The monitor displays "Are you sure you wish to exit Applications?")
 - b. **EITHER**, press RETURN to exit the 416/832 Applications program. (The monitor displays the "C:\AP>" programming prompt.)

NOTE: When the 416/832 Applications program is exited, a five minute timer begins. If the system is not powered down (or returned to the Applications program) before the timer expires, the system will perform a major reset.

OR, press TAB and then press RETURN to cancel the exit.

- (2) At the C:\AP> prompt:

EITHER, enter "secure" and press RETURN to park the heads. (The monitor displays "OK to power down" or other similar message.)

OR, enter "int416" or "gmx416" (or "int832" or "gmx832") and press RETURN to return to the 416/832 Applications program without parking the heads. (Disregard the next step.)
- (3) Turn OFF the AC POWER switch. When power is restored, the system download returns the hard disk drive to normal operation.

14. RECOMMENDED DATABASE SAVE PROCEDURE

14.1 As a precaution, the 416/832 System database should be saved (backed up) prior to any planned shutdown of the system. If a problem should occur, the database can then be restored. To save the database, follow these steps:

- (1) Properly format a double sided/high density floppy disk as outlined on page 5-168 of the manual.
- (2) Save the current system database as outlined on page 5-168 of the manual.
- (3) Using a soft-tipped marking pen, label the floppy disk with the current date and time.
- (4) Store the floppy disk in a dry, temperate environment. Avoid direct sunlight and extreme heat or cold.
- (5) For added security, repeat steps 1 through 4 and store the second floppy disk in a different location.

15. PREVENTATIVE MAINTENANCE

15.1 For optimal system performance, periodically conduct the following preventative maintenance routines:

- **Clean and Dust** — To ensure proper air circulation and reduce excess heat, clean and dust the ventilation slots on the equipment cabinet, the mesh screen on the power supply chassis, and the components on the computer and telecom circuit cards.
- **Check Component Connections** — Ensure that all components on the computer and telecom circuit cards are seated securely in their sockets and that no pins are bent.
- **Check Card Connections** — Ensure that all computer and telecom circuit cards are seated securely in their appropriate card slots.
- **Check Cable Connections** — Ensure that all system power and interface cables are properly connected.
- **Check System Voltages** — Ensure that all system power supply voltages are within tolerance, as outlined on page 3-103.

16. POST-INSTALLATION CHECKLIST

16.1 To ensure that the system has been installed properly, review the installation outline on page 3-3. Then review the items in the following list as a final check.

- Equipment cabinet, MDF, and station locations, and cable runs meet environmental requirements and cable lengths are within loop limits.
- Ferrite beads are installed on all station, trunk, and RS-232-C cables.
- Bridging clips are installed where required on all MDF blocks.
- Gas discharge tubes with silicon avalanche suppressors are installed on the trunks for lightning protection. Also, if extra protection is desired, the cable between the telephone company RJ-type block(s) and the gas discharge tubes is at least 75 feet long.
- If off-premises extensions are used, OPX or customer-provided circuits, and OPX repeaters (if needed), are connected at the MDF.
- The equipment cabinet is attached to an approved earth ground.
- The system power supply is plugged into an isolated, dedicated AC outlet, and no other equipment has been plugged into the same outlet. An extension cord was *not* used. A voltage surge/spike protector is installed to reduce the effects of AC voltage surges and spikes that can cause system malfunctions, false logic, and/or damage to the electronic components.
- Power supply voltages are in tolerance.
- Amphenol-type connectors, modular jack connectors, and station instrument line cords are all connected securely. All keyset, DSS/BLF Unit, Attendant Computer Console, single-line, and play-back device stations are working properly.
- All optional equipment is properly installed and working correctly (for example, printer has paper and ribbon, radio is tuned to a station, etc).
- CO dial tone is present and calls can be placed and received using all trunks. (Refer to FEATURES and PROGRAMMING for configuring the system and for programming outgoing access, allowed answer, and ring in.)
- After programming the system, the database is backed up onto floppy disks. (Refer to the PROGRAMMING section for details.)

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1. INTRODUCTION

1.1 The 416/832 System, in addition to its sleek, modular appearance and easy installation and programming, provides over 200 user-friendly features. To describe the system features, this FEATURES section has been divided into the following sections:

- **Accessing the Features:** This section contains a list of the feature codes and their definitions.
- **System Organization:** This section describes possible attendant arrangements, automated attendants, tenant groups and hunt groups.
- **Trunk Features:** This section explains the trunk functions and programmable features, including: dual-tone multi-frequency (DTMF) or dial-pulse signaling; outgoing access, allowed-answer, and ring-in assignments; day and night modes of operation; trunk and toll restriction; trunk group assignments; Least-Cost Routing (LCR); T1; E&M; Direct Inward Dialing (DID); Direct Inward System Access (DISA); trunk maintenance; and loop and ground start trunks.
- **Station Instruments:** This section describes the station instruments of the 416/832 System. Available station instruments include keysets, single-line sets, Direct Station Selection/Busy Lamp Field (DSS/BLF) Units, and Attendant Computer Consoles.
- **Intercom, Outside, and General Call Processing Features:** Several sections explain the use of the station features that are available to all station users, including intercom call features, outside call features, and general call processing features.
- **Attendant Features:** This section explains the special attendant-only features and the use of the DSS/BLF Unit. Attendant Computer Console instructions are covered in the manual included with the console unit.
- **Record Keeping and Maintenance Features:** For record keeping purposes, the 416/832 System offers station message detail recording (SMDR) and station message detail accounting (SMDA). A system error reporting feature provides self-diagnostic information to make the system more reliable and easier to service.

2. ACCESSING THE FEATURES

A. FEATURE CODES

2.1 Each of the station features is assigned a feature code. Using the station's keypad, these codes are entered to access trunks, process calls, and use special features. Complete explanations of the features and instructions for using them are covered later in this section of the manual.

2.2 The codes shown on the following pages are the values that are assigned when the system is in the default state. If desired, they can be changed in database programming to any one- to four-digit value.

CAUTION

Changing a feature code may affect the accessibility of other feature codes. See PROGRAMMING, page 5-59, for details.

B. FEATURE KEYS

2.3 Keysets, Enhanced Single-Line Sets (ESLSs), and Single-Line Instruments (SLIs) have feature keys that allow one-key dialing of feature codes. Information is programmed in the database to determine the arrangement of the feature keys and their default values. If desired, some of the keyset feature keys can be designated as user-programmable keys. All ESLS and SLI feature keys (except the FLASH key) are user-programmable.

C. SPCL AND FLASH KEYS

2.4 In some instances, feature codes are entered immediately after lifting the handset or pressing the SPKR key. Other times, the user must signal the system by pressing a designated key before entering the feature code. Keyset users signal the system by pressing the SPCL key. ESLS and SLI users press the FLASH key, and single-line DTMF set users perform a hookflash (press and release the hookswitch quickly). If the user does not enter a code or begin dialing before the Dial Initiation timer expires, the system sends reorder tones.

2.5 There is a system-wide option that, if enabled, allows keyset users to dial trunk access codes and feature codes without lifting the handset or pressing the SPKR or SPCL key. This programmable feature is called "hot dial pad" to indicate that the dial pad keys are always activated.

D. TRUNK ACCESS CODES

2.6 The feature codes used to access trunks are listed below.

FEATURE NAME	CODE	DEFINITION
Automatic Trunk Selection	89	Answers the call that has been ringing or holding the longest at that station. Refer to page 4-31 for the priority list. Or, if no call is ringing or holding, the highest-numbered available auto trunk is selected for an outgoing call. (Keysets use the ANSWER key)
Least-Cost Routing	9	Allows the system to select the desired route for placing a call, as programmed in the database. (Keysets use the OUTGOING key or a call key, ESLs use the OUT key, and SLs use the LCR key)
Select Trunk Group 1-89	801-889	Selects an available trunk from a programmed group of trunks for placing an outside call. (These are the only default trunk group codes. However, there can be up to 142 trunk groups.)

E. GENERAL FEATURE CODES

2.7 The following pages list the general feature codes. These feature codes may be used at any station. When a default feature key can be used in place of the feature code, it is indicated at the end of the explanation. Refer to pages 4-46 and 4-49 for listings of the default feature keys.

FEATURE NAME	CODE	DEFINITION
Automatic Trunk Answer	350	Station users with allowed answer can pick up trunks that are ringing into the system, but are not actually ringing at the stations themselves. This feature does not pick up transferred calls or recalls that are ringing at the station.
Background Music Channel Selection	318	Allows the keyset user to select the music channel that will be heard when background music is enabled at the station, or when placed on hold by another station user. Allows single-line set user to select the music channel that will be heard when the station is placed on hold by another user.
Call Forward — All Calls	355	Immediately forwards all calls to another station or to an outside telephone number. (Keysets use the FWD key)
Call Forward — If Busy	357	Immediately forwards all calls to another station or to an outside telephone number when the station is in use. (Can be assigned to the keyset FWD key)
Call Forward — If No Answer	356	Forwards all calls to another station or to an outside telephone number if not answered within a predetermined time. (Can be assigned to the keyset FWD key)
Call Forward — If No Answer/Busy	358	Forwards all calls to another station or to an outside telephone number if not answered within a predetermined amount of time, or immediately if the station is in use. (Can be assigned to the keyset FWD key)
Call Forward — Cancel Any	359	Cancels any call forward request.
Call Splitting (Single-Line)	337	Allows the single-line station user to return to calls on individual hold, in the order they were placed on hold. (Keysets use the call and/or individual trunk keys and the HOLD key)

FEATURE NAME	CODE	DEFINITION
Cancel Current Message	379	Cancels a message waiting indication that is waiting at the station without requiring the user to respond to it. (Keysets use the asterisk [*] key)
Cancel Misc. Operations	395	This single feature code cancels Do-not-disturb, Hunt Group Remove, Page Remove, Call Forwarding, Disable Handsfree, Background Music, and Queue Request features.
Conference	5	Connects from three to eight parties in a conference. A conference consists of at least two stations and an outside caller, one station and two outside callers, or three stations. (Keysets and ESLs use the CNF key)
Do-Not-Disturb	370	Halts all intercom calls, transferred calls, and pages pages to the station. The cancel code returns the station to normal operation. The on/off code can be used to turn do-not-disturb on or off. (Keysets use the DND key)
Do-Not-Disturb Cancel	371	
Do-Not-Disturb Mode On/Off	372	
Feature Key Default	325	Keysets, ESLs, and SLIs have user-programmable feature keys that can be set to access feature codes. The keys can be set to the defined default values or they can be programmed individually. Display keyset users can view key assignments.
Feature Key Display	326	
Feature Key Programming	327	
Hold — Individual	336	Places a call on hold so that it can be directly accessed only at that station or accessed through a reverse transfer from any other station. (HOLD key)
Hookflash	330	Sends a timed hookflash over the trunk while on an outside call.
Hunt Group Remove	322	Removes the station from the hunt group or places it in again. Does not affect non-hunt group calls. The on/off feature code can be used to toggle the feature on or off, and it can be assigned to a single feature key.
Hunt Group Replace	323	
Hunt Remove/Replace On/Off	324	
Message	365	This feature code is used for leaving and retrieving a message waiting indication at a called station or the called station's message center. Depending on how the message was left, the called station user can retrieve the message from his/her message center or from the station that left the message. (Keysets and ESLs use the MSG key)
Message — Cancel	366	Allows the station user to cancel a message waiting indication that he or she left at another station.
Message — Silent	378	Leaves a message waiting indication at a station without first placing an intercom call.
Optional Account Code	390	Allows the station user to enter an optional account code for SMDR and SMDA reports during an outside call. Also used for entering a class-of-service account code before placing a call (if class-of-service account codes are enabled).
Page	7	When followed by a paging zone code, it allows announcements to be made through keyset speakers and/or external paging speakers. (Keysets use the PAGE key)
Private CO Call	369	Allows station users to invoke call privacy on an outside call when privacy release is enabled system-wide.

FEATURE NAME	CODE	DEFINITION
Queue Request	6	Requests an automatic callback when a busy trunk or station becomes available. The cancel code terminates a queue request. (Keysets and ESLs use the QUE key)
Queue Request Cancel	376	
Redial	380	Redials the last outside telephone number dialed or saved at the station (up to 48 digits). Also used to save numbers at keysets programmed for last number saved. (Keysets and ESLs use the REDIAL key, SLIs use the REDL key)
Reverse Transfer (Call Pick-Up)	4	Picks up a call ringing or holding at another station. Also used for the Group Call Pick-Up feature to pick up calls that are ringing at a hunt group pilot number or hunt group station.
Ring Intercom Always	367	Programs the station to always place private (non-handsfree) intercom calls. The cancel code allows the station to again place handsfree calls. The on/off feature code can be used to toggle the feature on or off, and it can be assigned to a single feature key.
Ring Intercom Always Cancel	368	
Ring Intercom Always On/Off	377	
Software Version Number	385	<i>(Can be entered by a Voice Computer DTMF single-line port only)</i> If DTMF feedback and extended DTMF tones are enabled, this generates a four-digit DTMF code that indicates the last four digits of the software part number. It is used by voice processing software to ensure that the system software is compatible with the voice processing features.
Station Exchange	303	Allows a station user to perform an exchange between two station circuits by swapping their extension numbers. All database and station programming follows the extension numbers. A password is required when this feature is used.
Station Speed Dial	382	Dials/programs one of the 10 station speed-dial telephone numbers when followed by a location code (0-9). (Keysets have IC/CO Speed-Dial [SD] keys, ESLs have PGM STN and STN SPD keys, SLIs have STN SPD key)
Station Speed Dial Programming	383	
System Speed Dial	381	Dials one of the system or tenant-specific speed-dial telephone numbers when followed by a location code (000-399 on standard systems, 000-499 on expanded systems). Also used for reviewing system or tenant-specific speed-dial numbers at stations and for programming at the designated keyset. (Digital keysets, IMX 12/24-line keysets, 24-line DVKs, and ESLs have SYS SPD key)
Transfer CO Call	345	Transfers an outside call to another station or to an outside telephone number. (Keysets use XFR key)
Transfer Intercom Call	346	Transfers an intercom call to another station or to an outside telephone number.
Transfer to Hold	347	Transfers a call to another station and places it on individual hold so that it does not ring or send call waiting signals while holding (but will ring at the station when recalling).

F. KEYSSET-ONLY FEATURE CODES

2.8 The following pages list the keyset-only feature codes. Most of them can be used at any keyset station; however, some codes require a display and some require a Data Port Module.

FEATURE NAME	CODE	DEFINITION
Digital, AIM, DVK Keyset — Default Volume	394	Sets the volume levels on the audio interface module of the digital, AIM, and DVK keysets to the database-defined default values.
Automatic Intercom Access	362	Allows the keyset user to determine how ringing intercom calls will be answered: simply by lifting the handset (automatic access), or by lifting the handset and pressing the IC key. The on/off feature code can be used to toggle the feature on or off and it can be assigned to a single feature key.
Automatic Intercom Access Cancel	363	
Automatic Intercom Access On/Off	364	
Automatic Trunk Access	360	Allows the keyset user to determine how ringing outside calls will be answered: simply by lifting the handset (automatic access), or by lifting the handset and pressing a call key, individual trunk key, or the ANSWER key. The on/off feature code can be used to toggle the feature on or off and it can be assigned to a single feature key.
Automatic Trunk Access Cancel	361	
Automatic Trunk Access On/Off	374	
Background Music On/Off	313	Turns on and off background music heard through the keyset speaker. (MUSIC key)
Barge	397	Connects the keyset user to an ongoing call at the called station, if the Barge option is enabled.
Call Splitting (Keyset)	338	When transferring a call, the keyset user can toggle between the call being transferred and the called party by entering this code.
Data	340	Allows operation of a data device attached to a keyset with an installed Data Port Module. Requires a Data Port Module and a modem- equipped data device. (DATA key)
Data Port Monitor	341	Permits the keyset user to lift the handset and monitor a data transmission when the data port is in use, without affecting the transmission. Requires a Data Port Module and a modem-equipped data device.
Date and Time Display	300	Displays the system date and time, user name, and extension number during a call or when other displays are shown.
Do-Not-Disturb Override	373	If enabled in the database, allows the keyset user to break through another station's do-not-disturb mode to place an intercom call to the station that is in do-not-disturb.
Handsfree Disable	310	Disables/enables the keyset's handsfree intercom answering. Incoming intercom calls ring as private calls if handsfree answering is disabled. The on/off feature code can be used to toggle the feature on or off, and it can be assigned to a single feature key.
Handsfree Enable	311	
Handsfree On/Off	319	
Headset Enable	315	The enable code signals the system that a headset has been connected to the keyset. The disable code returns the keyset to normal operation. The on/off feature code can be used to toggle the feature on or off, and it can be assigned to a single feature key.
Headset Disable	316	
Headset Mode On/Off	317	

FEATURE NAME	CODE	DEFINITION
Hold — System	335	Places an outside call on system hold. It can be picked up directly at any keyset that has an individual trunk key for that trunk or by the station that placed it on hold (by pressing the flashing call or individual trunk key). The hold flash can only be seen at other stations if they have an individual trunk key for that trunk. (Cannot be used on intercom calls. If used on conference calls, the system places the parties on individual hold.)
Microphone Mute On/Off	314	Turns the microphone on or off during a call. If off (muted), the keyset user can hear the other party, but the party cannot hear the keyset user. (MUTE key)
Page Remove	332	Halts pages through the keyset speaker or allows them to be received again. The on/off feature can be used to toggle the feature on or off, and it can be used to assign the feature to a single feature key.
Page Replace	333	
Page Remove/Replace On/Off	334	
Redial Mode — Last Number Dialed	320	Programs the keyset redial mode to store either the last outside telephone number dialed or the last outside telephone number saved.
Redial Mode — Last Number Saved	321	
Release	339	If on a speakerphone call (intercom or outside), entering this feature code disconnects the call and returns the keyset to the idle state. If using the handset, entering this code disconnects the call and returns the keyset to dial tone.
Reminder Message	305	The keyset user can set reminder messages that signal the station at specific times. Or, the user can cancel all reminder messages at the station.
Reminder Message Cancel	306	
Ring Tone Selection	328	Selects the type of ringing alert tone that will be heard from the keyset.
Speakerphone On/Off	312	Turns the keyset speakerphone on or off for on-hook dialing, conversation, and monitoring. (SPKR key)
Station Monitoring	396	Allows a designated hunt group supervisor to monitor a station-to-outside call of anyone in the associated hunt group.
System Directory — Intercom	307	Allows display keyset users to search for system extension numbers and user names. The number can then be dialed, if desired.
System Directory — Outside	308	Allows display keyset users to search for system and/or tenant specific speed-dial numbers and names. The number can then be dialed, if desired.
System Feature Directory	309	This feature code is entered when an Executive Keyset user presses the OTHER FEATURES menu key. It displays a list of features that can then be selected by pressing the associated menu keys.

G. ATTENDANT FEATURE CODES

2.9 The following feature codes may be used only at designated attendant stations. Non-attendant station users hear reorder tones if they attempt to use these feature codes.

FEATURE NAME	CODE	DEFINITION
Cancel All DND Requests	012	Cancels Do-Not-Disturb and/or Call Forwarding for all stations or individual stations that are served by that attendant depending on the feature code used.
Cancel All Station FWD Requests	013	
Cancel All Station DND/FWD Requests	014	
Cancel Station DND Request	015	
Cancel Station FWD Request	016	
Cancel Station DND/FWD Request	017	
Clear System Alarm	019	Cancels a system alarm display.
Database Programming Enable	029	Allows the weekly toll limit information to be programmed in the database.
Feature Directory	009	This feature code is entered when an Executive Keyset user presses the ADMIN FEATURES menu key. It displays a list of features that can then be selected by pressing the associated menu keys.
Night Ring On/Off	010	Places system or tenant group in night mode or cancels night mode. While in night mode, the night toll and trunk restriction lists are used.
Paging Speaker Music On/Off	018	<i>(Primary Attendant Only)</i> Turns background music on or off to the external paging speaker(s). After the code is entered, the desired zone is indicated by entering a port number (1-9) or 0 to turn off all ports. NOTE: To help avoid confusion between zone and port numbers, program external port 1 into zone 1, external port 2 into zone 2, etc.
Program Station Data	022	Reprograms specific station data, including user name, tenant group and department, and serving attendant.
Program System DND Messages	024	Reprograms up to 19 of the 20 system do-not-disturb messages.
Program System Reminder Messages	023	Reprograms any or all of the 20 system reminder messages.
Program System Speed Dial	020	Programs system-wide or tenant-specific speed-dial numbers when followed by location codes (000-499). (Also accessed by the SYS SPD key — feature code 381.)
Remote Hunt Group Replace	032	Removes a station from its assigned hunt group(s) or places it in the hunt group(s) again.
Remote Hunt Group Remove	033	
Set Time of Day	021	Programs system time, date, and day of week.
SMDA	025	Generates a station message detail accounting (SMDA) report.
Trunk Maintenance	027	Removes a trunk from operation to allow service personnel to test and perform maintenance on the trunk. Can also be used to place the trunk back in service if the attendant has an individual trunk key for that trunk.
Remove All Trunks From Maintenance	028	Returns all trunks to operation that have been removed using the Trunk Maintenance feature.

H. EXTENSION NUMBERS

2.10 Extension numbers are recognized as feature codes by the system. When the system is in the default state, the extension numbers are assigned as follows:

Attendant	0
Stations	1000-1223 or 1000-1159 (depending on initial system configuration)
Hunt groups	2000-2039
Modem (MXC port)	2600

3. SYSTEM ORGANIZATION

3.1 The 416/832 System is designed to allow organization of the stations into groups. The following system features divide the system into manageable units for easier call processing and record keeping.

A. FLEXIBLE ATTENDANT ARRANGEMENTS

3.2 Attendants provide the following services for the stations they serve:

- Accessed by dialing "0"
- Central operators for incoming calls (if programmed for ring in)
- Message centers (if programmed)
- Recall stations for unanswered calls (day mode)
- Clear displayed system alarms
- Able to cancel Do-Not-Disturb and/or Call Forwarding for the stations they serve
- Program specific station information
- Program system do-not-disturb messages
- Program system reminder messages
- Program tenant-specific and system-wide speed-dial numbers
- Place the tenant group in night mode or day mode
- Set the system time of day, date, and day of week
- Place trunks out of service for maintenance purposes, and return them to service

3.3 In addition to the capabilities listed above, one attendant can be designated as the primary attendant who can:

- Place the entire system in night mode or day mode
- Program all system speed-dial numbers (including tenant-specific numbers), unless this ability has been assigned to another keyset
- Receive unsupervised outside call and hunt group recalls
- Turn background music on or off for the external paging speakers

3.4 All attendant stations should be equipped with display keysets to show system alarms and recall sources. If desired, each attendant's keyset can also be used with

one or more DSS/BLF Units for one-key intercom access to stations and for constant station/hunt group status indications. Or, attendant stations can be equipped with Attendant Computer Consoles.

One-Attendant Operation

3.5 One attendant (generally designated as the primary attendant) has control of all the attendant features listed in paragraphs 3.2 and 3.3. All trunks (except private trunks) are usually programmed to ring in at this attendant's station.

Multiple-Attendant Operation

3.6 The system can be assigned as many attendants as needed (limited by the number of equipped keyset stations in the system). For example, there may be one or more attendants to serve each tenant group. Trunk groups are programmed to ring at any or all attendant stations. One attendant is designated as the primary attendant. With this arrangement, either the primary attendant can serve as the only system alarm station, or every attendant can receive alarm messages.

B. OPTIONAL AUTOMATED ATTENDANT

NOTE: This feature is available only in the *Extended* software packages.

3.7 The automated attendant is a programmable feature that can be used to provide some of the services normally handled by an attendant. It allows an outside party to dial into the system and automatically access (or be transferred to) an automated attendant station, which is generally a playback device with a prerecorded message. After hearing the message, the caller is disconnected from the automated attendant and hears system dial tone. The caller may then directly dial a station extension number or hunt group pilot number.

3.8 Automated attendant stations are designated in database programming and can be assigned direct ring in for specific trunk groups. Any single-line circuit (except voice mail ports) can be assigned as an automated attendant station.

NOTE: Due to the natural characteristics of the trunk, the volume level of DTMF tones transmitted over the trunk may be substantially reduced before reaching the 416/832 System. This natural degradation in tone volume may adversely affect the reliability of the automated attendant feature. Other factors which can affect automated attendant performance are trunk noise, the quality of the playback device, and the quality and strength of the DTMF tones generated by the off-premises phone itself.

Automated Attendant Applications

3.9 There are a number of different uses for this feature. For example, direct ring-in calls to a busy attendant could be forwarded to an automated attendant (using one of the forwarding features). Another option is to have calls ring in directly to an automated attendant station when the system is in day and/or night mode. Or, a group of automated attendant stations could be assigned to one hunt group. In this situation, a call would ring in or be transferred to the hunt group pilot number where it would circulate until an available automated attendant station answers the call.

3.10 Another possibility is to assign an automated attendant station as an announcement or overflow station in an existing hunt group. Unlike standard announcement or overflow stations, the caller hears system dial tone after being disconnected, rather than being returned to the hunt group, and can dial an extension number.

Automated Attendant Call Processing

3.11 When a station receives a call that has been routed through the automated attendant, the call rings as a transferred call (but the display shows **CALL RINGING IN ON TRNK GRP XX**). If ringback tones are enabled, the caller hears ringing while the call is being transferred. If ringback is not enabled, the caller hears music (refer to **PROGRAMMING**, page 5-67).

3.12 If the called station is forwarded, the call follows the programmed forward. If the called station is busy or does not answer, the call is transferred to the automated attendant's designated recall station after the appropriate Transfer timer expires. If the designated recall station does not answer the call, it is disconnected after the Abandoned Call timer expires. If the automated attendant does not have a designated recall station, the call transfers to the called party's attendant after the appropriate Transfer timer expires.

3.13 When a hunt group pilot number receives a call that has been routed through the automated attendant, the call rings or circulates according to how the hunt group is programmed (i.e., linear, distributed, or all ring). The call is displayed as a direct ring-in call; however, the system actually processes the call as a transferred call. Refer to page 4-16 for more information on hunt group calls.

3.14 The caller cannot access trunks or any other feature through the automated attendant station. An attempt to do so automatically transfers the call to the automated attendant's attendant.

3.15 To avoid possible camp-on tone interruptions during calls, it is recommended that camp-on tones be disallowed for the automated attendant station.

3.16 Intercom calls to an automated attendant station are handled the same as normal intercom calls. After hearing the message, the caller is disconnected from the automated attendant and is returned to intercom dial tone. Intercom callers cannot use the automated attendant features.

Playback Devices

3.17 Playback devices are generally used at the automated attendant station(s). When an outside call rings in or is forwarded to an automated attendant, the playback device plays a message (giving dialing instructions) and then disconnects from the call. The caller hears system dial tone. If using a DTMF telephone, the caller can dial a station extension number or hunt group pilot number to access the desired station or hunt group, or dial "0" for the automated attendant's attendant. If an invalid number is dialed or the DTMF decoders are busy, the call is immediately transferred to the automated attendant's attendant. If using a rotary telephone or unsure of the extension number, the caller can wait for the automated attendant's attendant to automatically be called after the SL Dial Initiation timer expires.

3.18 Playback device installation is described in **INSTALLATION** on page 3-138. Trunk ring-in programming is described on page 5-106. Trunks should not be programmed to ring in to multiple playback devices. Use the call forwarding or hunt group feature if multiple playback devices are to be used.

NOTE: If the automated attendant does not have an assigned attendant, calls normally routed to the automated attendant's attendant will instead go to the primary attendant.

User-Operated Automated Attendant Station

3.19 If desired, a user-operated station can also be designated as an automated attendant station. In this situation, when a direct ring-in or transferred outside call is received, the station user answers the call, gives the necessary dialing information, and hangs up. The caller hears system dial tone and has the same options as described in paragraph 3.17. Instead of disconnecting from the call, the automated attendant station user can choose to transfer it, place it on hold, or use other call processing features. Simply hanging up on the call does not terminate it from the system.

Dialing During Recording

3.20 A database option allows the programmer to determine if the system will accept a caller's DTMF tones (dialed extension numbers or hunt group pilot numbers) while the automated attendant station is giving dialing instructions (rather than having to wait until they hear system dial tone after the automated attendant hangs up). If the option is enabled, callers who know the extension number of the station or hunt group they wish to call can dial the number any time after the automated attendant answers the call.

NOTE: The reliability of allowing callers to dial during the instructions may be affected by the voice characteristics of the person giving the instructions, the quality of the playback device, the trunk noise levels, the DTMF tone levels, etc. If frequent problems occur, this option should be disabled.

Automated Attendant Do-Not-Disturb Breakthrough

3.21 Direct ring-in calls are not blocked by do-not-disturb; they ring at the called station. However, the database contains an option that allows or disallows automated attendant (and DISA and voice mail) calls to break through do-not-disturb on a station-by-station basis.

- *If do-not-disturb breakthrough is allowed*, an unanswered call is transferred to the automated attendant's designated recall station after the appropriate Transfer timer expires.
- *If do-not-disturb breakthrough is disallowed*, calls through the automated attendant to a station in do-not-disturb are immediately sent to the automated attendant's designated recall station (or, if one does not exist, the called party's attendant).

3.22 Allowing a voice computer acting as an automated attendant to transfer calls to stations in do-not-

disturb permits the voice computer to disconnect from the call and then make a page announcement to alert the called party, if the unit has that capability. (DTMF feedback and extended DTMF tones must be enabled to use this option.)

Digit Translation

3.23 The automated attendant feature allows outside callers to access the system and directly dial extension numbers or hunt group pilot numbers. To simplify this process and to help prevent the system from having problems recognizing digits (due to trunk noise levels, DTMF tone levels, etc.), a feature called Digit Translation may be used. Digit translation allows callers to dial a single digit to access a designated extension number or hunt group pilot number. Up to ten digit translation storage locations (0-9) are available in database programming (refer to PROGRAMMING, page 5-38).

3.24 To use digit translation, the programmer enters an extension number or hunt group pilot number in the desired translation location (0-9). A caller accessing the system through the automated attendant can then dial the single-digit location number to reach the designated extension number or hunt group pilot number. For example, if the pilot number for a customer support group were entered in translation location number 3, the automated attendant's message would read something like: "Dial 3 for customer support." This is easier than dialing a four-digit number, leaves less room for user error, and helps to prevent trunk noise from causing the system to make digit recognition errors.

3.25 To allow callers to dial zero for the attendant or dial station extension numbers, it is recommended that translation location numbers 0 and 1 be left blank. For example, if location 1 is assigned pilot number 231, any automated attendant caller attempting to dial a station extension number that begins with "1" will instead be transferred to 231.

C. TENANT GROUPS

3.26 Tenant service allows the customized distribution of trunk groups and DID groups among multiple users sharing a common system and allows the attendant for each tenant group to place the associated trunk groups in day or night mode. (The primary attendant can place *all* trunk groups in day or night mode.) Trunk groups are assigned to the attendants on a tenant-by-tenant basis.

3.27 This form of partitioning is ideal in instances where several small businesses share a 416/832 System, or departments within a larger company wish to operate as separate identities for such purposes as account billing or budgeting. Along with the multiple tenant arrangements, each tenant group may be further divided into system departments.

3.28 Eight tenant groups can be established in a standard system (up to 12 in an expanded system), with up to 10 departments in each tenant group. Each station must be assigned to one (and only one) tenant group and one (and only one) department. When the system is in the default state, all stations are in tenant group 1, department 1. Assigning groups of stations to different depart-

ments can be useful for comparing the number and estimated cost of calls that each department makes and receives. See SMDA, page 4-115, for details.

3.29 In database programming, each system speed-dial number can be programmed for use by stations in a single tenant group or by all stations in the system. The attendant for each tenant group can then program the associated tenant-specific and system-wide speed-dial numbers.

3.30 Traffic (communication) between tenant groups can be allowed or denied in database programming. If cross-tenant conversations are denied, a station can only call other stations within its tenant group and calls cannot be transferred or forwarded between tenant groups. Therefore, if cross-tenant traffic is denied, each tenant group should be assigned its own attendant. Attendants can always call any station regardless of the cross-tenant traffic option selected. Direct ring-in or transferred outside calls to hunt groups with stations in more than one tenant group are also not affected by the cross-tenant traffic designation. However, if cross-tenant traffic is denied, hunt group stations not in the same tenant group as an intercom caller do not receive the incoming intercom call (this includes transferred intercom calls).

D. HUNT GROUPS

3.31 The hunt group feature permits calls to be placed to a group of stations and to be automatically transferred to an available station within the group. Up to 30 hunt groups can be programmed in a standard system and up to 40 in an expanded system. There is no limit to the number of members per hunt group, as long as there are no more than 680 hunt group members per system (800 in an expanded system). Hunt groups are accessed by dialing a special extension number called a pilot number (defaults to 2000-2029 or 2000-2039). Individual hunt group members can also be accessed using their assigned extension numbers.

3.32 Each hunt group is designated as one of the following two types:

- **Station hunt groups:** These hunt groups contain keyset and/or single-line stations.
- **Voice mail/voice computer hunt groups:** Voice computer hunt groups contain single-line circuits which are designated as voice mail/voice computer stations. These hunt groups can be assigned special dial rules that signal the voice computer unit to perform such tasks as dialing a voice mail access number or the called station's mailbox number (refer to page 4-21 for more information on voice mail groups).

Hunt Group Call Distribution

3.33 When an intercom or outside call is transferred or rings in to the pilot number, it either rings at all stations in the hunt group (all-ring) or circulates through the hunt group in linear or distributed order until answered, as described below.

- **All-ring:** Incoming calls ring simultaneously at all stations in the hunt group. If any station is busy, the call camps on to that station and sends call waiting signals while ringing at the other stations.
- **Linear order:** Incoming calls always start circulating by ringing at the first station on the list that is stored in the database. If that station is busy, or if there is no answer before the No Answer Advance timer expires, the call goes to the next station on the list.
- **Distributed order:** To even out the call load, distributed order shifts the starting point of each call. When a station user receives a call, the next station on the list receives the next incoming call. If a station is busy, or if there is no answer before the No Answer Advance timer expires, the call goes to the next station on the list.

3.34 The order in which hunt group stations receive incoming calls is determined by a list stored in the data-

base. A station can appear in a single list more than once and it can appear in multiple hunt group lists, if desired.

Hunt Group Call Processing

3.35 Hunt group stations receive the following indications on individual trunk keys when a call is ringing in (call keys will not show indications):

- If an outside call is ringing, each of the available hunt group stations in an all-ring hunt group or the designated station in a linear or distributed hunt group shows ring flash on the associated individual trunk key until the call is answered.
- If all stations are busy, an intercom or outside call will camp on and cause the system to send camp-on tones and display messages to all stations in the hunt group; the associated trunk key flashes. As soon as one station is available, the camp-on tone and message end, and the available station receives ringing (if the hunt group is set for linear or distributed ringing, the individual trunk key stops flashing at all other stations). Camped-on calls follow the recall route as described in paragraph 3.51.
- If every station in a linear or distributed hunt group, (or a single station in an all-ring hunt group), is in do-not-disturb or has hunt group remove enabled, an incoming call will flash on the associated individual trunk key. If all stations in an all-ring hunt group are in do-not-disturb, the trunk key flashes, but the stations do not ring. If all stations in an all-ring hunt group are forwarded, the call rings and the trunk key flashes.

3.36 Trunk groups (and DID numbers) can be programmed to ring in directly to either a pilot number or extension number(s). If assigned to a pilot number, ring in for the trunk group (or DID number) cannot be assigned to any other extension number(s).

3.37 Stations within the hunt group can receive direct trunk and DID ring-in, intercom, forwarded, or transferred calls to their individual extension numbers without affecting other stations in the hunt group.

3.38 Hunt group programming affects the Call Forwarding feature in the following ways:

- If a station in a hunt group is in call forward mode, the station will still receive hunt group calls.
- If an announcement or overflow station has call forward enabled, hunt group calls will not follow the forward, but will remain at the station. (An exception to this occurs when hunt groups are programmed with multiple announcement stations; refer to paragraph 3.47 on the next page.)
- Stations can forward calls to a hunt group's pilot number.

3.39 If cross-tenant traffic is denied, hunt group stations not in the same tenant group as an intercom caller do not receive the incoming intercom call.

3.40 If an outside call rings in or is transferred to a pilot number that does not have hunt group station assignments, the call is sent to the primary attendant. If a station user attempts to transfer an intercom call to an invalid pilot number, the call is placed on transfer hold; the intercom call can be re-accessed on a keyset by pressing IC key, or on a single-line set by hanging up to allow the call to recall and then lifting the handset again. A station user attempting to place an intercom call to an invalid pilot number will hear reorder tones.

3.41 When a DISA call or a call routed through the automated attendant rings at a hunt group member's station, it is displayed as a direct ring-in call; however, the system actually processes the call as a transferred call.

3.42 Hunt groups can be assigned as message centers and/or alternate message sources for individual stations.

Announcement And Overflow Stations

3.43 Two types of special stations can be programmed to help calls circulate through the hunt group more efficiently: hunt group announcement stations and hunt group overflow stations.

3.44 Announcement and overflow stations are not included in the hunt group list; they are individual stations or hunt groups that receive unanswered calls when all of the hunt group stations are unavailable. Announcement and overflow stations can be assigned to separate stations/hunt groups or they can be the same station/hunt group. Also, each of the hunt groups can have the same announcement and overflow stations or they can be assigned different stations.

3.45 When the database is in the default state, all unanswered *direct ring-in* outside calls to the hunt group go first to the announcement station and then to the overflow station. Unanswered calls that were *transferred* to the hunt group, by default, go only to the overflow station. However, there is a system option that can be enabled to send *all* unanswered hunt group calls first to the announcement station and then to the overflow station. See page 5-68 in PROGRAMMING.

3.46 **Announcement Stations:** When the hunt group receives a call (direct ring-in and/or transfer, depending on programming), it rings at all stations or circulates in linear or distributed order until it is answered or the Announcement timer expires. If the timer expires, the unanswered call is sent to one of up to three designated announcement stations. (Paragraph 3.51 explains how

unanswered calls are handled.) An announcement station can have the following types of devices:

- **Playback Device:** A playback device answers the call, plays a greeting and message, and then disconnects from the call. The call continues ringing in the hunt group while the playback device is handling the call. If a hunt group station answers the ringing call while it is at the playback device, the call will immediately leave the playback and be connected to the hunt group station.
- **Station, Voice Computer Group, or Hunt Group:** At this type of announcement station, a user greets the caller and, if desired, may return the call to the hunt group using the Call Transfer feature. *The call will not automatically return to the hunt group from a station, voice computer group, or hunt group announcement station.*
- **Automated Attendant:** An automated attendant playback device announcement station will answer the call, play its message, and then send the call to the extension or pilot number selected by the caller. Each direct ring-in call will transfer to the announcement station(s) only once.

3.47 To handle heavy incoming traffic, each hunt group can be programmed with up to three announcement stations (or a single hunt group as the announcement station). With multiple announcement stations, an unanswered call is sent to the first announcement station on the list (after the Announcement timer expires). If the first announcement station is unavailable (no answer or busy), the call is forwarded to the second announcement station, and so on. (The No Answer Advance timer determines how long a call will ring unanswered at an announcement station before moving to the next announcement station.) Once the call reaches the last announcement station on the list, it remains there until the Forward No Answer timer expires. It then forwards to the first announcement station on the list and starts the process over again until it reaches an available announcement station.

NOTE: If a keyset or single-line set (rather than a playback device) is part of a multiple announcement station list, all calls to the station are processed according to the programmed forward condition. The station user cannot cancel the forward unless the station is removed from the multiple announcement station list in database programming; any manual call forwarding at the station will be overridden.

3.48 **Overflow Stations:** When an outside call is transferred to a hunt group by the announcement station (or any attendant, an automated attendant, DISA, or any station, if programmed to bypass the announcement station), it rings at all stations or circulates in linear or dis-

tributed order until it is answered or the Overflow timer expires. If unanswered when the timer expires, the call is sent to an overflow station. The overflow station can use the following types of devices:

- **Hunt Group, Voice Computer Group, or Station:** The overflow station be another hunt group, a voice computer group, or a station not in the group. If the overflow station is a hunt group, voice computer group, or a station, the call can only ring at or circulate through the hunt group once, unless the overflow station transfers it back using the Call Transfer feature.
- **Playback Device:** If the overflow station is a playback device, the programmer can determine the number of times (1-127 or unlimited) that the call will be allowed to transfer back to the hunt group and then return to the overflow station. (After the determined number of returns, the call becomes a recall.) A playback device answers the call, plays a greeting and message, and then disconnects from the call. The call continues ringing in the hunt group while the playback device is handling the call. If a hunt group station answers the ringing call while it is at the playback device, the call will immediately leave the playback and be connected to the hunt group station.

3.49 A hunt group with a playback device overflow station can be programmed, using an overflow count of 0, so that overflow calls are sent directly back to the transferring station when the Overflow timer expires. This option is set by designating that the hunt group has a playback device overflow station, then programming the overflow for immediate recall, or not assigning an overflow station.

Hunt Group Timers

3.50 Three timers are programmed on a hunt group-by-hunt group basis: No Answer Advance timer, Announcement timer, and Overflow timer.

- **No Answer Advance:** Determines the amount of time a call will ring at a hunt group station (unanswered) before advancing to the next station on the list. The default value is 18 seconds. It can be programmed for 3-255 seconds.
- **Announcement:** This determines the amount of time a direct ring-in call will remain unanswered before it is sent to the hunt group's announcement station(s). The default value is 18 seconds. It can be programmed for 10-255 seconds.
- **Overflow:** This determines the amount of time a transferred outside call will circulate through the hunt group (unanswered) before being sent to the

hunt group's overflow station. The default value is 72 seconds. It can be programmed for 10-255 seconds.

Unanswered Hunt Group Calls

3.51 The path that an unanswered hunt group call follows is determined by the configuration of the hunt group, as outlined in the following paragraphs. Note that intercom calls (direct or transferred) will not transfer to the announcement or overflow stations, and transferred intercom calls will not recall.

- **Direct ring-in outside calls:**

— *With a playback device announcement station:* When a call rings in to a hunt group, it circulates through the hunt group until it is answered or the Announcement timer expires. When this timer expires, the unanswered call is picked up by the designated playback device announcement station that answers the call and plays a message. Meanwhile, the call continues circulating through the hunt group (unless it has been sent to a voice computer station). If it is answered by an available hunt group station while the announcement station is connected to the call, the call will leave the announcement station. Each call will transfer to the announcement station only once. If it remains unanswered when the Overflow timer expires, the call will be sent to the overflow station. Or, if there is no overflow station, the call will be sent to the recall destination station when the Recall timer expires.

— *With a non-playback announcement station:* When an unanswered direct ring-in call is sent to a non-playback announcement station (after the hunt group Announcement timer expires), the call remains at the announcement station until it is answered or the caller hangs up. After the announcement station user answers, the call is processed as a normal outside call (if desired, the call can be manually transferred back to the hunt group using the Call Transfer feature).

— *Without an announcement station:* A direct ring-in call rings at or circulates through the hunt group until answered or the caller hangs up; it is not sent to the overflow station, nor does it recall any attendant.

- **Transferred outside calls** (unless transfers are programmed to go to the announcement station as described in paragraph 3.45 on page 4-17):

— *With a playback device overflow station:* If the call is unanswered when the Overflow timer expires, the call is picked up by a playback device overflow station that answers the call and

plays a message. Meanwhile, the call continues circulating through the hunt group (unless it has been sent to a voice computer station). If the call is answered by an available hunt group station while the overflow station is connected to the call, the call will leave the overflow station. If the call remains unanswered after returning from the overflow station for the last time, the call returns to the hunt group until the Overflow timer expires, and then recalls the transferring station.

— *With a non-playback overflow station:* When an unanswered transferred outside call is sent to a non-playback overflow station, the call remains at the overflow station until it is answered or until the Recall timer expires; it then recalls the transferring station. If the call still remains unanswered, it recalls the transferring station's attendant.

— *Without an overflow station:* An unanswered transferred call circulates until the hunt group Overflow timer expires and then returns to the transferring station. If the call still remains unanswered, it recalls the transferring station's attendant.

NOTE: In all cases, if the transfer came from the announcement station or an automated attendant, it recalls the primary attendant.

● To avoid the Recall timers:

— A hunt group can be assigned as its own overflow station. The call will circulate through the hunt group until it is answered or the caller hangs up.

3.52 If a station that receives a recalling hunt group call chooses to transfer the call back to the hunt group, the call retains its original queue position in the hunt group. That is, it will be answered ahead of any calls that were received by the hunt group while the call was recalling. It will not go back to the end of the queue.

Hunt Group Remove/Replace And Do-Not-Disturb

3.53 Hunt group stations can temporarily halt hunt group calls by entering the Hunt Group Remove feature code as described below. Also, the Do-Not-Disturb feature can be used to block all incoming hunt group calls to a station. Announcement stations and overflow stations cannot block hunt group calls using the Do-Not-Disturb Or Hunt Group Remove features.

3.54 The Hunt Group Remove/Replace feature can also be controlled from the attendant's station using the Remote Hunt Group Replace feature code. See page 4-111.

3.55 When the Hunt Group Remove feature is enabled, the user will not hear ringing or receive the camp-on message display for calls to the hunt group unless it is in an all-ring hunt group. In linear and distributed hunt groups, the individual trunk key flashes only if all other hunt group members are unavailable — busy, in do-not-disturb, with calls forwarded, or with Hunt Group Remove enabled. (The station continues to receive calls placed to its extension number.) All-ring hunt group stations will receive ring flash but no display while in do-not-disturb or hunt group remove mode. Hunt group overflow and announcement stations cannot block hunt group calls.

3.56 TO REMOVE OR REPLACE THE STATION'S HUNT GROUP CALLS:

(1) **Keypad:** While on or off hook, press SPCL.

Single-Line Set: Lift the handset.

(2) Enter the Hunt Group Remove feature code (322) to halt hunt group calls or enter the Hunt Group Replace feature code (323) to return the station to its hunt group(s). Keypad users hear a confirmation tone, single-line sets users hear dial tone. (Or use the hunt group remove/replace on/off feature code [324] to toggle the hunt group mode on or off.)

(3) *If off hook,* hang up.

Station Call Monitoring

3.57 This feature allows hunt group supervisors to monitor the outside calls of anyone in a specified hunt group. It can be useful in training or in evaluating the performance of hunt group members.

NOTE: As a courtesy, hunt group members should be notified in advance that their calls may be monitored. In addition, a programmable option can be enabled that sends a tone to the station being monitored whenever the hunt group supervisor joins an ongoing call. (Note that call monitoring may be illegal in some locations. It is up to the end user to ensure that use of this feature is in compliance with local laws.)

3.58 In database programming, each hunt group can have one keypad assigned as the hunt group supervisor. This can be any keypad, even if it is not a member of the hunt group. If the supervisor is a member of the hunt group, the Hunt Group Remove/Replace feature can be used at any time without affecting the Station Monitor ability. If desired, one keypad can be assigned as the supervisor for more than one hunt group.

3.59 To monitor a hunt group member's call, the supervisor enters the Station Call Monitoring feature code and dials the desired extension number. The super-

visor is then connected to the ongoing call and can hear both parties, but cannot be heard by either one. If using a display keyset, the top line of the supervisor's display shows the hunt group member's extension number (or user name) and trunk number (or trunk identification). The bottom line of the supervisor's display shows the hunt group member's call cost information (just as it is on the hunt group member's display). If the monitored call is terminated, transferred, or placed on hold by the hunt group member, the monitor function is terminated.

3.60 In the associated hunt group, the supervisor may monitor any active CO-to-intercom call (both hunting and non-hunting), including incoming, outgoing, and DISA-to-intercom calls. Conference calls and calls that do not involve hunt group members cannot be monitored. Also, if privacy release is enabled system-wide and another keyset user joins an ongoing CO-to-intercom call that is being monitored (i.e., joins it by lifting the handset and pressing the busy individual trunk key), the call monitoring function is terminated.

3.61 If the supervisor attempts to monitor a station that is already being monitored or one that is not on an active CO-to-intercom call, the system sends reorder tones and allows the supervisor to dial another extension number. If the supervisor attempts to monitor a station that is not in the hunt group or an idle station in the hunt group, the system sends reorder tones and cancels the Station Call Monitor feature.

3.62 TO MONITOR A HUNT GROUP CALL (DESIGNATED SUPERVISOR ONLY):

(1) **To use the speakerphone:** While on hook, press SPCL and enter the Station Call Monitoring feature code (396). You hear a confirmation tone and the SPKR key lights.

To use the handset: Lift the handset and enter the Station Call Monitoring feature code (396). You hear a confirmation tone.

(2) Dial the extension number (or press the lit SD or DSS/BLF key) of the station to be monitored. You are automatically connected to the call and the display shows the intercom identification, trunk identification, and the monitored station's call cost information. The MUTE key lights.

(3) **To monitor another hunt group member's call:**

EITHER, Press SPCL, enter the Station Call Monitoring feature code (396), and dial the extension number (or press the SD key).

OR, Press the DSS/BLF key for another station without pressing SPCL or entering a feature code.

To terminate the monitor feature: *If off hook,* hang up. *If on hook,* press the SPKR key.

To place or receive a call: Press the IC key or an individual trunk or call key (or the ANSWER or OUTGOING key).

E. VOICE MAIL/VOICE COMPUTER HUNT GROUPS

3.63 Any hunt group can be designated as a voice computer hunt group. These hunt groups can be assigned special dial rules that signal the voice mail unit to perform such tasks as dialing a voice mail access number or the called station's mailbox number. (See page 4-16 for more information about hunt groups.)

3.64 The order in which the voice mail stations receive incoming calls (intercom, transferred, direct ring-in, and DISA calls) is determined by a list stored in the database. A station can appear in a single list more than once and it can appear in multiple lists, if desired. The station list is always checked in linear order.

3.65 If a call is not answered by the first station on the list before the No Answer Advance timer expires, the call is sent to the next station on the list. If the call remains unanswered when the Recall timer expires, it will recall the designated recall designation (or the primary attendant, if there is no recall destination specified in the database).

Recalls

3.66 A recall destination is assigned to voice computer hunt groups. The recall destination can be a station or another hunt group. If a call is transferred to a station by the voice computer, and the applicable Transfer timer expires, the call is sent to the designated recall destination. If a call is transferred to a hunt group by the voice computer, and the Overflow timer expires, the call is sent to the designated recall destination. (If there is no recall destination, it is sent to the primary attendant.)

DTMF Feedback Tones

3.67 If a station is designated for voice mail and is connected to a voice computer, the progress tones that are normally sent to the voice mail station can be replaced with DTMF "feedback" tones. These tones can be utilized by the voice computer to determine call status such as whether the call is ringing, has been answered, has been disconnected, or if the called station is in do-not-disturb, busy, or forwarded to an outside telephone number. If the voice mail unit cannot interpret the DTMF feedback tones, normal progress tones should be kept enabled.

3.68 If feedback tones are enabled, the "extended" set of feedback tones can also be enabled in system-wide programming. These extended tones include codes for indicating when a station is forwarded to another station and when the calling party hangs up.

Voice Mail/Computer Do-Not-Disturb Breakthrough

3.69 Calls through the voice computer (and DISA and automated attendants) can be allowed to ring at the station if it is in do-not-disturb. If disallowed, such calls will immediately transfer to the designated recall destination (or to the primary attendant, if no recall destination is specified).

3.70 Allowing voice mail/computers to transfer calls to stations in do-not-disturb permits the voice mail/computer to disconnect from the call and then make a page announcement to alert the called party, if the voice computer has that capability.

Voice Mail/Computer Dial Rules

3.71 The 416/832 System has the ability to support voice computers that can process codes which give detailed information about the status, origin, and destination of the call, and can dial feature codes. Refer to the manual provided with your voice computer to determine the dial rules most suited to your specific unit. The dial rules and codes are as follows.

3.72 Dial rule 1 — Originating Extension: Dials the intercom number of the individual who initiated the call. For example, if extension 200 called a voice computer hunt group that used dial rule 1, the system would send "200" to the voice mail unit. This is a general purpose dial rule; it can be used for things such as automatically dialing the caller's mailbox, etc.

3.73 Dial rule 2 — Controlling Extension: This dial rule is meant for use with voice computer conference features not yet developed. It dials the intercom number of the station user that brought the voice computer into the conference. For example, if extension 200 is talking to extension 201 and extension 200 brings a voice computer hunt group that uses dial rule 2 into the call using the conference feature, the system would send "200" to the voice computer. The call could then be recorded in mailbox number 200 so that it can be replayed and/or transcribed later.

3.74 Dial rule 3 — Destination Extension: This dial rule has two purposes: (1) It dials the extension of the station that is forwarded to the voice computer hunt group. For example, if extension 201 calls extension 202 and extension 202 forwards the call to extension 200 who forwards the call to a voice computer hunt that uses dial rule 3, the system would send "200" to the voice mail unit whenever a call was forwarded through the chain. This dial rule is useful for installations in which only a few extensions in a building have mailboxes. Assuming that only an extension that had a voice mailbox would forward to a voice computer, the system should dial the extension that would most likely

have a voice mailbox. (2) It dials the intercom number of a station when a call is transferred to the voice mail unit. For example, if extension 100 transferred a call to a voice computer hunt group that used dial rule 3 and entered "200" in response to the system-generated prompt, the system would dial "200" when it transferred the call to the voice computer.

3.75 Dial rule 4 — Original Destination Extension: This dial rule dials the original destination of the call. For example: If extension 200 dials a voice computer hunt group that uses dial rule 4, the system would not dial anything for this dial rule because there was not a "destination." However, if extension 201 dialed extension 200, which was forwarded to extension 202 which was forwarded to a voice computer hunt group that used dial rule 4, the system would dial "200." Similarly, if extension 100 transferred a call to a voice computer hunt group that used dial rule 4 and entered "200" in response to the system-generated prompt, the system would dial "200" when it transferred the call to the voice computer.

3.76 Dial rule 5 — Reserved for future use.

3.77 Dial rule 6 — Other IC/Controlling IC: This dial rule is meant for conferencing features not implemented at this time. It is the opposite of dial rule 2. Where dial rule 2 would dial the intercom number of the station that brought the voice computer hunt group into the conference, this dial rule will dial the other intercom number that is involved in conference. This dial rule is meant to be used only during two-party calls. It is useful for features such as a "wake-up message" in which an operator in a hotel would receive a call from someone wanting a wake-up call. The operator could then invoke the "wake-up" feature and enter a time for the other person while in a conference on a call.

3.78 Dial rule 7 — Hunt Group Number: This dial rule tells the voice computer which hunt group it serves (as an announcement or overflow station). For example, if a call overflows from hunt group 1 into a voice computer hunt group that uses dial rule 7, the system will send "01" to the voice computer. This dial rule is meant to be used for the voice computer performing announcement or overflow functions for one or more hunt groups.

3.79 Dial rule 8 — Associated Tenant Group Number: This dial rule tells the voice computer which tenant group the originating extension is in. For example, if extension 200 is in tenant group 1 and it calls a voice computer hunt group that uses dial rule 8, the system will send "1" to the voice computer.

3.80 Dial rule 9 — Associated Department Number: This dial rule tells the voice computer which department the originating extension is in. For example, if extension 200 is in department number 1 and it calls a voice computer hunt group that uses dial rule 9, the system will send "1" to the voice computer. This dial rule can be used in conjunction with dial rule 8.

3.81 Dial rule 10 — Associated Day/Night Flag: This dial rule will dial a "1" if the originating extension's tenant group is in day mode. Otherwise, it will dial "0." This dial rule is useful for determining when the system is in night mode and indicating that the attendant station is therefore unavailable.

3.82 Dial rule 11 — Associated Account Code: This dial rule will dial the account code, if any, that was previously assigned to a call.

3.83 Dial rule 12 — Call Type (IC/CO): This dial rule will identify the type of call. If the call is an intercom call, the system will dial a "1" for this dial rule. Otherwise, this dial rule will dial a "2."

3.84 Dial rule 13 — Hunt Group Queue Position: This dial rule will identify the queue position the call was in (first, second, third...) while waiting for the hunt group. For example, if there was one other call ahead of this call when it overflowed to a voice computer hunt group that uses dial rule 13, the system would dial "2" for this dial rule. This dial rule is designed for features such as hunt-group overflow processing in which the recording tells the caller, "There are five calls ahead of your call." This is especially useful for processing hunt group calls since the call does not lose its position in the hunt group when it is sent to the overflow station.

3.85 Dial rule 14 — Hunt Group Overflow Count: This dial rule will dial the number of times that the call has been sent to the overflow station. If a call overflows to a voice computer hunt group with dial rule 14, the system will dial "1" the first time, "2" the second time, etc. This is useful for features such as hunt-group overflow processing in which the voice computer plays different messages or performs different types of processing depending upon the number of times a caller receives an overflow message.

3.86 Dial rule 15 — Recall Source: This dial rule dials the intercom number of the station that received a transfer recall. The basic operation is the same as dial rule 4, except that this rule is intended for entering the voice mail system through a recall and dial rule 4 is for entry through direct dialing. It is useful for automated attendant applications to make the call transfer appear supervised.

DIAL RULE		IC-TO-VOICE COMPUTER CALL	CO-TO-VOICE COMPUTER CALL
1	Originating Extension	Originating station's intercom number	No code sent
2	Controlling Extension	Originating station's intercom number	No code sent
3	Destination Extension	Intercom number of last non-voice mail station to forward the call if a chain of stations is forwarded to voice mail or voice mail transfer mailbox number	Intercom number of last non-voice mail station to forward the call if a chain of stations is forwarded to voice mail or voice mail transfer mailbox number
4	Original Destination Extension	Intercom number of the first non-voice mail station to forward the call if a chain of stations is forwarded to voice mail	Intercom number of the first non-voice mail station to forward the call if a chain of stations is forwarded to voice mail
6	Other IC/Controlling IC	Originating station's intercom number	No code sent
7	Hunt Group Number	Receiving hunt groups or voice mail group number	Receiving hunt group or voice mail group number
8	Associated Tenant Group Number	Originating station's tenant group number	No code sent
9	Associated Department Number	Originating station's department number	No code sent
10	Associated Day/Night Flag	If system is in day mode = 1 If system is in night mode = 0	If system is in day mode = 1 If system is in night mode = 0
11	Associated Account Code	No code sent	Account code, if entered
12	Call Type (IC/CO)	Intercom call: code = 1	Outside call: code = 2
13	Hunt Group Queue Position	No code sent	Number of calls waiting ahead of this call for the hunt group
14	Hunt Group Overflow Count	No code sent	The number of times this call has been sent through the hunt group
15	Recall Source	Intercom number of the station that received a transferred call which recalls. This applies even if the receiving station is forwarded; it uses the intercom number that was dialed to make the transfer, not the final destination.	No code sent

4. TRUNK FEATURES

4.1 This section explains the trunk functions and programmable features. Trunk capacities are explained in SPECIFICATIONS on page 2-2.

NOTE REGARDING TRUNK SECURITY

While this system is designed to be reasonably secure against CO trunk misuse by outside callers, there is no implied warranty that it is invulnerable to unauthorized intrusions and toll fraud. If the central office does not provide supervision, and disconnect the call when one party hangs up, it is possible for a caller to remain connected to a CO trunk circuit. If this happens, and the caller begins dialing, the call could be placed through the 416/832 System and would then be billed to the system's owner. The system cannot check this type of call for toll restriction and may not register the call in SMDR. This problem could arise when a call is connected to a station, when a call is in an unsupervised conference, when a call is forwarded or transferred to the public network, or when DISA is used for placing outgoing calls.

To determine if disconnect supervision exists on a trunk, disable "standard" tones for trunks in the database. Then place a call to an outside party using the trunk to be tested and have the called party hang up while you remain off hook. If there is disconnect supervision, you will hear 416/832 dial tone within 30 seconds. If you hear telephone company dial tone, there is no supervision. If supervision does not exist, contact the telephone company to determine if it can be enabled. Centrex and loop start trunks frequently do not provide disconnect supervision. To make a loop start trunk more secure, a loop-to-ground start converter can be installed. Each trunk should be checked when it is first installed and periodically rechecked to reduce the probability that the trunk will be used for unauthorized calls.

A. DUAL-TONE MULTI-FREQUENCY (DTMF) OR DIAL-PULSE SIGNALING

4.2 Trunks can be designated for DTMF or dial-pulse signaling through database programming (see PROGRAMMING, page 5-103).

4.3 A digital code is generated by the keysets and decoded by the system to be sent as either a DTMF or dial-pulse signal, depending on the trunk designation.

Keysets and DTMF single-line sets can be used on either type of trunk.

4.4 A non-AIM/non-digital/non-DVK keyset user or DTMF single-line set user can switch from dial-pulse to DTMF signals, while using a dial-pulse trunk, by pressing the pound (#) or asterisk (*) keys. After the pound or asterisk key is pressed, all digits that follow during that call are sent out as DTMF tones. (This is useful when calling computerized services that require a DTMF telephone, such as automated banking.)

NOTE: Inter-Tel AIM keysets and digital keysets do not require this procedure; DTMF is enabled once the call has been established. Inter-Tel/DVK keysets send both digital code and DTMF tones; therefore, this procedure is also not required when using a DVK keyset.

B. OUTGOING-ACCESS, ALLOWED-ANSWER, AND RING-IN ASSIGNMENTS

4.5 Each trunk group has programmed lists of stations for outgoing-access, allowed-answer, and ring-in assignments for day and night modes.

- Outgoing-access assignment for a particular trunk group permits the station user to place calls using trunks in that trunk group.
- Allowed-answer assignment for a particular trunk group permits the station user to answer incoming calls on the trunks in that trunk group. Although the call can be answered, it does not ring or flash at the user's station.
- Ring-in assignment for a particular trunk group permits the station user to receive direct ring-in calls on trunks in that trunk group. The station rings and, on keysets, the individual trunk or call key flashes. Allowed answer for the trunk group is automatically assigned to a station with ring in.

4.6 When keyset stations have outgoing-access or ring-in assignments, the associated individual trunk keys show the status of their trunks. Stations that do not appear on any of the lists cannot place or directly receive outside calls; they are limited to intercom calls, conferences, transferred calls, and retrieving calls on system hold. (A call on system hold can only be picked up at the station that placed it on hold or at a station with an individual trunk key for the trunk.)

4.7 A private trunk group (with one or more trunks) can be established by programming outgoing-access, ring-in, and allowed-answer assignments for the trunk group to only one station.

C. RING-IN/ANSWER PATTERNS

4.8 Trunk groups, DID numbers, and auto ring-in E&M trunks can be assigned to ring in to one of the following:

- A single station extension number
- A hunt group pilot number
- DISA
- Multiple stations in a programmed ring-in/answer pattern

4.9 Ring-in/answer patterns can be set up and assigned to the trunk groups, DID numbers, and auto ring-in E&M trunks (when they are not designated for ring-in to a single station, a hunt group, or DISA). There can be 40 patterns in a standard system and up to 60 in an expanded system. These patterns designate the stations that will receive direct ring-in, and/or have allowed-answer permission for the trunks.

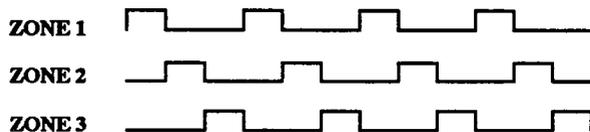
D. RING ZONES

4.10 The system power supply's ring generator can provide ring voltage to ring up to 20 AC-ringing single-line stations simultaneously without any noticeable change in the ring tone. To preserve the ring tone quality, single-line stations should be divided into ring zone groups.

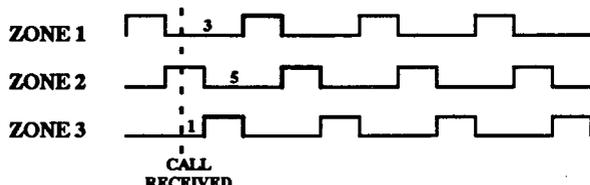
4.11 Most central office ring signals follow a 2 second on/4 second off pattern that could be represented by this drawing:



4.12 Ring zones 1, 2, and 3 use this pattern, but the "on" times are shifted so that only one zone is ringing at a time.



4.13 The system is constantly cycling through this timing pattern. When a call rings in, the zone that will receive ringing first depends on where the system is in the cycle. For example, if a call rings when the system is three seconds into the cycle (as shown below), the stations in zone 3 would begin ringing one second later. Zone 1 would ring three seconds after the call was received, and zone 2 would ring after 5 seconds.



4.14 There is an immediate-ring option that provides ringing as soon as the call is received, regardless of the cycling described above. When the system is in the default state, all single-line sets are set for immediate ringing.

4.15 If there are fewer than 20 AC-ringing single-line sets that would ring at once, they can all be placed in the immediate ring zone. If there are more than 20, they should be removed from the immediate zone and divided up among zones 1-3 so that no more than 20 sets ring at once. Be sure to check all ring-in patterns in day and night modes to ensure that ring zone assignments do not allow more than 20 AC-ringing single-line sets to ring at once.

E. SIGNAL DEVICES

4.16 The Matrix card contains four relays and the Expansion Card contains four relays. Up to seven of the relays can be used to activate an external signaling device when a call rings in on one of the assigned trunks. The signal follows the 2 seconds on/4 seconds off pattern. Ring-in can be programmed for day and/or night modes by placing the relays in the desired ring-in/answer pattern(s). For more information, refer to page 2-14 in SPECIFICATIONS.

F. DAY AND NIGHT MODES

4.17 There are separate lists in the database for toll restriction, outgoing access, allowed-answer, and ring-in assignments for day and night modes. When an attendant enters the Night Mode feature code, the associated tenant group uses the night lists. When the primary attendant enters the Night Mode feature code, all tenant groups are placed into night mode. When the primary attendant cancels night mode, all tenant groups are in day mode.

4.18 There is no attendant recall during night mode. A call will recall the station that transferred it or put it on hold and will ring there until the Recall and Abandoned Call timers expire; then the system will disconnect the call.

Night Switch Relays

4.19 The Matrix and Expansion Cards have programmable relays. If desired, one or more can be designated for night switch operation. Night switch relays are activated when the system is placed in night mode. They can be used for controlling lights, alarm systems, or other electrical devices. Night relays are programmed in the database (see page 5-73 in PROGRAMMING, and page 2-14 in SPECIFICATIONS for more information).

G. TRUNK RESTRICTION AND STATION TOLL RESTRICTION

4.20 Trunks and stations can be toll restricted using several methods. Trunks can be "subject to toll restriction" or "unrestricted." They can also be identified to allow equal access dialing and/or to absorb digits. Stations can be toll restricted using a combination of eight station class of service (SCOS) restrictions and/or they can be restricted from accessing specific trunk groups. Each of the trunk and station restrictions is described separately in the following paragraphs.

Trunk Restriction

4.21 Trunk group access is programmed on a station-by-station basis. Individual stations can be allowed or denied access to each trunk group separately for day and night modes. In addition, each trunk group can also be designated as "subject to toll restriction" or "unrestricted" in database programming. (All trunks are subject to toll restriction when the system is in the default state.) When a station user selects a trunk that is designated as subject to toll restriction, the system checks the database for that station's SCOS. When an unrestricted trunk is chosen, the station's SCOS is not checked and dialing is not required to hold the trunk.

4.22 Trunk groups are often programmed as unrestricted to allow station users to have access to reduced-cost long distance carriers, or to use ringdown lines, dictaphones, voice mail systems, and other auxiliary equipment. When the installer is programming unrestricted trunks, one of four call cost factors can be selected to designate calls as free, local, ten-digit toll, or operator/international. The selected call cost is then used for all calls that are placed using that trunk.

Trunk Group Exemption From LCR Only

4.23 The trunk group may be designated as "exempt from Least-Cost Routing (LCR) only." This allows users with SCOS 6 (LCR Only) to directly access specified trunk groups by pressing the appropriate trunk group keys (or the ANSWER key for auto trunks) or by entering the appropriate Trunk Group Access feature codes. This feature is required if trunks are connected to auxiliary equipment, such as voice mail, dictation, or ring-down equipment. When such trunks are designated as exempt from LCR Only, stations with SCOS 6 and allowed access can use the special facilities.

4.24 Designating a trunk group as exempt from LCR Only also allows LCR-Only stations to use the Call Forward To The Public Network feature. To do this, station users can enter a trunk group access code when programming the call forward number.

4.25 The default assignment for all trunks is *not exempt* from LCR Only. It is a system-wide designation. That is, if a trunk group is subject to LCR Only, all stations with SCOS 6 are denied direct access to the trunks.

Absorbed Digits

4.26 Restricted trunk groups can be programmed to "absorb" or ignore the first digit(s) dialed so that only the remaining digits are checked for toll restriction and call cost purposes. There are two applications for this feature: PBX (E&M network) installations and installations in areas where part of the local office code is absorbed by the central office.

4.27 When using a dial-repeating E&M trunk, a 416/832 station user must dial an E&M trunk access code to reach the other telephone system, then that system's trunk access code to place a call using its trunks. The 416/832 System must absorb the second code (the one that accesses the other system's trunk) to allow proper toll restriction. Without absorbed digits, the 416/832 System cannot perform the toll restriction and call cost functions. However, with absorbed digits, the 416/832 System absorbs the other system's trunk access codes, checks the remaining digits for toll restriction, and calculates call cost.

4.28 When a number is dialed that does not match one of the absorbed digit strings (up to 50 strings, with a maximum of 12 digits in each string), it is considered to be an intercom call in the other telephone system, toll restriction is passed, and the call is designated as a free call (000) in the SMDR report. When redialing or using call forward, the system automatically inserts a short pause after the E&M trunk access code (which is entered as part of the call forward number). When speed dialing, the speed-dial number must include the other system's trunk access code and a pause before the telephone number.

4.29 In some rural areas, specific digits (dialed as all or part of the local exchange) are absorbed by the central office, thus reducing the number of digits required to dial local calls. These digits may also be "repeatable." That is, they are absorbed if dialed more than once. To determine if a central office absorbs digits and whether they are repeatable, contact the telephone company.

4.30 If the system is not programmed to recognize the absorbed digits, two problems may arise. One problem is that a telephone number of fewer than seven digits, that is dialed at a toll-restricted station, is not recognized as a valid telephone number and the call is dropped. The other problem is that toll restriction can be defeated by dialing the absorbed digits before dialing a toll number. However, when programmed to recognize a single string of absorbed digits (with up to 12 digits in the

string), the system checks the remaining digits for toll restriction and processes numbers with fewer than seven digits as local calls (except 411 calls, which are considered seven-digit toll calls). If the first non-absorbed digit is "1" or "0," SCOS 1, 2, and/or 8 are enforced immediately (see SCOS, beginning in paragraph 4.34). Absorbed digits appear in the SMDR record when dialed if they are not repeatable or suppressed.

4.31 The absorbed-digit designations are programmed on a trunk group-by-trunk group basis. No trunk groups are designated for absorbed digits when the system is in the default state. Refer to page 5-113 in PROGRAMMING for more information.

Equal Access

4.32 With equal access, the customer must choose a primary long distance carrier. This is the carrier that will automatically be accessed when the user dials a long distance telephone number. Customers may also select a secondary carrier or use several secondary carriers. These secondary carriers are accessed by dialing the equal access prefix (10 or 101) and a three- or four digit code assigned to the desired carrier (XXX or XXXX) before dialing the telephone number. When using a secondary carrier, the telephone number is dialed as usual after the equal access code — including the toll field (1, 0, or 01) and the area code, if needed.

4.33 A restricted trunk group that does not have equal access designation prevents the system from providing accurate toll restriction and call cost information when "10XXX" or "101XXXX" is dialed on a trunk in that trunk group. When programmed for equal access, the system ignores the equal access code and checks the remaining digits for toll restriction. Equal access designation is programmed on a trunk group-by-trunk group basis. All trunk groups are designated for equal access when the system is in the default state. To limit access to specific secondary carriers, the stations can be restricted to using LCR Only.

Station Class of Service (SCOS)

4.34 SCOS is programmed on a station-by-station basis and each station can have different restrictions for day and night modes. A station can be completely unrestricted (SCOS 0) or can have any combination of the following restrictions.

4.35 SCOS 1 — Operator restriction: Calls that begin with a "0" are restricted. This also restricts international calls.

NOTE: If this restriction is not set, and a user dials "0" as the first digit when placing a call, only SCOS 3 is checked; no other toll restriction is checked.

CAUTION

REGARDING EMERGENCY NUMBERS

In areas where the emergency number is 1911, be sure that toll-restricted stations have SCOS 8 (Enable ALD) and that 911 is in the allowed long distance number list. Otherwise, toll-restricted users may not be able to find a station that is permitted to dial "1+" numbers. Note that 911 is allowed at every station regardless of toll restriction, but 1911 requires this special programming.

4.36 SCOS 2 — Toll access restriction: This restricts calls that begin with "1" unless they are on the allowed long distance number list and the station has SCOS 8.

4.37 SCOS 3 — International call restriction: Calls that begin with "01" are restricted.

NOTE: If international calls are allowed (SCOS 1 and SCOS 3 are not set) and the user dials "01" as the first digits when placing a call, no other toll restriction is checked.

4.38 SCOS 4 — Eight-digit call restriction: Calls are not permitted if they are over seven digits in length, unless they are in the allowed long distance number list and the station has SCOS 8. Users with this SCOS must dial a valid telephone number before the appropriate Interdigit timer expires; otherwise the connection will be dropped and the user will hear reorder tones.

4.39 SCOS 5 — Area/office code restriction: This restriction is divided into user groups to allow different area/office code restriction tables for each of the user groups (up to eight groups in a standard system, up to 12 in an expanded system). This is useful for reducing restrictions for some of the station users while increasing restrictions for others. Each station is assigned to a user group in database programming. Within each user group, area codes can be designated as restricted, allowed, or extended. Restricting an area code prevents users from placing calls to that area code. Allowing an area code also allows all office codes within that area code. Designating an area code as extended allows the programmer to determine which office codes (up to 800) are allowed or restricted within that area code. For each user group, 800 area codes can be marked as allowed or restricted in the database list, and up to four area codes may be marked as extended.

4.40 SCOS 6 — LCR Only: Calls can only be placed using the Least-Cost Routing (LCR) feature when this restriction is assigned. The user will hear reorder tones when attempting to place a call using any other method. A restricted user can still access individual trunk groups if the trunk groups are designated as "exempt from LCR

Only" (as described on page 4-26), or were transferred, were placed on hold, or are recalling or ringing. LCR-Only stations access only the facility groups assigned (see page 4-33 for more details). Trunk restriction determines which trunk groups in the facility group can be accessed by the station. Because stations with this SCOS can use only LCR, they cannot forward calls to outside telephone numbers (unless they are using a trunk group designated as exempt from LCR-Only). For more information on LCR, refer to page 4-32.

4.41 SCOS 7 — Alternate carrier number restriction: Calls can not be placed to any of the numbers on the alternate carrier number list if the station is given this restriction. (For example, to restrict 411 at certain stations, enter the number in the alternate carrier list and give the stations SCOS 7.) There can be up to 20 alternate carrier numbers with up to 10 digits each. The numbers should not contain the toll field, but can contain equal access digits (e.g., do not enter 1+ or 0+ numbers, except 10XXX and 101XXXX numbers). An "X" in a number represents any digit 0-9.

NOTE: Allowed long distance numbers override alternate carrier number restrictions. Also, numbers are only restricted if they exactly match the number on the alternate carrier list. For this reason, alternate carrier numbers can have a plus (+) added to the end of the number to restrict users from bypassing toll restriction by dialing extra digits after dialing the alternate carrier number. For example, 976+ restricts all calls that begin with 976.

4.42 SCOS 8 — Allowed long distance number: Stations with this SCOS are allowed access to numbers in the allowed long distance number list. There can be up to 20 numbers (30 in expanded systems) of up to 10 digits each. Calls placed to these numbers are not subject to SCOS restrictions 2 and 4-7. Operator-assisted and international calls (SCOS 1 and 3) are not checked against this list. An "X" in the number represents any digit 0-9; for example, XXX-555-1212 allows users to dial directory information using any area code. A plus (+) in the number allows any number that begins with the designated sequence (for example, 800+ allows any 800 number to be dialed). The numbers should not include the toll field.

Class-of-Service Account Codes

4.43 SCOS can be programmed to be associated with account codes. This permits a user to place a call from any station using his class of service account code to enable his usual SCOS. When a class-of-service account code is entered, the system checks the associated station and applies its SCOS to the call being made (trunk ac-

cess permission and LCR advance class-of-service are not applied). When the call is completed, the programmed SCOS for the station being used goes back into effect. The call appears in the SMDR report as being placed from the station being used, and the account code will appear unless an optional account code is entered later (during the call).

Speed-Dial Override of Toll Restriction

4.44 System speed-dial numbers can be programmed to bypass SCOS restrictions on a system-wide basis. If the option is not enabled, all system speed-dial numbers are subject to toll restriction.

North American Numbering Plan (NANP)

4.45 The growth of telecommunications services has created an increasing demand for more telephone numbers. To meet the demand, Bellcore has prepared a long-range North American Numbering Plan (NANP) to provide additional telephone numbers. The plan expands the capacity of the current numbering system by making area and office codes interchangeable. That is, numbering patterns formerly reserved for office codes can be used as new area codes, and office codes within existing area codes can have the same pattern as other area codes.

4.46 With interchangeable codes, switching systems lose the ability to distinguish between 7- and 10-digit numbers by examining the first three digits. To address this, three methods have been proposed:

- The Prefix method requires a 1 before a 10-digit number, and does not allow 1 before 7-digit numbers.
- The Timing method requires the switch to wait approximately four seconds after seven digits have been dialed to see if additional digits are received.
- The Hybrid method requires timing only if a 0 or 1 is dialed before a 7-digit number that begins with three digits that could be an area or office code (use the NXX pattern described below).

4.47 The former dialing pattern required an area code to be in the "NZX" format, where N=2-9, Z=0 or 1, and X=0-9. The new numbering plan allows the area code format "NXX," which is the current office code format. Therefore, with the new numbering plan, more area and office codes will overlap.

4.48 The following chart illustrates the difference between the new Numbering Plan Analysis (NPA) and each of the overlap flags. In the chart, N=2-9, Z=0 or 1, and X=0-9.

	AREA CODES CAN BE:	OFFICE CODES CAN BE:
OFFICE CODES AS AREA CODES	NZX or NXX	NXX
AREA CODES AS OFFICE CODES	NZX	NXX or NZX

4.49 In order to properly process the new NPA, four flags have been added to the system database. During database programming, the programmer can specify the following non-standard numbering plan information:

- **Office Codes Used as Area Codes:** An area code in another location uses an NXX pattern that matches an office code within the system site's area code. (This flag defaults to *no*.)
- **Area Codes Used as Office Codes:** One or more office codes within the system site's area code use an NZX pattern that is the same as an area code in another area. (This flag defaults to *no* unless you are converting a database that has the "Overlap Area/Office Code flag enabled.)
- **Toll Digit Allowed On Toll Local Calls:** This option applies only if the area and office codes overlap. Callers in the site's area code usually dial a 1 when placing a call within the local area code(s). (This flag defaults to *no*.)
- **Toll Digit Required On Toll Long Distance Calls:** This option applies only if the area and office codes overlap. Callers in the site's area code must dial a 1 when placing a call outside of the local area code(s). (This flag defaults to *yes*.)

4.50 Area code lists in the database, for toll restriction and LCR, include all 800 possible area codes. All area codes are allowed in toll restriction and are included in LCR Route Group 1 when the software is in the default state. (In upgrades, only the new area codes default to allowed in toll restriction, and they are *included* only in

Route Group 1. All other area codes remain as programmed.)

NOTE: Toll restriction SCOS 4 (Restrict Eight-Digit Calls) is affected by the area/office code database flags and toll digit flags. The area/office code flags must be set properly on the system in order for toll restriction to work correctly for the given site. The system must know whether the area and office codes overlap and whether toll digits will be dialed to properly detect end of dialing and apply toll restriction. For example, if you have the system set to look for a toll digit (1) on toll long distance calls on a system where area and office codes overlap, and the station user placing a call does not dial the 1 (dials 213-555-1234 instead of 1-213-555-1234), the system will allow the call and will consider end-of-dialing to be after the seventh digit, as if the user was dialing a local non-toll call. However, if the station user dials 1-213-555-1234, the call will be restricted as usual after eight digits are dialed.

Home And Local Area Codes

4.51 In many areas, the telephone company has created call-cost arrangements that refer to "home" and "local" area codes. The home area code is the area code within which the system resides. The local area codes are additional area codes that, when called, use the local or toll local call-cost rate instead of the long distance rate. Up to three local area codes can be programmed and then extended within toll restriction programming to provide proper call costing.

4.52 The local area codes can be programmed as "Extended" area codes to allow or restrict specific office codes within them and to label the office codes' call cost as "local" or "seven-digit toll." If the home or local codes are extended in User Group 1, the system will use the call cost designations for that extended area code whenever a station (in any user group) places a call using that area code.

H. OPTIONAL WEEKLY TOLL LIMITS

NOTE: This feature is available only in the *Extended* package and is enabled only by Inter-Tel Services personnel. The system must have a modem that allows remote access.

4.53 When enabled, the Weekly Toll Limit feature keeps track of the accumulated call cost for specified types of toll calls. The feature can monitor 7- and 10-digit toll calls and/or operator-assisted/international calls that are placed by station and DISA users.

4.54 The database is programmed with a weekly dollar limit for each type of call being monitored. This value can range from \$0-\$65,000. Each time a monitored call is placed, the call cost is added to the total.

4.55 If the total cost of monitored calls reaches 80% of the weekly limit, the system sends an alarm message to alarm stations and the SMDR that states TOLL SECURITY LIMIT AT 80%.

4.56 When the weekly limit is reached, the system sends another alarm message that states TOLL SECURITY LIMIT EXCEEDED. The monitored types of calls (7/10-digit or operator/international) will not be allowed until one of the following occurs:

- The weekly limit is set to a higher value through database programming, as described on page 5-97.
- The weekly accumulated total is reset to zero through programming, as described on page 5-97.
- The weekly accumulated total automatically resets to zero at the end of the week (12:01 am Sunday).

4.57 If a station is forwarded to a toll number that is being disallowed due to the weekly limit being exceeded, calls will be handled as follows:

- An intercom caller hears busy tones.

- A direct ring-in outside call rings at the station until the Transfer Available or Transfer Busy timer expires before being sent to the primary attendant.
- Calls through DISA or an automated attendant ring at the station until the Transfer Available timer expires before being sent to the appropriate recall destination.
- Transferred calls remain at the transferring station.
- Calls from a voice computer are sent to the attendant.

4.58 Weekly toll limit information can be changed only after the Database Programming feature code (029) has been entered at an attendant station. The programming privilege will remain in effect until the end of the programming session. When the data has been changed, a system alarm shows TOLL SECURITY DATA CHANGED at alarm stations and in SMDR. For programming information, refer to page 5-97 in PROGRAMMING.

NOTE: If the "Remaining Days" value is 0, weekly toll limit database information cannot be updated.

4.59 The Weekly Toll Limit feature is enabled by Inter-Tel Services personnel. The database contains a prompt that indicates the remaining days that the weekly toll limits will be in effect. This value automatically decreases by one each day. When the "Remaining Days" value reaches 0, the Weekly Toll Limit feature is disabled and calls are no longer monitored. A system alarm indicates TOLL SECURITY FEATURE EXPIRED. Users trying to place monitored calls will see a display that says CALL FAILED - TOLL LIMIT EXCEEDED. To enable the feature again, Inter-Tel Services personnel must reset the "Remaining Days" value. (See page 6-41.)

NOTE: If a system database restore is performed, the Remaining Days value of the Toll Security Weekly Limit feature is reset to 0. It is not restored to its previous value.

I. TRUNK GROUP ASSIGNMENTS AND AUTOMATIC ANSWER/SELECT

4.60 Each trunk is assigned to 1 of 102 possible trunk groups (142 in expanded 832-port systems). Trunk groups are assigned to specific tenant groups to determine which attendants will place the trunk groups in night mode. A trunk group can also be designated for auto trunk selection (using the ANSWER key as described in paragraph 4.62) for a tenant group.

- Trunk Group feature codes and trunk group keys are used to select a trunk in one of the programmed trunk groups — up to 142 groups. Each trunk must be assigned to a trunk group. For example, all local trunks could be in one group, while another group contains WATS trunks that are used for long distance calling. Unused trunks can be assigned to a single trunk group labeled “unused.” Trunk Group feature codes are necessary when forwarding calls to outside numbers.
- Auto trunks are incoming or outgoing trunks (up to 344 in standard systems, up to 696 in expanded systems) that are accessed by entering the Automatic Trunk Selection feature code (89) or by pressing the ANSWER key.

4.61 Automatic Trunk Answer: If a station is programmed with allowed-answer assignment only (no ring-in) for a trunk group, direct ring-in calls on that trunk group can be answered by entering the Automatic Trunk Answer feature code (350) or pressing the flashing individual trunk key.

4.62 Automatic Trunk Select: For calls that are ringing or holding at the station, the user may enter the Automatic Trunk Selection feature code (89) or press the ANSWER key. When more than one call is ringing or holding, the following priority list determines which call is answered first:

- Ringing outside calls (ring ins, recalls, callbacks, or transfers) are answered in the order they were received.
- Then calls on individual hold are answered (not calls on system hold, conference hold, or being transferred). Calls are picked up in the order they were placed on hold.
- If no calls are ringing or holding, an available outgoing auto trunk is selected (unless the station is restricted to using Least-Cost Routing Only or is restricted from the trunk group).

J. LEAST-COST ROUTING (LCR)

4.63 LCR is a money-saving feature that allows the system to be programmed to select the desired route for placing outgoing calls. For example, the system may be programmed to always place calls using the least-expensive route. It can be used for placing outgoing calls or transferring calls to outside telephone numbers, but cannot be used for forwarding calls to outside telephone numbers. Stations can be programmed to use LCR only for placing outgoing calls.

NOTE: The Least-Cost Routing (LCR) feature cannot be used in the KF-rated system. If a user attempts to enter the LCR feature code or presses an LCR key, the system sends reorder tones. Programmable feature keys on keysets and single-lines are defaulted to LCR in a KF-rated system and should be changed.

4.64 When LCR is selected, the user dials the number (including the area code, if needed), and the system does the following:

- **Checks the area code and/or office code:** The database contains up to 19 lists of area and office codes called route groups. The system checks the route groups in numerical order (1-19) and selects the first group that contains the area and/or office code that was dialed. Special route groups are included in the software for handling calls that begin with 0, 01, and 011.
- **Checks the time of day:** Each route group has three time blocks: day (8:00 AM - 4:59 PM), evening (5:00 PM - 10:59 PM), and night (11:00 PM - 7:59 AM and weekends).
- **Selects a facility group:** Each time block contains programmed groups of up to 142 trunk groups each, called facility groups. There can be 24 facility groups in standard systems and up to 32 in expanded systems. The groups should be programmed so that the least-expensive group of trunks is checked and, if available, is selected first. If the least-expensive group is not available and the station has LCR camp-on permission, the station camps on until a trunk is available or the LCR Advance timer expires. If the timer expires, the user hears a progress tone and the system checks the next facility group.

NOTE: The system advances only as far as each station's assigned LCR advance limit allows.

- **Adds or deletes digits according to the facility group chosen:** Each facility group has a programmed set of dial rules that tell the system what to dial. (The system can have up to 32 dial rules — 28 of which are programmable. Each facility group can use 1 to 32 dial rules.) For example, if the selected facility group requires that the number contain "1,"

but no area code, the dial rules include the "1" and drop the area code. The modified telephone number can contain up to 48 digits.

- **Checks for toll restrictions:** Once the number has all of the necessary digits added or deleted, the system checks the SCOS and trunk group restrictions for the station to determine whether the call is allowed. If allowed, the system continues to the next step. If not allowed, the system selects another facility group. If the station is restricted from all of the facility groups in the route group, the system sends reorder tones and the call is dropped without being dialed.

NOTE: If more than one trunk group is assigned to a facility group, only the highest numbered trunk group is checked for toll restriction. That trunk group's toll restriction programming is applied to all other trunk groups in the facility group. Therefore, to restrict calls, ensure that the highest numbered trunk group in the facility group has the desired toll restriction programming. Toll restriction is checked each time a new facility group is accessed, allowing individual facility groups within each route group to have different toll restrictions.

- **Dials the modified telephone number:** If the number is allowed, the system seizes an idle trunk in the selected trunk group, waits for the Dial Tone Wait timer to expire (unless DT detect is enabled), and then dials. The user hears a single progress tone and outside dial tone. If the system DTMF tones are not muted and the station is not programmed for "transparent LCR" the user also hears the dialing sequence while the call is being placed.

4.65 When LCR is used, the station user hears a single confirmation tone when a call key, the LCR key, the OUT key, or the OUTGOING key is pressed or when the feature code is entered. The user does not hear dial tone, but will hear the digits being sent on the trunk. The user is connected to the trunk once the system has completed dialing the call and the call appears under an available call key.

Operator-Assisted/International LCR

4.66 The Least-Cost Routing feature has special route groups to handle calls that begin with "0" (operator assisted calls), "01" (operator assisted international calls), and "011" (station-to-station international calls).

4.67 Each of these special route groups contains three time blocks (day, evening, and night/weekend) and each time block contains an ordered list of facility groups. Country codes, area codes, and office codes are not checked; all calls that begin with "0," "01," or "011" are automatically sent to the appropriate route group.

Transparent LCR

4.68 Transparent LCR mode is a station option that changes what the user hears so that an LCR call sounds like an outside call placed using direct trunk group access. With this mode, dial tone is heard when a call key or the LCR, OUT, or OUTGOING key is pressed or when the feature code is entered. Dial tone stops when the user begins dialing. No tones are heard by the user while the system is dialing the number out on the trunk. When the system is in the default state, this feature is enabled.

LCR-Only Forced Account Codes

4.69 Forced account codes for toll calls can be programmed for stations with LCR-Only toll restriction in day *and* night modes. When this account code type is enabled, the user only has to enter an account code if the system detects that a toll call has been dialed when LCR is used. See pages 4-62 and 4-66 in FEATURES, and page 5-54 in PROGRAMMING for more information.

LCR Advance Limit

4.70 In addition, stations are assigned day and night mode LCR advance limits that determine the number of facility groups that the call may advance through when LCR is used. (When facility groups are busy or unavailable, LCR is generally programmed to advance from the least expensive facility group to the more expensive facility groups.)

4.71 Before assigning an LCR advance limit, determinations should be made as to exactly how many facility groups a station user may be allowed to advance through, should the less expensive facility group trunks be busy. Consideration should be given as to how important it is that the call go out immediately, or whether it is more important that the caller wait for a less expensive trunk to become available.

4.72 An LCR advance limit is assigned to each station, even those not assigned LCR Only (SCOS 6). Each station is given a numerical advance limit, "unlimited," or "no advance." The numerical advance limit designations indicate the number of facility groups through which the station can advance. Stations with "no advance" will not advance past the first facility group in each route group, stations with "1" may advance once (to the next programmed facility group), and so on. Stations with the "unlimited" designation may advance through all programmed facility groups in each route group. The default designation for all stations is "unlimited."

4.73 If a station is restricted from the trunks in a facility group or if the LCR-modified telephone number is toll restricted due to its station class of service, the system will immediately proceed to the next facility group and will count this as one advance.

NOTE: LCR advance limit assignment applies to all route groups and all time blocks.

K. E&M TRUNKS

NOTE: This feature is available only in the *Extended plus T1 and E&M* software packages.

4.74 E&M trunks, also called "tie" lines, are special trunks that tie two distant telephone systems together. They allow the users of either telephone system transparent access to the users and resources of the other telephone system, often for less than what it would cost to use normal long distance service.

Incoming E&M Calls

4.75 There are two modes of ring-in for E&M trunks: auto ring-in and dial-repeating.

- **Auto ring-in** E&M trunks, like standard trunks, may be programmed to ring in to individual stations, multiple stations, or hunt groups or as a DISA call. (If programmed to ring in at a single station, the E&M call will follow any programmed forward.)
- **Dial-repeating** E&M trunks perform a "handshake" with the other telephone system and allow the caller to dial an extension number or a trunk access code for placing an outgoing call. The handshake can be immediate-dial, delayed-start, or wink-start, depending on the E&M trunk installed (defaults to im-

mediate-dial). The programmer can also determine whether the caller will hear dial tone (defaults to "enabled") and whether reorder tones will be presented as a burst of tones or continuous tones (defaults to "burst of tone").

Outgoing E&M Calls

4.76 E&M trunk groups are programmed for day and night mode outgoing access like standard trunk groups.

4.77 E&M trunks can be assigned to LCR facility groups to route outgoing calls through the other telephone system. This is useful when a call that is placed from one telephone system would be a local call on the other system. The "long distance" call could be placed using LCR, routed through the E&M trunk group, and go out of the other telephone system as a local call. (The LCR facility group would have to have dial rules programmed to dial the other telephone system's trunk access code as well as sending the dialed telephone number.)

4.78 When the system is in the default configuration, all E&M trunks are configured for DTMF signaling. If necessary, some or all of the trunks can be reprogrammed for dial-pulse signaling through database programming.

L. T1 SPANS

NOTE: This feature is available only in the *Extended plus T1 and E&M* software packages.

4.79 The term "T1" refers to a specific digital method of transmitting voice and data; it is the basic 24-channel time-division multiplex, pulse code modulation system used in the United States. Since each T1 span actually consists of 24 individual circuits (or channels) multiplexed together, it is often less expensive to purchase a single T1 trunk than it is to purchase multiple individual trunks.

4.80 Fractional T1 (FT1), which uses fewer than the standard 24 circuits, can be used on the 416/832 System. If FT1 is used, the unused circuits of the T1C must be unequipped. Refer to PROGRAMMING, page 5-173, for details.

4.81 Although most T1 interfaces will be with the public network, it is possible to use a T1 trunk to connect two telephone systems together (e.g., two 416/832 Systems in the same building or in two buildings and connected with a repeater). Refer to Figure 4-1 on the next page for examples of T1 applications. Also refer to PROGRAMMING, page 5-122, for special procedures required for each type of installation.

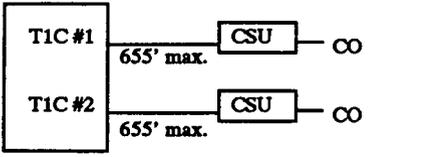
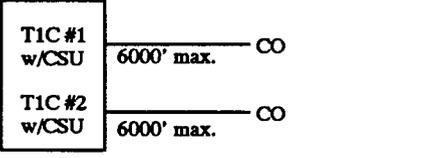
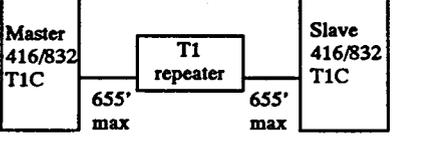
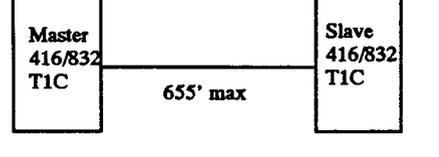
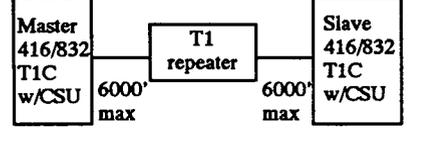
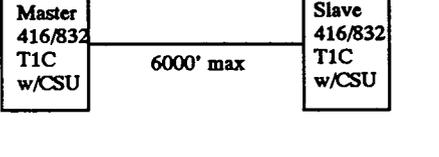
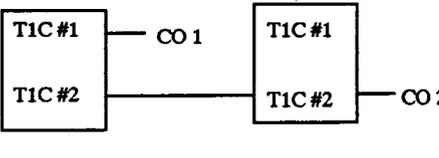
4.82 When purchasing a T1 span, there are several variables involved, depending on the T1 application required. (Refer to SPECIFICATIONS, page 2-22, for details.) The variables include the following:

- **Card type:** The type of framing scheme used by the T1 trunks connected to the card can be D4 Superframe (normally used for voice transmissions) or Extended Superframe (ESF is usually used for data transmissions).
- **Zero code suppression scheme:** The T1 trunk zero-suppression scheme (that limits the number of consecutive zeroes in transmissions) for the trunks on the T1 card can be AMI (Bit 7), Bipolar Eight Zero Substitution (B8ZS), or "None."
- **PCM encoding law:** In pulse code modulation (PCM) systems, there are two primary methods of encoding analog signals (sampled audio wave-

forms) into digital signals. In North America and Japan, the "mu-law" (μ -law) method is normally used. In other places like Europe, the "A-law" method is widely used. The programmer must select both the transmit and receive method of encoding used by the T1 Card. In the United States, this will almost always be mu-law to mu-law.

- **Relay activation:** If desired, you can enable one or both of the two relays on the T1 Card. If enabled, you can attach a signaling device (such as a light or alarm) and select whether the relay is activated for a "T1 line error" or to indicate "T1 line OK."
- **Channel service unit (CSU) or DSX-1 Interface:** In some applications, an optional on-board CSU is installed on the T1 Card. In other applications, a DSX-1 Interface will be used. Figure 4-1 on the next page shows several possible applications.
 - **Line build-out (LBO):** If the optional on-board CSU is installed, the LBO attenuation of the T1 trunk connected to the card must be designated in programming. This value is determined by the distance to the nearest public network T1 repeater.
 - **DSX-1 line length:** If the optional on-board CSU is *not* installed, the length of the cabling between the T1 Card and the external CSU, or between the T1 Card and the other telephone system to which it is connected must be designated in programming.
- **Reference clock programming:** If the T1 Card is connected to the public network, the card is automatically designated as a slave clock (the public network always acts as the master clock and the first slave clock provides the 416/832 system reference clock; all other slave clocks act as backups). If the card is not connected to the public network, but is instead connected to another T1 Card or a card in another telephone system, it can be a master clock or a slave clock (in relation to the card on the other end). If the card is a master, the card's on-board oscillator can be the source of the clock or it can rely on an external clock.

FIGURE 4-1. T1 SPAN APPLICATIONS

<p>416/832-to-CO with external CSU</p> 	<p>In this application, the T1Cs are connected to the central office using an external CSU. A DSX-1 Interface is enabled and the length of the cabling between the 416/832 System and the CSU (655 feet maximum) is designated in programming. Both cards draw reference clock from the public network and are slave clocks. One card is designated as the system reference clock.</p>
<p>416/832-to-CO with onboard CSU</p> 	<p>In this application, the T1Cs are connected directly to the central office and optional on-board CSUs are used. The line buildout is programmed to match the distance to the CO (or nearest repeater), up to 6000 feet. Both cards draw reference clock from the public network and are slave clocks. One card is designated as the system reference clock.</p>
<p>416/832-to-416/832 DSX-1 with repeater(s)</p> 	<p>Here, two 416/832 Systems are connected through a T1 repeater. Both T1Cs have the DSX-1 Interface enabled. The length of cabling to the repeater (up to 655 feet) is designated in programming for each card. One card is designated as the master clock (which does not draw reference clock from the public network) and the other is the slave clock (that receives reference from the master clock acting as the "public network"). Both T1Cs are programmed as reference clocks for their 416/832 Systems.</p>
<p>416/832-to-416/832 DSX-1 without repeater</p> 	<p>In this example, the two 416/832 Systems are connected directly. Both T1Cs have the DSX-1 Interface enabled and the length of cabling between the two systems (up to 655 feet) is designated in programming. One card is designated as the master clock (which does not receive reference clock from the public network) and the other is the slave clock (that receives reference from the master clock acting as the "public network"). Both T1Cs are programmed as reference clocks for their 416/832 Systems.</p>
<p>416/832-to-416/832 CSU with repeater(s)</p> 	<p>In this application, two 416/832 Systems are connected through a T1 repeater. Both T1Cs have the on-board CSU enabled and the line buildout is programmed to match the distance to the T1 repeater (up to 6000 feet) for each T1C. One card is designated as the master clock (which does not receive reference clock from the public network) and the other is the slave clock (that receives reference from the master clock acting as the "public network"). One card is designated as the master clock and the other as the slave.</p>
<p>416/832-to-416/832 CSU without repeater</p> 	<p>In this application, two 416/832 Systems are connected directly to each other. The T1Cs both have on-board CSUs enabled and the line buildout is programmed to match the distance between the 416/832 System (up to 6000 feet) for each T1C. One card is designated as the master clock (which does not receive reference clock from the public network) and the other is the slave clock (that receives reference from the master clock acting as the "public network"). One card is designated as the master clock and the other as the slave.</p>
<p>Sample T1 Network</p> 	<p>In a T1 network that involves multiple CO and T1C connections, the CSU/DSX-1 variable is determined by each connection. In the example shown here, the two T1Cs connected to the CO receive reference clock from the public network and are slave clocks. The two that are connecting the 416/832 Systems do not draw reference from the public network. T1C #2 on 416/832 #1 is the master clock and T1C #1 on 416/832 #2 is a slave clock.</p>

M. DIRECT INWARD DIALING (DID)

4.83 Direct inward dialing (DID) allows an outside party to dial into the system without attendant intervention. To gain direct access to the system, an outside party dials a number that was assigned by the telephone company to the DID trunks installed on the 416/832 System. The system then provides ring signal to the station, stations, or hunt group according to the programmed ring-in/answer pattern for that DID number.

4.84 There can be up to 11 DID trunk groups in a standard system and up to 16 in an expanded system. Each is assigned the following parameters:

- **Tenant group designation:** A DID trunk group must be assigned to a specific tenant group.
- **Music-on-hold selection:** The DID trunks can use music channel 1 or 2, or they can use tick-tones or silence.
- **Start type:** The "start type" of the DID groups can be immediate, wink, or delay, depending on the type of DID trunks ordered from the telephone company.
- **DISA codes:** Individual DID trunk groups can be designated for DISA use; however, the security codes are the same for all DID trunks in the group.
- **Trunk list:** Each DID trunk must be assigned to a DID group.
- **Base number:** The base number is the 3- to 6-digit number that is not dialed into the system by the central office. For example, in the number 961-9000, if the base number was 9619, the central office would send only 000 into the system. The system then sends the call to the ring-in designation associated with 961-9000. There can be a total of 600 DID entries in a standard system (800 in an expanded system). The entries can be divided as desired among the direct inward dialing (DID) groups. There is no limit to the number of entries per group as long as the system-wide maximum is not exceeded.

4.85 Each DID number is individually programmed with ring-in designations for day and night modes. The calls can ring in to a single station, a ring/answer pattern, a hunt group, or as DISA calls. If the number is not assigned one of these designations, it will always ring at the primary attendant's station.

N. LOOP AND GROUND START TRUNKS

4.86 The 416/832 System can use both loop and ground start trunks. In database programming, the trunks are designated as loop or ground start on a trunk-by-trunk basis.

4.87 In unsupervised trunk-to-trunk calls (such as unsupervised conferences and forward to an outside number) if either outside party is using a loop start trunk, the Unsupervised CO timer is activated. When this timer expires, both parties receive a burst of dial tone. Either party can reset the timer by pressing any DTMF key before the Single-Line Dial Initiation timer expires. If the timer is not reset, the call recalls the primary attendant who can determine whether the trunks are still in use or if the call should be disconnected. If the trunk connections are ground start or DID trunks, this timer is not needed as they supply reliable disconnection signals.

4.88 The Hookflash feature (feature code 330) can be enabled or disabled for loop and/or ground start trunks on a trunk group-by-trunk group basis.

O. TRUNK MAINTENANCE

4.89 Attendants can place individual trunks out of service by entering a feature code. This unequips the trunk, but does not block incoming calls on the trunk. To outside callers, the trunk will appear to be functioning and they will hear ringing. However, station users will not hear ringing or see a flashing trunk key and cannot access the trunk for receiving or placing calls until the attendant places the trunk back into service by entering another feature code (or the trunk is returned to service through the database). The advantage of using this feature instead of unequipping the trunk in the database, is that all programming for the trunk is preserved. The trunk returns to complete functionality as soon as it is returned to service with no additional programming required. Instructions for placing a trunk out of service are located on page 4-113. This feature applies to all trunks, including DID trunks.

4.90 Each T1C is equipped with a "make busy" switch for removing all circuits on the card from service and placing them back in again, and do not require use of this feature. Pressing the switch will light its LED and begin the process of "busing out" each circuit not in use. The circuits that are in use are then busied out as soon as the users hangs up.

NOTE: If the trunk that is being placed out of service is part of a telco rotary hunt, the central office will detect that trunk as being available and will not bypass it for incoming calls.

P. DIRECT INWARD SYSTEM ACCESS (DISA)

4.91 DISA is a programmable feature that allows an outside party to dial into the system from an external DTMF telephone and then access the following system resources: extension numbers for placing calls to stations; trunks groups or auto trunks for placing outgoing calls; hunt group pilot numbers; and, if equipped, a modem extension number for remote system programming or report generation.

4.92 Toll restriction is not checked on DISA calls when an outgoing trunk is accessed. DISA users cannot access LCR, specific individual trunks (unless they are the only trunk in a trunk group), or paging.

4.93 Any of the trunk groups can be programmed to receive incoming DISA calls in day and/or night mode. When not in use for DISA, the trunk can be used by system users for placing outgoing calls (unless designated as an "incoming-only" trunk).

NOTE: Due to the natural characteristics of the trunk, the volume level of DTMF tones transmitted over the trunk may be substantially reduced before reaching the 416/832 System. This natural degradation in tone volume may adversely affect the reliability of the DISA feature. Other factors which can affect DISA performance are trunk noise and the quality and strength of the DTMF tones generated by the off-premises phone itself.

4.94 When a DISA user calls a station extension number, the call rings as a direct ring-in call, even if the called station is busy or in do-not-disturb. The DISA caller hears music (if enabled) until the appropriate Transfer timer expires; then if the call is not answered it recalls the called station's attendant. If the called station is forwarded, the call follows the programmed forward.

4.95 When a DISA caller is using or accesses a loop start trunk, the Unsupervised CO timer is activated. When the timer expires, both parties hear a burst of dial tone. Either party may reset the timer by pressing any DTMF key. If the timer is not reset, the call recalls the attendant. If the attendant does not answer the recall before the Recall and Abandoned Call timers expire, the call is disconnected. (This is not applicable to ground start trunks.)

NOTE: There may be some reduction in voice volume when a DISA caller accesses an outside trunk.

4.96 When a hunt group pilot number receives a call through DISA, the call rings or circulates according to how the hunt group is programmed (i.e., linear, distributed, or all ring). The call is displayed as a direct ring-in call; however, the system actually processes the call as a transferred call. Refer to page 4-16 for more information on hunt group calls.

DISA Calls In SMDA Reports

4.97 DISA call information is included in the System Summary SMDA report. See page 4-115.

Blocked DISA Calls in SMDR Reports

4.98 Whenever an outgoing DISA call is denied, either by toll restriction or weekly toll limits, the SMDR report will show a call record for the DISA call and then another line with the abbreviation "BLK" (for "blocked"). See page 4-123 for details.

DISA Do-Not-Disturb Breakthrough

4.99 Under normal circumstances, direct ring-in calls are not blocked by do-not-disturb. However, the database contains an option that allows or disallows do-not-disturb breakthrough for DISA (and automated attendant and voice mail/computer) calls on a station-by-station basis. If do-not-disturb breakthrough is disallowed, DISA calls to a station in do-not-disturb are immediately sent to the station's attendant. If the attendant does not answer the call, it is disconnected after the Abandoned Call timer expires.

Security Codes

4.100 DISA trunks can be assigned security codes that must be entered before the caller has access to the system and/or the CO trunks. In the *Extended* software package, codes can be 4-7 digits long (using any combination of digits 0-9, *, and #). All other software packages use 4-digit security codes. The installer can program separate codes for each DISA trunk group to be used during day and/or night modes.

4.101 In the *Extended* software package, a DISA caller will have three opportunities to enter a valid security code. If the caller fails three times, the failure will generate a system alarm on alarm stations and in SMDR that says "DISA SECURITY LIMIT EXCEEDED" and the system will not answer that DISA trunk again for five minutes. (Any other DISA trunks will be unaffected.)

DISA Toll Restriction

4.102 In the *Extended* software packages, DISA trunks can be given day and/or night mode toll restrictions like those described on page 4-27 for individual stations (except LCR-Only). When a DISA caller dials an outgoing call, the call is checked against the DISA trunk's toll restriction. If the call is disallowed, the DISA caller is sent to the primary attendant.

4.103 If the Weekly Toll Limit feature is enabled, calls through DISA will be subject to monitoring as described on page 4-30.

NOTE: While DISA is designed to be reasonably secure against misuse by outside callers, there is no im-

plied warranty that it is invulnerable to unauthorized intrusions. The installer and owner of the system should ensure that proper security measures have been taken to prevent outside callers from accessing and misusing outgoing trunks for unauthorized calls. Also, if the central office does not provide supervision and disconnect the call when one party hangs up, it is possible for a caller to remain connected to a CO trunk circuit. If this happens, and the caller begins dialing, the call could be placed through the 416/832 System and would then be billed to the system's owner. The system cannot check this type of call for toll restriction and may not register the call in SMDR. This problem could arise when a call is connected to a station, when a call is forwarded or transferred to the public network, or when DISA is used for placing outgoing calls.

Using DISA

NOTE: DISA calls are not answered unless the necessary resources (a DTMF decoder and a voice channel) are available. If you hear a busy signal followed by music, the trunk you tried to access is busy. You have camped on and will be connected to the desired trunk as soon as it is available. If you call an extension number, you will hear music (if enabled) until the appropriate Transfer timer expires; then if your call is not answered it recalls the called station's attendant.

4.104 TO USE DISA IF A SECURITY CODE IS NOT REQUIRED:

- (1) From a DTMF telephone, dial the telephone number of the DISA trunk.
- (2) When the call is answered by the system and you hear system dial tone, do one of the following:
 - a. *For placing an outside call:* Dial a trunk access feature code. You then hear outside dial tone and can place your call.
 - b. *For remote system programming:* Dial the extension number assigned to the modem (defaults to 2600). Refer to PROGRAMMING, page 5-4, for complete remote programming instructions.
 - c. *For placing an intercom call:* Dial an extension number or a hunt group pilot number (if calling the attendant, dial the extension number, not 0). You hear music until the call is answered.

4.105 TO USE DISA IF A SECURITY CODE IS REQUIRED FOR INTERCOM, MODEM, AND TRUNK ACCESS:

- (1) From a DTMF telephone, dial the number of the DISA trunk.
- (2) When the call is answered by the system and you hear a single progress tone, enter the appropriate (day or night) DISA security code.

- (3) When you hear dial tone, do one of the following:

- a. *For placing an outside call:* Dial a trunk access feature code. You hear outside dial tone; place your call.
- b. *For remote system programming:* Dial the extension number assigned to the modem. Refer to PROGRAMMING, page 5-4, for complete remote programming instructions.
- c. *For placing an intercom call:* Dial an extension number or hunt group pilot number. (If calling the attendant, dial the extension number, not 0.) You hear music until the call is answered.

4.106 TO USE DISA IF A SECURITY CODE IS REQUIRED FOR TRUNK AND MODEM ACCESS ONLY:

- (1) From a DTMF telephone, dial the telephone number of the DISA trunk.
- (2) When the system answers the call and you hear dial tone, do one of the following:
 - a. *For placing an outside call:* Dial a trunk access code. When you hear a single progress tone, enter the appropriate (day or night) DISA security code. You hear outside dial tone when the system recognizes the security code and if a trunk is available.
 - b. *For remote system programming:* Dial the extension number assigned to the modem. When you hear a single progress tone, enter the appropriate (day or night) DISA security code. You hear outside dial tone when the system recognizes the security code. Refer to PROGRAMMING, page 5-4, for programming instructions.
 - c. *For placing an intercom call:* Dial an extension number or hunt group pilot number. (If calling the attendant, dial the extension number, not 0.) You hear music until the call is answered.

NOTE: If you enter an invalid security code, the trunk is dropped. If you enter an invalid feature code or extension number, or dial an invalid number, you hear reorder tones and then system dial tone. You may try again. If you dial a valid hunt group pilot number that has no members assigned to it, the call automatically rings at the primary attendant station until the appropriate Transfer and Abandoned Call timers expire (this occurs in both day and night modes). If the attendant does not answer before the Abandoned Call timer expires, the call is disconnected.

5. STATION INSTRUMENTS

5.1 To allow system flexibility and cost efficiency, a variety of station instruments can be used on the 416/832 System. They are:

IMX 416/832 Digital And Analog Station Instruments

- Standard Digital Keysets — standard and display
- Executive Digital Keysets — display only
- IMX 12/24-Line Keysets — display and standard
- IMX 8-Line Keysets — non-display only
- IMX 8/12/24-Line AIM keysets — display only
- Enhanced Single-Line Sets (ESLSs)
- Single-Line Instruments (SLIs)
- Digital DSS/BLF Units — single or in string of up to four Units (attached to a digital keyset)
- IMX DSS/BLF Units (on separate circuits from associated keysets)
- Attendant Computer Consoles
- Industry-standard, single-line, dual-tone multi-frequency (DTMF) sets

NOTE: With the proper software package, the Inter-Tel GX station instruments can also be installed on the system. Refer to Appendix A in the back of the manual for complete information.

GMX-416/832 Analog Station Instruments

- Inter-Tel/DVK 24-Line Keyset — standard and display
- Inter-Tel/DVK 12-Line Keyset — standard and display
- Inter-Tel/DVK 8-Line Keyset — standard and display
- GMX 24-Line Keyset — standard and display
- GMX 12-Line Keyset — non-display only
- GX 24-Line Keyset — standard and display
- Attendant Computer Console
- Inter-Tel/DVK DSS/BLF Unit — single or tandem
- GMX DSS/BLF Unit — single only
- GX DSS/BLF Unit — single or tandem
- GMX/GX Single-Line Instrument (SLI)
- Industry-standard single-line, dual-tone multi-frequency (DTMF) set

NOTE: For more information on the GX and GMX station instruments, refer to appendixes A and B in the back of this manual.

5.2 The Inter-Tel AIM keysets, digital keysets, and DVK keysets contain audio-integrated modules that allows the user to adjust volume levels independently for pages, calls, ring tones, etc.

5.3 Keyset Cards (KSCs and KSC-Ds) and Digital Keyset Cards (DKSCs) are used to support keyset stations. Single-Line Cards (SLCs) are used to support single-line stations. Inward Dialing Cards (IDCs) can be installed to support AC-ringing off-premises single-line stations, on-premises single-line sets, DC-ringing single-line devices for special applications, or DID trunks.

5.4 The IMX 8-line dual-circuit AIM keysets can be installed *two* to a circuit, if desired. To do this, single KSC-D circuits are designated as “dual” circuits in System Configuration programming. (Other keyset models cannot be installed two to a circuit.) The designated dual circuit actually becomes two circuits that can be programmed individually (X.XA and X.XB, where X.X is the circuit number).

5.5 System software will support any configuration of station instruments with the limitation that there must be a minimum of one Keyset Card. The actual configuration is defined by the type of cards and the number of circuits in use on the system.

A. KEYSETS

5.6 Keyset design features are described in the following paragraphs.

Handsfree Speakerphone

5.7 All keyset stations allow the user to dial while on hook. In addition, the keyset speaker may provide background music (if an external music source is installed) and is used to receive pages.

5.8 IMX Keysets and Inter-Tel/DVK Keysets have a built-in, integrated speakerphone that allows handsfree operation on outside calls and inside (intercom) calls.

5.9 Digital Keysets have a built-in speaker and microphone that allow the user to answer intercom calls handsfree, dial while on hook, monitor calls, and listen to background music. Speakerphone resources are provided by Digital Signal Processors (DSPs) on the Digital Keysets Card (DKSC). A DKSC can have up to two DSPs. Each DSP supports up to 12 speakerphones simultaneously. Each time a digital keyset user presses the SPKR key while on hook, the speakerphone function is activated and the speakerphone resource is assigned to that phone for the length of the call. If more than 12 speakerphones are enabled on a DKSC with one DSP and a thirteenth digital keyset user requests the speakerphone function, the user will hear reorder tones and the

display will show NO SPKRPHN AVAIL STAY OFF HOOK. If the user attempts to change to the speakerphone and hangs up during a call when speakerphones are unavailable, the user will be forced into a monitor-only mode. The user will be able to hear the other party but will not be allowed to transmit to them. In this mode, the user's MUTE key will be lit and the display shows NO SPKRPHN AVAIL COME OFF HOOK. Pressing the lit MUTE key will result in a burst of reorder tone; you must lift the handset to speak.

5.10 A programming option can be enabled that disables the speakerphone (as described on page 4-55) or the user can disable the speakerphone using a feature code. This prevents the station from using the speakerphone on outgoing intercom calls and all outside calls. If the option is enabled, the speakerphone can still be used for receiving handsfree intercom calls, but the user must lift the handset to speak when placing intercom calls and when placing or receiving outside calls. The MUTE key is lit when the speaker is activated for outside calls or outgoing intercom calls. Call monitoring and on-hook dialing are not affected.

NOTE: On certain handsfree-to-handsfree intercom calls, voice volume levels may cause feedback to occur. If this happens, one user should pick up the handset.

Liquid Crystal Display (LCD)

5.11 Several keyset types are available in standard or display models. The difference is that there is a liquid crystal display (LCD) on the display keyset. Standard keysets can be converted to display keysets by installing LCD Units (refer to REPLACEMENT PARTS for unit part numbers). Installation instructions are in the INSTALLATION section of the manual.

5.12 The LCD has two 16-character display lines. When the keyset is not in use, the LCD shows the date and the time of day (and, if enabled, the station extension number and user name). Other displays include: reminder messages, do-not-disturb messages, numbers dialed, call sources, elapsed time of calls, current call costs, error messages, station status, programming messages, etc. The displayed information is described throughout the instructions in this section of the manual.

5.13 Executive Digital Keysets have four additional display lines with keys on both sides (eight keys) that are used for selecting features from the menu display instead of pressing feature keys or entering feature codes. Pressing the key on either side of a display line selects the option shown on that line. The following menu options are available on the Executive Digital Keyset display:

- **ADMIN FEATURES:** (*This appears only if the station is programmed as an attendant.*) This option displays a menu of attendant features.
- **IC DIRECTORY:** This allows quick access to the intercom directory.
- **CO DIRECTORY:** This option provides quick access to the CO (system speed-dial) directory.
- **OTHER FEATURES:** This displays a list of features in alphabetical order.

5.14 Under the display are six "display-oriented" feature keys. PREVIOUS and NEXT are used for scrolling through screens. The BACKSPC, FORWARD, CLEAR, and CANCEL keys do not have a function on the IMX 416/832 System.

Keyset Identification Displayed

5.15 If this option is enabled in the database (refer to PROGRAMMING, page 5-68), the extension number and assigned user name appear on the top line of the keyset display, and the time and date appear on the bottom line when the keyset is idle. If the option is not enabled, the display shows date and time only, unless the user presses the SPCL key and enters the Display Date And Time feature code (300) to read the full display.

Date, Time, User Name, And Extension Number Display

5.16 When a display keyset is idle, the date and time (and, if enabled, user name and extension number) are displayed. While on an outside call, in do-not-disturb, or unconditionally forwarded, other displays are shown. In these circumstances, use the following procedure to re-display the date, time, name, and extension number for five seconds.

5.17 TO DISPLAY THE DATE, TIME, USER NAME, AND EXTENSION NUMBER:

Press the SPCL key and enter the Display Date And Time feature code (300). The date, time, user name, and extension number are displayed for five seconds.

Circuit Number On Power-Up

5.18 To aid in installation and troubleshooting procedures, display keysets show their station identification for five seconds when power is turned on, when the system is reset, or when the keyset line cord is first plugged in (or removed and replaced). The extension number and assigned user name appear on the top line of the display, and the circuit number appears on the bottom line. After the five-second identification display, the keyset

returns to the appropriate display, depending on its current status.

“Hot” Dial Pad Keys

5.19 There is a system-wide option that, if enabled, allows keyset users to dial trunk access codes and feature codes without lifting the handset or pressing the SPKR or SPCL key. This programmable feature is called “hot dial pad” to indicate that the dial pad keys are always activated.

Key Maps

5.20 There can be up to 20 different keyset key map groups in a standard system and up to 30 in an expanded system. Refer to PROGRAMMING, page 5-44, for more details. (There is also one map each for ESLs and SLIs and 12 maps for DSS/BLF Units.)

5.21 Each keyset is assigned to a programmed key map group that determines the layout of the keys for all the stations assigned to that group, including the following:

- **Call key:** Up to 10 call keys can be assigned in each key map. These keys are used for outside call access. They are not associated with specific trunks. Instead, they are assigned to calls in the order that the calls are placed or received. For example, if a user has three call keys and places a call using a trunk group feature code, call key 1 will light to show the current call status. If another call rings in while the first call is still in progress, it will cause call key 2 to flash. If one more call rings in, or if the user places the first call on hold and places another call, call key 3 will be used (and call key 1 will flutter). If there are more calls in progress than there are call keys (e.g., if yet another call rings in to the keyset in the example), the newest call would camp on to the station until a call key became available. If LCR is programmed, pressing an idle call key will access the LCR feature for outgoing calls.

NOTE: All key maps should have at least one call key if there is not an individual trunk key for every trunk.

- **Secondary Call key:** See page 4-44 for explanation.
- **DSS/BLF key:** A DSS/BLF key will dial the associated extension number when pressed. If assigned to a key with a lamp, it will also show status of the associated station as described for DSS/BLF Units on page 4-50. DSS/BLF keys cannot be changed by the station user.

- **Feature key:** These are programmed with feature codes. The feature code appears in the same key location on all stations assigned to the key map and cannot be changed by the keyset user.
- **Forward key:** The forward key can be programmed with any of the Call Forwarding feature codes and the forwarding feature code used by the key can be changed by the keyset user.
- **Hunt Group key:** Like a DSS/BLF key, this key dials a hunt group pilot number and, if assigned to a key with a lamp, will show the status of that hunt group.
- **Individual Trunk key:** These keys are associated with one trunk each. They can be used for placing outgoing calls, picking up calls on system hold, and answering incoming calls on that trunk. If call privacy is disabled system-wide, a busy individual trunk key can be pressed to join a non-private call.
- **IC, SPKR, and SPCL keys:** All keysets must have an IC key, a SPKR key, and a SPCL key.
- **IC/CO Speed-Dial (SD) keys:** Each key map can have up to 10 IC/CO speed-dial keys. Each SD key can be programmed by the keyset user to dial one extension number and one outside number. If assigned to a key with a lamp, the lamp will show the status of the station associated with that key.
- **Station Programmable key:** Up to eight keys can be designated as station-programmable in the key map. Then the functions are assigned on a station-by-station basis in the Station Programmable Key Programming window (page 5-35 of PROGRAMMING). They cannot be changed by the keyset user (unless designated as user-programmable). Station programmable keys can have any of the following functions:
 - Call key (if all 10 available call keys have not been assigned in the key map)
 - DSS/BLF key
 - Feature key
 - Forward key (can be programmed by the user to access any of the Call Forwarding feature codes)
 - Hunt group key
 - Individual trunk key
 - IC/CO Speed-dial (SD) key (if all 10 available speed-dial keys have not been assigned in the key map)
 - Intercom (IC) key (if not already assigned in the key map)

- SPCL key (if not already assigned in key map)
- Trunk group key
- Undefined
- User programmable key (if all available user-programmable keys have not been assigned in the key map)
- **Trunk Group key:** These keys are associated with specific trunk group access codes and are used for placing outgoing calls on trunks in the selected trunk group. If assigned to a key with a lamp, the lamp will be lit if all trunks in the trunk group are in use.
- **Undefined key:** The key can be left undefined if it will not be needed.
- **User-Programmable key:** Up to nine user-programmable keys can be designated and given default values in the key map. They can then be reprogrammed to access any of the trunk group access codes or feature codes by the individual keyset users as desired.

Connecting A Headset

5.22 For convenience, a headset can be used at any keyset station. The SPKR key is used to connect ringing

calls and disconnect calls when the headset is attached; handsfree intercom calls will be automatically connected to the headset. Refer to SPECIFICATIONS, page 2-27, when selecting a headset for use on the keyset.

5.23 TO CONNECT A HEADSET:

- (1) Disconnect the handset by unplugging the coiled handset cord from the base of the headset. Leave the handset in the cradle.
- (2) Insert the headset plug into the vacant handset jack.
- (3) Press the SPCL key and enter the Headset Enable feature code (315) or the Headset Mode On/Off feature code (317).

5.24 TO DISCONNECT THE HEADSET:

- (1) Disconnect the headset by unplugging the headset cord from the base of the keyset.
- (2) Plug the coiled handset cord into the base of the keyset.
- (3) While on hook, press the SPCL key and enter the Headset Disable feature code (316) or the Headset Mode On/Off feature code (317).

Secondary Call Keys

5.25 This feature is very useful for call screening applications in which one person places and receives calls for someone else. The following terms will be used in describing this feature:

- **Call Key:** This refers to a standard call key that shows the status of calls intended for that station (up to 10 per station).
- **Secondary Call Key:** A special call key that shows the status of calls intended for a primary station (up to 16 per station).
- **Primary Station:** A station that has its primary call keys defined at up to 10 secondary stations.
- **Secondary Station:** A station that has secondary call keys defined on it.

NOTE: A station can be both a primary and a secondary station.

5.26 When a call rings in at the primary station, any secondary station with the corresponding secondary call key will also have a flashing call key. The secondary station(s) or the primary station can answer the call.

5.27 Each secondary station can have ring *and* flash signals or *only* flash signals on an individual secondary call key-by-secondary call key basis. If the secondary station is programmed for ring and flash, the display shows CALL RINGING IN ON GRP#XX for calls ringing in on a secondary call key; note that there is no distinction between primary or secondary calls on the display. In other words, the display will not indicate that the call is actually ringing *for* the primary station.

5.28 One or more of the primary station's call keys can be associated with secondary call keys on secondary stations. For example, if the primary station has four call keys, the secondary station can have up to four associated secondary call keys for that primary station. If the secondary station has only three secondary call keys and a call rings in on the primary station's fourth call key (that is not associated with a secondary call key), the secondary station will not have any indication of the ringing call.

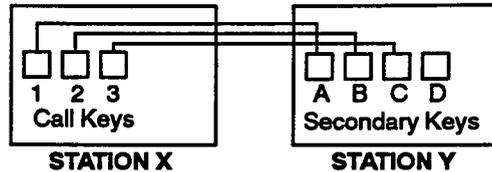
5.29 The following example explains how secondary call keys are assigned:

- Station X is a primary station and has three call keys.
- Station Y is a secondary station and has been assigned a key map that contains four secondary call keys. (Key map programming is explained on page 5-44 in PROGRAMMING) The keys were then

associated with Station X using the window shown on page 5-37 in PROGRAMMING.

- The keys are associated as follows:

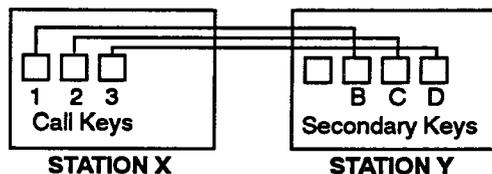
STATION X	STATION Y
Call key 1	Key A (Secondary call key 1)
Call key 2	Key B (Secondary call key 2)
Call key 3	Key C (Secondary call key 3)
No associated key	Key D (Secondary call key 4)



The call keys are assigned to the secondary call keys in numerical order. That is, the first secondary call key that is associated with the primary station is assigned to Station X's call key 1. The next secondary call key associated with Station X is associated with call key 2, and so on.

- If a secondary call key is deleted (programmed as another type of key) at Station Y, the remaining secondary call keys do not change physical position on the keyset. However, their association with Station X's call keys are shifted relative to one another. For example, if Key A in the previous list is no longer a secondary call key, Key B becomes secondary call key 1 and the list appears as follows:

STATION X	STATION Y
Call key 1	Key B (Secondary call key 1)
Call key 2	Key C (Secondary call key 2)
Call key 3	Key D (Secondary call key 3)

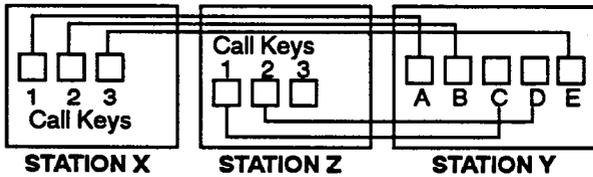


5.30 A secondary station can have call keys for more than one primary station. The primary station corresponding to each key is determined during programming. However, each time a secondary call key is associated with a primary station, the call keys are assigned in numerical order, as shown in the following example:

- Station X is a primary station with three call keys.
- Station Z is a primary station with three call keys.
- Station Y is a secondary station and has been assigned to a key map that has five secondary call keys.

- The keys are associated as follows:

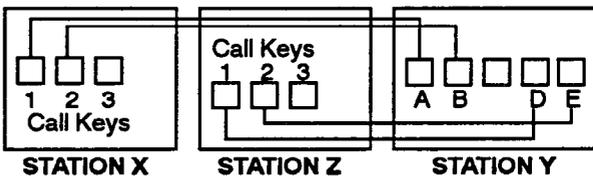
STATION/CALL KEY	STATION Y
Station X/Call key 1	Key A (Secondary key 1)
Station X/Call key 2	Key B (Secondary key 2)
Station Z/Call key 1	Key C (Secondary key 3)
Station Z/Call key 2	Key D (Secondary key 4)
Station X/Call key 3	Key E (Secondary key 5)



Again, the call keys are assigned in numerical order for each primary station. When Key C (secondary call key 3) was associated with Station Z, it was assigned to station Z's call key 1. Then Key D (secondary call key 4) was assigned to Station Z's call key 2. The programmer then associated Key E (secondary call key 5) to Station X, which assigned it to Station X's call key 3. (If it had been associated with Station Z, it would have been assigned to Station Z's call key 3.)

- The programmed list of associated stations for secondary call keys does not change when a secondary call key is deleted. In the example above, secondary call keys 1, 2, and 5 (Keys A, B, and E) are associated with Station X and secondary call keys 3 and 4 (Keys C and D) are associated with Station Z. If one call key is deleted, the remaining keys are renumbered, and any keys that change number assume the association assigned to that number. For example: If Key C is no longer a secondary call key, Key D becomes secondary call key 3 and Key E becomes secondary call key 4. (Secondary call key 5 is no longer associated with a key on Station Y.) Therefore, the list appears as shown below:

STATION/CALL KEY	STATION Y
Station X/Call key 1	Key A (Secondary key 1)
Station X/Call key 2	Key B (Secondary key 2)
Station Z/Call key 1	Key D (Secondary key 3)
Station Z/Call key 2	Key E (Secondary key 4)
Station X/Call key 3	No secondary call key



5.31 If a secondary station user presses a secondary call key to place a call, that secondary station's SCOS and trunk restrictions are checked, not the primary sta-

tion's, and the call will appear in the SMDR report as originating at the secondary station.

5.32 If a secondary station has call forward enabled, only calls made directly to that station will follow the forward. Calls on the secondary call keys will not be forwarded.

5.33 If the primary station has immediate call forward (all calls or if busy) enabled, calls will be forwarded and will not cause the secondary call keys to flash at the secondary stations. If call forward no answer is enabled, the secondary call keys will flash until the Call Forward No Answer timer expires and the forward is completed.

5.34 The ANSWER key will still answer ringing calls in the order that they were received by that station. Even if a call comes in on a secondary call key and then another call comes in on a primary call key, the call on the secondary call key will be answered first. (The ANSWER key cannot be used to answer flash-only calls.)

5.35 If Automatic Trunk Answer is enabled at a secondary station, calls on the secondary call keys cannot be answered by simply lifting the handset. The secondary station user must press the desired secondary call key, or the ANSWER key to access the call.

5.36 If the primary station or any secondary station puts a call on system hold, all associated primary and secondary call keys flutter to show that a call is on hold. If the call is placed on individual hold, the station that placed it on hold will have a flashing call key and all associated standard and secondary call keys will be lit (to indicate that the call key is in use). Only the station that placed the call on individual hold can access the call.

5.37 If a call on a secondary call key is placed on hold and the call recalls, the call will ring and the recall display (GRP#XX RECALL FROM <station that placed it on hold>) will appear at the primary station and any applicable secondary stations set for ring and flash. All associated standard and secondary call keys will flash to indicate ringing. If the call is not answered, it will recall the primary station's attendant (the display then shows the primary station as the source of the recall).

5.38 If a call on a secondary call key is transferred, and the call recalls, it goes back to the station that transferred it. The recall will appear under a standard call key at that station.

5.39 If the primary station transfers a call that recalls, all associated secondary call keys will flash to indicate that the recall is ringing. Secondary stations programmed for ringing will also see the recall display.

5.40 When a primary station receives a queue callback, the corresponding secondary call key at the sec-

ondary station(s) will be lit (to indicate that the call key is in use). The secondary station(s) will not be able to answer the queue callback.

5.41 If a secondary station user requests a queue callback while using a secondary call key, the queue callback will appear under one of that station's standard call keys and will not appear at the primary station or any of its other secondary stations.

5.42 Although calls on system hold cannot usually be reverse transferred, a call on a standard call key at the primary station or any secondary call key that has been placed on system hold can be picked up, using reverse transfer, at any station. If reverse transferred calls are not automatically connected, the call will be placed on individual hold at the reverse transferring keyset. (Single-line sets will automatically be connected to the call.)

5.43 When a direct ring-in trunk can be accessed (allowed-answer or ring-in assignment) by both a secondary call key and an individual trunk key on a secondary station, both keys will show the ring-in by flashing. (If a primary station has an individual trunk key, calls on that trunk will not appear under a call key and, therefore, cannot be answered at secondary stations.)

5.44 If a call is answered using an individual trunk key, the system assumes that the secondary station is answering the call for itself and places the call on the individual trunk key. All of the primary station's call keys and any other secondary station's secondary call keys for that trunk stop flashing and remain unlit.

5.45 If a call is answered using a secondary call key, that secondary call key flashes and all other associated call keys for that trunk stop flashing. The individual trunk key on the answering station is lit to indicate that the trunk is busy.

5.46 If privacy release is enabled, a secondary station user can join an ongoing call by lifting the handset and pressing the busy secondary call key. If privacy release is not enabled, the user will hear reorder tones if the lit secondary call key is pressed.

Default Keyset Feature Keys

5.47 When the system is in the default state, all keysets are in the same key map group and have the following feature keys. Not all keys indicated below appear on all keysets, as indicated in the chart. Feature code descriptions start on page 4-5.

KEY	FUNCTION
ANSWER	Automatic Trunk Selection (89)
CNF	Conference (5)
DATA	Data (340) — <i>On digital, IMX 12/24-line, and DVK keysets only</i>
DND	Do-Not-Disturb On/Off (372)
FWD	Call Forward All Calls (355) — This feature key may be reprogrammed with any of the call forward options (however, other feature codes may not be used). Pressing a lit FWD key has the same effect as the cancel any Call Forward feature code (359).
HOLD	Individual Hold (336)
IC	Selects a voice channel or picks up a holding or camped-on intercom call.
MSG	Message (365) — Also retrieves messages when the flashing MSG key is pressed.
MUSIC	Background Music On/Off (313) — <i>On digital, IMX 12/24-line, and 24-line DVK keysets only</i>
MUTE	Microphone Mute On/Off (314)
OUTGOING	Selects a trunk for placing an outgoing call using the Least-Cost Routing (LCR) feature (9).
PAGE	Page (7)
QUE	Busy Trunk/Station Callback (Queue) Request (6) and Cancel Queue (376).
REDIAL	Redial (380) — <i>On digital, IMX 12/24-line, and DVK keysets only</i> . When the system is in the default state, the mode of the redial feature code is Last Outside Number Dialed (320). Users may reprogram the mode to Last Outside Number Saved (321).
SPCL	Signals the system to expect a feature code.
SPKR	Speakerphone On/Off (312)
SYS SPD	System Speed Dial (381) — <i>On digital, IMX 12/24-line, and 24-line DVK keysets only</i>
XFR	Transfer CO Call (345) and Reverse Transfer (4)

Keypad Light-Emitting Diode (LED) Indications

5.48 The keypad call keys, trunk keys, IC/CO speed-dial (SD) keys, hunt group keys, and some of the feature keys contain light-emitting diodes (LEDs). The LED flash rates, shown below, indicate the status of the stations, trunks, and features. The rates are shown in interruptions per minute (IPM).

	STEADY 0 IPM	SLOW 30 IPM	MEDIUM 120 IPM	FAST 240 IPM	FLUTTER 60/960 IPM
DATA	Auto-dial modem is dialing; data port cannot be accessed	Data call is being monitored			Data call is in progress; continuous = data device is off hook
IC			Recalling intercom call is camped on	Intercom call is camped on	Intercom call is on hold
SPKR	Speakerphone is on or ready for use				
CNF		Conference is in progress	Conference is recalling station		Initiator left conference in progress; or conf. party is on conference wait hold
MUTE	Microphone is muted				
FWD	Calls are being forwarded				
MSG			Message is waiting		
DND	Your station is in do-not-disturb				
SD	Station is busy or unplugged	Station is in do-not-disturb		Station has a call ringing in	Continuous = station left off hook
HUNT GROUP	All stations in hunt groups are unavailable			Hunt group has a call camped on	
CALL		Trunk is in use at your station	Trunk is recalling from hold or transfer	Trunk is ringing in or camped on (waiting); or busy trunk call-back	Trunk is on hold
TRUNK	Trunk is in use at another station or unplugged	Trunk is in use at your station	Trunk is recalling from hold or transfer	Trunk is ringing in or camped on (waiting); or busy trunk call-back	Trunk is on hold

Volume Controls

5.49 On some keysets, speaker volume and ring tone volume are controlled by two thumbwheels on the right-hand side of the keyset.

5.50 On Inter-Tel AIM keysets, digital keysets, and DVK keysets, volume is controlled by pressing volume control feature keys (labeled UP and DOWN) on the keyset.

5.51 *TO CHANGE VOLUMES ON AN AIM, DIGITAL, OR DVK KEYSET:*

(1) Press the UP (or VOL UP) key to raise the volume or press the DOWN (or VOL DN) key to lower the volume, while performing one of the following. A confirmation tone will alert you when you have reached the highest or lowest possible volume. On display keysets, the display shows the level as it is raised or lowered.

- a. **To change handset intercom voice volume:** Press the desired key while on an off-hook (handset) intercom call.
- b. **To change handsfree intercom voice volume:** Press the desired key while on an on-hook (speakerphone) intercom call.
- c. **To change handset outside call voice volume:** Press the desired key while on an off-hook (handset) outside call.
- d. **To change handsfree outside call voice volume:** Press the desired key while on an on-hook (speakerphone) outside call.
- e. **To change background music volume:** Press the desired key while listening to background music through the keyset speaker.
- f. **To change alerting tone (ring tone) volume:** Press the desired key while the keyset is ringing. **OR**, while on hook, press both keys to hear the currently programmed volume, then press the desired key to adjust it up or down. **NOTE:** The selected alert tone volume level is automatically saved.
- g. **To change handset progress tone volume:** Press the desired key while listening to intercom dial tone through the handset.

h. **To change speakerphone progress tone volume:** Press the desired key while listening to intercom dial tone through the speakerphone.

- (2) **To save the setting:** Press both the UP and DOWN keys at the same time. If this step is not performed, the keyset will return to the previous volume level when the call, tone, or music ends (except for the ringing alert tone volume, which is automatically saved at the most current volume level).

5.52 *TO RETURN AN AIM, DIGITAL, OR DVK KEYSET TO DEFAULT VOLUME LEVELS:*

While on or off hook, press the SPCL key and enter the Default Volume feature code (394).

Selectable Ring Tone

5.53 Keyset users can select the type of ringing alert tone to be heard at their respective keysets. This is useful in open office settings where phones are close together and it is difficult to tell which one is ringing. Eight distinctive ring tone settings are available (1-8) or ring tones can be disabled at the keyset (setting 0).

5.54 Disabling ring tones does not affect lamp status or displays. A ringing call will still cause ring flash on the trunk key and display keysets will show the appropriate display for an incoming call.

5.55 If ring tones are disabled as described below, they can be re-enabled by repeating the procedure and entering any ring tone selection 1-8.

5.56 *TO CHANGE KEYSET RING TONE:*

(1) While on hook, press SPCL and enter the Select Ring Tone feature code (328). (Displays SELECT RING TONE.)

(2) **EITHER**, Enter a number 1-8 to select the desired ring tone, or enter 0 to disable ring tones.

OR, Press the asterisk (*) key or the pound (#) key to scroll through tones 1-8. You cannot scroll to 0.

OR, Enter 9 to repeat the selected tone.

(3) Lift and replace the handset, or allow the Long Interdigit timer to expire. The last tone selected will now be in effect when the keyset rings.

B. SINGLE-LINE SETS

5.57 There are three types of single-line sets: Enhanced Single-Line Sets (ESLSs), Single-Line Instruments (SLIs), and industry-standard single-line DTMF sets. Any of these single-line instrument types can also be used as an off-premises extension (OPX).

Enhanced Single-Line Set (ESLS)

5.58 The ESLS has nine user-programmable feature keys for one-key dialing of feature codes and a FLASH key that sends a timed hookflash to signal the system before a code is entered. It also has a neon message waiting lamp that lights (like a keyset MSG key) when a message is received. The default values of the feature keys are defined in a key map in database programming (see PROGRAMMING, page 5-44, for details). They are user-programmable feature or trunk group keys. They can be assigned any of the general feature codes or trunk access codes listed on pages 4-5 through 4-11. When the system is in the default state, the feature codes assigned to the keys are as follows:

KEY	FUNCTION
CNF	Conference (5)
HOLD	Individual Hold (336).
MSG	Message (365) — Also retrieves messages when the message waiting lamp is flashing and message indication tones are heard
OUT	Selects a trunk for placing an outgoing call using the LCR feature (9).
QUE	Busy Trunk/Station Callback (Queue) Request (6) and Cancel Queue (376).
PGM SPD	Program Station Speed Dial (383)
REDIAL	Redial (380)
STN SPD	Station Speed Dial (382)
SYS SPD	System Speed Dial (381)

Single-Line Instrument (SLI)

5.59 The SLI has four user-programmable feature keys for one-key dialing of feature codes and a FLASH key that sends a timed hookflash to signal the system before a feature code is entered. The default values of the feature keys are defined in database programming (see

PROGRAMMING, page 5-44, for details). They are user-programmable feature or trunk group keys. They can be assigned any of the general feature codes or trunk access codes listed on pages 4-5 through 4-11. When the system is in the default state, the feature codes assigned to the keys are as follows:

KEY	FUNCTION
STN SPD	Station Speed Dial (382)
REDL	Redial (380)
LCR	Least-Cost Routing (9)
HOLD	Individual Hold (336).

Single-Line DTMF Sets

5.60 Single-line DTMF set users access the features by hookflashing (pressing and releasing the hookswitch quickly) and entering feature codes.

Off-Premises Stations

5.61 SLIs, ESLSs, or any AC-ringing DTMF single-line sets can be used as off-premises stations. They are placed at a remote location and are connected to the 416/832 System through a telephone company OPX circuit or a customer-provided circuit. The circuits are connected to an Inward Dialing Card (IDC). (Refer to INSTALLATION, page 3-31, for details.)

5.62 Off-premises station users access the features by hookflashing (pressing and releasing the hookswitch quickly) and entering feature codes.

5.63 IDCs do not support message waiting applications. If single-line sets with message waiting lamps are installed on IDCs, the lamps will not function.

Ring Zones

5.64 The system power supply can provide power to ring up to 20 AC-ringing single-line stations simultaneously without any noticeable change in the ring tone. To preserve the ring tone quality, single-line stations should be divided into ring zone groups.

5.65 If more than 20 AC-ringing single-line sets are in the same ring-in pattern, they should be divided among the three ring zones so that no more than 20 ring at a time. Refer to page 4-25 for more information.

C. DIRECT STATION SELECTION/BUSY LAMP FIELD (DSS/BLF) UNITS

5.66 There can be a maximum of 50 DSS/BLF-equipped keyset stations on the system.

- IMX and Inter-Tel/DVK DSS/BLF Units are programmed to be used with specific keysets, but are not physically attached to the keysets. Each unit requires separate cabling and a separate Keyset Card (KSC) circuit. For each DSS/BLF Unit installed, one fewer keyset can be installed.
- Digital DSS/BLF Units are connected to digital keysets using a PC Data Port Module (PCDPM) attached to the keyset. Up to four digital DSS/BLF Units can be connected in series to one PCDPM.

5.67 Each DSS/BLF Unit has 60 keys. The keys can be programmed as one of the following types:

- **DSS/BLF Keys:** DSS/BLF keys provide one-key access to extension numbers. Together, the lamps in the DSS/BLF keys create a busy lamp field that indicates the status of each station or hunt group assigned to the keys. The LED indicator in the key is solidly lit when the associated station is busy, flashes slowly when the station is in do-not-disturb, flashes fast when the station has a call ringing in, or flutters continuously if the station is causing a STATION OFF-HOOK system alarm. If assigned to a hunt group, the LED indicator is solidly lit when all stations in the hunt group are unavailable (busy, in do-not-disturb, or removed from the hunt group) and it flashes fast when a call is camped on to a busy hunt group.
- **Feature Keys:** The keys on the DSS/BLF Unit can be programmed in the database to be feature keys. Feature keys provide one-key dialing of selected feature codes. The DSS/BLF Unit feature keys can be used just like keyset feature keys.

- **System Speed-Dial Keys:** The keys on a DSS/BLF Unit can be programmed as system speed-dial keys for dialing the system speed-dial numbers that are programmed through the attendant station or programming terminal. These keys function as follows:

- Pressing the key while your station is idle will display the associated speed-dial number on the keyset display.
- Pressing the key while on an intercom call will cause reorder tones.
- If an extension number is stored in the speed-dial location, pressing the key while listening to dial tone dial the extension number. (These keys will not show busy lamp status for the station. They are used only for speed dialing.)
- If an outside number is stored in the speed-dial location, pressing the key while listening to outside dial tone will dial the number.

5.68 The key arrangements for the DSS/BLF Units are programmed in up to eight different arrangements (12 on expanded systems) using the key maps in the database.

D. ATTENDANT COMPUTER CONSOLES

5.69 The Attendant Computer Console is an IBM-compatible personal computer that is connected to an available Keyset Card (KSC) circuit. (It cannot be installed on "dual" KSC-D circuits). It is primarily designed for use by attendants of larger 416/832 System installations where the use of DSS/BLF Units would be difficult because of the number of users. However, it also provides enhanced call processing features, such as electronic text messaging and directory dialing, that would be useful in 416/832 Systems of all sizes. (Refer to the manual provided with the Attendant Computer Console for more information.)

6. USER-PROGRAMMABLE FEATURE KEYS

6.1 Individual keyset keys can be designated as "user-programmable" in the key maps during database programming. All ESLS and SLI feature keys except the FLASH key are user-programmable. The installer programs the default feature codes (see PROGRAMMING, page 5-44) and the station user can reprogram the feature codes as desired.

- **Keyset:** (Default feature codes are shown on page 4-46.) Up to nine user-programmable keyset keys can be programmed to access any of the general feature codes (except Single-Line Call Splitting — 337, which is a single-line feature code). The FWD key can also be programmed with any of the four Call Forwarding feature codes.

- **Single-Line Set:** (Default values are shown on page 4-49.) ESLS and SLI feature keys can be programmed to access any of the general feature codes.

6.2 TO DISPLAY THE CURRENT KEY ENTRIES (ON A DISPLAY KEYSSET):

- (1) While on hook, press the SPCL key and enter the Feature Key Display feature code (326). (Display keysets show DISPLAY FEATURE KEY PROGRAMMING.)
- (2) Press the feature key(s) to be displayed. (Display keysets show the current feature assigned, as the keys are pressed.)

6.3 TO RETURN THE KEYS TO THE VALUES PROGRAMMED IN THE DATABASE:

Keyset: While on or off hook, press the SPCL key and enter the Feature Key Default feature code (325). *If off hook*, hang up.

Single-Line Set: Lift the handset, enter the Feature Key Default feature code (325), and hang up.

6.4 TO PROGRAM THE KEYS:

- (1) **Keyset:** While on hook, press the SPCL key and enter the Feature Key Programming feature code (327). (Display keysets show NOW PROGRAMMING FEATURE KEY.)

Single-Line Set: Lift the handset and enter the Feature Key Programming feature code (327).

- (2) Press the desired feature key. (Display keysets show the feature currently assigned to the key.)
- (3) Enter the feature code to be stored under that key. Keyset users hear a single progress tone when the programming is completed; single-line sets return to intercom dial tone. (Display keysets show the newly programmed feature.) An invalid code causes repeating reorder tones and does not change the feature code assigned to the key. (Display keysets show ERROR! FEATURE CODE INVALID.)

NOTE: If you do not enter a feature code, the programming mode times out when the Long Interdigit timer expires and you hear reorder tones; the feature code assigned to the key remains unchanged.

- (4) **Keyset:** Wait 5 seconds for the display to return to date and time, or lift and replace the handset. To program other keys, repeat the procedure.

Single-Line Set: Hang up. Program other keys by repeating the procedure.

7. AUTOMATIC CALL ACCESS (KEYSETS ONLY)

7.1 This feature allows a keyset user to determine the way incoming calls are answered. Feature codes are entered by the users to select the type of call access. The four variations are as follows:

- The user hears intercom dial tone when the handset is lifted and must press a call or individual trunk key (or the ANSWER key) to access an outside call, or press the IC key to access an intercom call.
- The user can answer ringing intercom calls by simply lifting the handset, but outside calls must be answered by pressing a call or individual trunk key or the ANSWER key. (When the system is in the default state, all keysets have this type of call access.)
- The user can answer ringing outside calls by lifting the handset, but ringing intercom calls must be answered by pressing the IC key.
- The user can answer any ringing call by lifting the handset. If no call is ringing, the user hears intercom dial tone when the handset is lifted. (This option is the way single-line sets work.)

NOTE: In any of the above variations, keyset users may still receive handsfree intercom calls (if enabled).

7.2 The selected option determines how all types of ringing intercom or outside calls (direct calls, transferred calls, recalls, etc.) are answered. If more than one call is ringing at the station, the first call received is the first answered.

7.3 When programmed for automatic trunk access, a station user with allowed answer, but without ring in, for a trunk must always press an individual trunk key (or press SPCL and enter the Automatic Trunk Answer feature code — 350) to answer a non-ringing call. Transferred ringing calls and recalls can be answered by lifting the handset.

7.4 Camped-on calls cannot be answered by simply lifting the handset or pressing the SPKR key. For example, a station is programmed to automatically answer ringing outside calls, but requires pressing the IC key to answer ringing intercom calls. If a private intercom call rings in and is immediately followed by an outside call ringing in, the display shows the intercom call message

and the outside call camps on. The intercom call also camps on when the handset is lifted. The user can then choose between the camped on calls by pressing either the IC key or the call or individual trunk key (or ANSWER key).

7.5 The automatic call access options outlined below can be programmed at keyset stations only. Single-line sets are already designed to automatically answer ringing intercom and outside calls by lifting the handset.

7.6 TO PROGRAM OUTSIDE CALL ACCESS:

- (1) While on hook, press the SPCL key.
- (2) Select the option:
 - a. *If you wish to automatically answer ringing outside calls by lifting the handset*, enter the Automatic Trunk Access feature code (360). You hear a confirmation tone.
 - b. *If you wish to access outside calls by pressing the call key, individual trunk key, or ANSWER key*, enter the Cancel Automatic Trunk Access feature code (361). You hear a confirmation tone.
 - c. *To change the current option to its opposite (toggle on or off)*, enter the Automatic Trunk Access On/Off feature code (374). You hear a confirmation tone.

7.7 TO PROGRAM INTERCOM CALL ACCESS:

- (1) While on hook, press the SPCL key.
- (2) Select the option:
 - a. *If you wish to automatically answer ringing intercom calls by lifting the handset*, enter the Automatic Intercom Access feature code (362). You hear a confirmation tone.
 - b. *If you wish to access ringing intercom calls by pressing the IC key*, enter the Cancel Automatic Intercom Access feature code (363). You hear a confirmation tone.
 - c. *To change the current option to its opposite (toggle on or off)*, enter the Automatic Intercom Access On/Off feature code (364). You hear a confirmation tone.

8. MUSIC-ON-HOLD AND BACKGROUND MUSIC

8.1 The Music-On-Hold feature not only makes waiting on hold as pleasant as possible, but it assures the holding party that the call is still connected.

8.2 Keypad users can choose to listen to background music by entering the Background Music feature code (313) or pressing the MUSIC key. The primary attendant can enable background music for the optional external paging speakers by entering a feature code (see page 4-111).

8.3 The system can be equipped with one or two optional external music sources for the Music-On-Hold and Background Music features. An optional external music source can be a customer-provided radio, tape player, or other device connected to the Matrix Card (MXC) in the equipment cabinet. When a music source is installed, Music-On-Hold is enabled by placing the MOH straps on the Matrix card in the ON position. It can be disabled by placing its straps in the OFF position. If music is not desired, the system can be programmed for tick-tones or silence on hold.

NOTE: In some circumstances, there may be broadcast restrictions associated with the music heard by callers on hold. Check with the music's original distributor and/or the radio station for copyright and broadcast restrictions concerning Music-On-Hold.

8.4 Station users can select a *music channel* that determines which of the two music sources they wish to listen to when camped onto a system resource, when placed on hold by another station, and for keypad background music. The music channels are assigned on a station-by-sta-

tion basis in the database. Station music channel programming can be changed by the user by entering a feature code. The music channel used by system Music-On-Hold and Paging Speaker Background Music is set in the database.

8.5 TO SELECT THE MUSIC CHANNEL:

Keypad: While on hook, press SPCL and enter the Background Music Channel Selection feature code (318). The music channel will change between channels one and two each time the code is entered.

Single-Line Set: Lift the handset, enter the Background Music Channel selection feature code (318) and hang up. The music channel will change between channels one and two each time the code is entered.

8.6 The music channel heard by outside callers is determined on a trunk group-by-trunk group basis in the database.

8.7 Throughout the instructions in this section of the manual, the term "music" refers to the selected option: music, tick-tones, or silence, depending on what is enabled.

8.8 Background music is interrupted for pages. Music over keypad speakers is also interrupted for calls, keypad programming, and ringing.

8.9 TO TURN KEYPAD BACKGROUND MUSIC ON OR OFF:

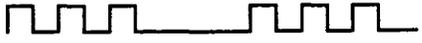
While on or off hook, press the MUSIC key (or press the SPCL key and enter the Background Music On/Off feature code — 313). *If off hook*, hang up.

9. SIGNALS AND TONES

9.1 There are several distinct signals and tones on the 416/832 System. The installer can choose to use these tones (pure system tones), or dial tones and busy tones similar to those of the telephone company (standard tones), by selecting an option in the database (see PROGRAMMING page 5-69).

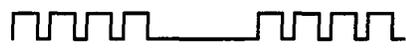
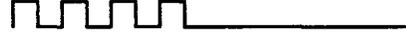
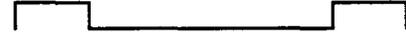
A. RING SIGNALS

9.2 The system signals and tones generated by the ringer or keyset speaker are as follows.

TYPE OF CALL	SIGNAL	
Outside call	Single long tone every 6 seconds	
Intercom call or off-hook voice announce call	Two short tones and a pause (repeats for private calls)	
Queue callback	A repeating signal of three short tones and a long pause	
Recall from transfer or hold	A repeating signal of four short tones and a long pause	
Reminder message	Eight short tones	

B. CALL PROCESSING SIGNALS

9.3 The following signals and tones are heard through the handset or keyset speaker.

SIGNAL		ACTION
Intercom dial tone		Handset lifted or SPKR or IC key pressed.
Double tones (called station receives the same signal)		Intercom call — repeats for private call or call to non-handsfree station; one double tone for handsfree call.
Intercom busy signal — slow repeating tones (until camp on)		Called station or selected trunk is busy.
A repeating signal of four fast tones and a pause		Called station is in do-not-disturb.
Reorder tones — fast tones (may be four tones or continuous)		Number or feature code was not accepted, number did not pass toll restriction, or dialing timer expired.
System busy signal — reorder tones followed by music		All resources are busy, station is camped on.
Single progress tone		Feature procedure completed, or something needs to be entered.
Camp-on tone — single tone every 15 seconds (programmable)		Another station has camped on to this station.
Message waiting tone — six tones followed by intercom dial tone after lifting the handset or hookflashing		A message is waiting at this single-line station.

NOTE FOR SINGLE-LINE SET USERS: When the procedures tell you to hookflash, quickly press and release the hookswitch. If you press the hookswitch to hang up, hold it down until the SL Hookflash Maximum timer expires (default value is 0.7 seconds); otherwise, the system recognizes it as a hookflash. If using an SLI or ESLS, use the FLASH key to perform a hookflash. If using an ESLS, you do not need to hookflash when using one of the programmed feature keys.

10. INTERCOM CALLS

10.1 The intercom can be used to place station-to-station calls that can be answered handsfree. Or, it can be used to place private (non-handsfree) calls. A station user that reaches a busy station can camp on, request a callback (queue), leave a message, or use the Off-Hook Voice Announce feature (if enabled). Other features that apply to both outside and intercom calls, as described later in this section of the manual, include placing calls on hold, call waiting, call transfer, reverse transfer, and call forwarding.

NOTE: Integrated speakerphones, which allow handsfree operation on outside calls and intercom calls, are standard on keysets. ESLSs and SLIs do not have speakerphones.

A. PROGRAMMING FOR PRIVATE INTERCOM CALLS

10.2 A station user can place private (non-handsfree) intercom calls by pressing the pound (#) key before dialing the extension number. Or, the station can be programmed to always send and/or receive private calls using "ring intercom always" or "handsfree disable."

Ring Intercom Always

10.3 A station user can always place private calls by programming the station with the Ring Intercom Always feature code. While this feature is enabled, the called party hears repeating double tones and must lift the handset (or press the SPKR key or IC key) to answer.

10.4 *TO PROGRAM THE STATION TO ALWAYS PLACE PRIVATE INTERCOM CALLS (RING INTERCOM ALWAYS):*

Keyset: While on hook, press the SPCL key and enter the Ring Intercom Always feature code (367) or the Ring Intercom Always On/Off feature code (377).

Single-Line Set: Lift the handset. Enter a Ring Intercom Always feature code (367 or 377) and hang up.

10.5 *TO CANCEL RING INTERCOM ALWAYS:*

Keyset: While on hook, press the SPCL key and enter the Cancel Ring Intercom Always feature code (368) or the Ring Intercom Always On/Off feature code (377).

Single-Line Set: Lift the handset. Enter a Cancel Ring Intercom Always feature code (368 or 377) and hang up.

Keyset Handsfree Enable/Disable

10.6 A keyset user can always receive private calls by disabling the keyset handsfree answering feature using the Disable Handsfree feature code, as described in the following paragraph. The keyset user hears repeating double tones when receiving an intercom call and must lift the handset (or press the SPKR and/or IC key) to answer while this feature is enabled.

10.7 *TO PROGRAM THE STATION TO ALWAYS RECEIVE PRIVATE INTERCOM CALLS (KEYSETS ONLY):*

While on hook, press the SPCL key and enter the Disable Handsfree feature code (310) or the Handsfree On/Off feature code (319).

10.8 *TO RESTORE THE HANDSFREE ANSWERING FEATURE:*

While on hook, press the SPCL key and enter the Enable Handsfree feature code (311) or the Handsfree On/Off feature code (319).

Private Intercom Override

10.9 If a keyset station is programmed with the Private Intercom Override flag, the user can place a handsfree call even if handsfree mode is disabled or ring intercom always is enabled. The caller simply presses * or # while listening to the repeating ring signal of a private call (see the complete procedures for placing an intercom call on the next page). This feature will not work for non-handsfree message replies, system forwards, or transferred calls.

B. STATION-TO-STATION CALLING

Receiving Intercom Calls

10.10 *TO RECEIVE AN INTERCOM CALL ON A KEYSET:*

If you hear a double tone and a call announcement (handsfree call), and the SPKR key is lit, respond handsfree or lift the handset. (Display keysets show INTERCOM CALL FROM EX XXXX [or user name] to identify the source of the call. The source identification remains on the display until the user picks up the handset or presses the SPKR or IC key.)

If you hear repeating double tones (private call), lift the handset, or press the SPKR or IC key to respond handsfree. (Display keysets show INTERCOM CALL FROM EX XXXX [or user name] to identify the source of the call. The source identification remains on the display until the user answers the call.)

10.11 TO RECEIVE AN INTERCOM CALL ON A SINGLE-LINE SET:

When you hear repeating double tones, lift the handset.

10.12 TO RECEIVE A TRANSFERRED-TO-HOLD CALL AT ANY STATION:

When you hear a page announcing that a call is holding at your station:

Keyset: When the IC key is fluttering, lift the handset and press the IC key. Or, while on hook, press the IC key to speak handsfree. You are connected to the caller.

Single-Line Set: Lift the handset and press the HOLD key or enter the Individual Hold feature code (336). You are connected to the caller.

Placing Intercom Calls

NOTE: When placing an intercom call, begin dialing before the Dial Initiation timer expires. If the timer expires, the system drops the connection and sends repeating reorder tones. This prevents a voice channel from being tied up accidentally.

10.13 TO PLACE AN INTERCOM CALL:

(1) Keyset:

To use the handset: Lift the handset.

To use the speakerphone: While on hook, press the SPKR key or the IC key. The SPKR key lights.

Single-Line Set: Lift the handset. (If the DTMF decoders are busy, you hear silence. Hang up and try again.)

(2) If you want to place a private (non-handsfree) call to a keyset, press the pound (#) key.

(3) Dial an extension number. The number can be 0 for the attendant, a station extension number, or a hunt group pilot number. (Display keysets show the number dialed.) If you dial too slowly, the In-

terdigit timer may expire and you will hear repeating reorder tones.

a. *If calling a handsfree keyset station, speak after you hear a double tone.*

b. *If calling a single-line station, a hunt group, or a keyset with handsfree disabled, you hear repeating double tones until the call is answered. NOTE: If your station has the Private Intercom Override feature enabled, you can press * or # when you are calling a keyset station from another keyset and want the call to ring through handsfree.*

c. *If placing a private call, you hear repeating double tones until the call is answered.*

d. *If you dial an invalid number, you hear repeating reorder tones.*

e. *If the called station is busy, you have the following options:*

1. *Hang up and try later. If dialing handsfree (keysets only), press the SPKR key to disconnect.*

2. *Do not hang up, your call camps on. When the called station is available, a private call is placed. Refer to paragraph 10.14 for details.*

3. *Request a busy station callback (queue). This is similar to camping on except that you hang up and wait for the busy station to be available. For more information, refer to paragraph 10.17.*

f. *If you hear a repeating signal of four fast tones and a pause, the station is in do-not-disturb. You can use the Busy Station Callback feature or, if enabled on your keyset, use the Do-Not-Disturb Override feature by pressing SPCL and entering the Do-Not-Disturb Override feature code (373).*

g. *If the called station is busy, in do-not-disturb, or there is no answer, you can leave a message waiting indication with the station itself or with the station's message center. For details, refer to page 4-58.*

h. *If the called station is a busy digital, IMX 12/24-line, or DVK keyset and if all the necessary conditions for OHVA are enabled, you can announce the call using the Off-Hook Voice Announce feature. For a complete explanation of this feature, refer to page 4-61.*

C. INTERCOM CAMP ON AND BUSY STATION CALLBACK (QUEUE)

Camp On

10.14 When a station user calls a busy station or hunt group, the system sends a busy signal. The caller can wait off hook to camp on (after the Camp-On timer expires) and hear music while waiting until the called station is available. The system periodically sends call waiting signals to the busy station(s). Up to 415 stations (831 in an expanded system) can camp on to the same extension number.

10.15 If a station enables do-not-disturb while an intercom call is camped on, the caller is removed from the camped on state and receives do-not-disturb indications (see page 4-69). Intercom callers cannot camp on to a station that is in do-not-disturb.

10.16 TO CAMP ON TO AN EXTENSION NUMBER:

If you hear a busy signal when calling an extension number and wish to camp on, do not hang up. You hear music (if enabled) while camped on. When the station is available, a private call is automatically placed and you hear repeating double tones until the call is answered.

Busy Station Callback (Queue)

10.17 When a called station is busy or in do-not-disturb, the caller can request a callback (queue) and hang up until the station is available. This can be done before or after the call camps on. Each station can have only one active queue request at a time.

10.18 Queue callbacks must be answered before the Queue Callback timer expires. If a callback is not answered, the queue is cancelled. If the station is busy when called back, the queue request is placed behind any other waiting queue requests.

10.19 TO QUEUE A STATION:

(1) **Keyset:** When you hear a busy signal or do-not-disturb signal (a repeating signal of four fast tones and a pause) when calling an extension number, press the QUE key (or press SPCL and enter the Queue Request feature code — 6) and hang up.

Single-Line Set: When you hear a busy signal or do-not-disturb signal when calling an extension number, press the ESLS QUE key, or press the FLASH key (hookflash) and enter the Queue Request feature code (6). Then hang up.

(2) When the queued station is available, you hear a repeating signal of three tones and a long pause. (Display keysets show EXXXXX [or user name] IS NOW AVAILABLE.) Lift the handset. A private call is automatically placed to the queued station.

10.20 TO CANCEL A QUEUE REQUEST (BEFORE THE QUEUED STATION BECOMES AVAILABLE):

Keyset: While on hook, press the QUE key (or press the SPCL key and enter the cancel Queue Request feature code — 376).

Single-Line Set: Lift the handset, enter the cancel Queue Request feature code (376), and hang up.

11. INTER-STATION MESSAGES

11.1 If a station is busy, there is no answer, or it is in do-not-disturb, intercom callers may leave a message waiting indication. The called station's MSG key flashes (and display keysets show the message source). There are two message options:

- **Have the called party return your call.** (Display keysets show the source of the message.) When the called party responds to the message indication, a call is automatically placed to your station.
- **Leave a message with the called party's message center.** (Display keysets show that a message was left with the keyset user's assigned message center.) When the called party responds to the message indication, a call is automatically placed to his or her message center.

11.2 To signal that a message is waiting, a called keyset's MSG key flashes and the display shows the message source. ESLs are equipped with message waiting lamps that, if enabled in the database, light when the station receives a message. For single-line sets, a system programming option can be enabled that sends six short message waiting tones when the user lifts the handset or presses the hookswitch.

11.3 Any station (or hunt group) can be designated as the message center for any other station. However, a station cannot be programmed as its own message center.

11.4 If the designated message center is a voice mail system, the voice mail system is called after the Message (At Message Center) timer expires. When the voice mail system answers the call, the called party's "mailbox" is automatically dialed. The caller can then leave a message in the mailbox. The called party's MSG key flashes and the display shows MESSAGE RECEIVED FROM [Voice Mail].

11.5 Each station user can leave message waiting indications at more than one station, but only one per station. There can be a maximum of 446 waiting messages in a standard system and up to 862 in an expanded system.

11.6 When a station is forwarded or has system forwarding, and a caller leaves a message waiting indication after calling the forwarded station, the message indication appears at the original station instead of the station that received the forwarded call.

11.7 On display keysets, the messages can be viewed in the order they were received and answered as desired.

A. LEAVING MESSAGES

11.8 TO LEAVE A MESSAGE WAITING INDICATION:

- (1) When calling a station, if you hear a busy signal, do-not-disturb signal (repeating signal of four fast tones and a pause), or the call is not answered:

Keyset: Press the MSG key or press SPCL and enter the Message feature code (365).

Single-Line Set: Press the ESLS MSG key, or press the FLASH key (hookflash) and enter the Message feature code (365).

- (2) **To have the called party call you:** Hang up or press a trunk access key or the IC key to disconnect before the Message timer expires. The station will receive a message waiting indication. (Display keysets show MESSAGE RECEIVED FROM [your station].)

To leave the message with the called party's message center: Do not hang up. When the Message timer expires, a private call is automatically placed to the called party's message center. (If the message center is a voice mail system, the called party's mailbox is automatically dialed after the voice mail system answers the call.) Leave your message with the message center and hang up. The called station receives message waiting indications. (Display keysets show MESSAGE RECEIVED FROM [message center].) If the message center does not answer the call (that is placed after the timer expires), the station will still be directed to the message center when retrieving the message.

NOTE: If the station you are calling does not have a designated message center or if the station happens to be your message center, you will hear dial tone immediately after pressing the MSG key. The station will receive a message waiting indication.

Silent Messages

11.9 Silent messages can be placed while on or off hook without making an intercom call to the station.

11.10 TO LEAVE A SILENT MESSAGE:

Keyset: Press SPCL or lift the handset and enter the Silent Message feature code (378). Then dial the extension number of the desired station. *If off hook*, hang up.

Single-Line Set: Lift the handset and enter the Silent Message feature code (378). Then dial the extension number of the desired station and hang up.

Canceling A Message Waiting Indication That You Left

11.11 Occasionally, you may wish to cancel a message waiting indication that you left before the station user responds to the message. If the message was left with the station's message center, you cannot cancel the message waiting indication; only the message center can cancel the message using the procedure outlined below.

11.12 TO CANCEL A MESSAGE YOU LEFT:

- (1) At your station, press the SPCL key (FLASH key on single-line sets) and enter the Cancel Message feature code (366). (Display shows CANCEL MESSAGE ON EXT #).
- (2) Enter the extension number of the station that has the message indication that you wish to cancel. You hear intercom dial tone if off hook, or confirmation tone if on hook. (If a message was not present at the called station, you hear reorder tones).

B. RESPONDING TO MESSAGES

Answering Messages

11.13 TO ANSWER MESSAGES AT A KEYSSET:

- (1) If your MSG key is flashing (display shows MESSAGE RECEIVED FROM EX XXXX [or user name]), lift the handset and press the MSG key. Depending on how the message was left, an intercom call is placed to either the station that left the message or your message center.

NOTE: If, after pressing the flashing MSG key, the called station is unavailable (does not answer a private call, is busy, or is in do-not-disturb), your message key continues to flash (and the display indicates a waiting message) unless you immediately leave a message before hanging up or cancel the message after hanging up. The message waiting indications are cancelled automatically when you are actually connected with the called station.

- (2) If the MSG key continues to flash, there is another message (display shows the next message). Repeat step 1.

11.14 TO ANSWER MESSAGES AT A SINGLE-LINE SET:

- (1) **ESLS:** If your message lamp is lit and/or you hear message waiting tones (six tones) after lift-

ing the handset or hookflashing when the station is idle, press the MSG key. Depending on how the message was left, an intercom call is placed to either the station that left the message or your message center.

Other Single-Line Sets: If you hear message waiting tones (six tones) after lifting the handset or hookflashing when the station is idle, enter the Message feature code (365). Depending on how the message was left, an intercom call is placed to either the station that left the message or your message center.

NOTE: If the called station does not answer, is busy, or is in do-not-disturb, you may hang up or leave a message at that station before hanging up. When the handset is lifted again you will hear message waiting tones, and/or the ESLS message waiting lamp will remain lit (unless you left a message while attempting to retrieve the message or canceled the message after hanging up). The message waiting indications are cancelled when you are actually connected with the called station.

- (2) If you hear message waiting tones after hookflashing or when the handset is lifted again (or if the ESLS message waiting lamp remains lit), there is another message. Repeat from step 1.

Canceling A Waiting Message

11.15 TO CANCEL A MESSAGE WITHOUT ANSWERING AT A KEYSSET:

- (1) If the MSG key is flashing (display shows message), remain on hook and press the asterisk (*) key. The message is cancelled.
- (2) If the MSG key continues to flash, there is another message (display shows the next message). Either respond to it or cancel it.

11.16 TO CANCEL A MESSAGE WITHOUT ANSWERING AT A SINGLE-LINE SET:

- (1) If you receive message waiting tones and/or the ESLS message waiting lamp is lit, enter the Cancel Current Message feature code (379). The message is cancelled.
- (2) If you hear message waiting tones after hookflashing or when the handset is lifted again (or if the ESLS message waiting lamp remains lit), there is another message. Either respond to it or cancel it.

Viewing Waiting Messages

11.17 TO VIEW RECEIVED MESSAGES AT A DISPLAY KEYSSET:

- (1) If your MSG key is flashing, one or more messages are waiting. While on hook, press the MSG key repeatedly to view waiting messages.
- (2) *If desired*, you can answer or cancel a message while it is displayed.

Alternate Message Source

11.18 The Alternate Message Source feature was developed to enable a voice mail system to leave messages through a station or hunt group that is designated as its alternate message source. When a message is left on the voice mail system for a station user that has an assigned mailbox, the voice mail unit automatically dials the Message feature code (365) and then dials the extension number of the called station. The called station receives the message waiting indications. If it is a display keyset, the display shows MESSAGE RECEIVED FROM [alternate message source] rather than from the voice mail circuit. An actual intercom call has not been placed; only the message waiting indications are affected. When the station user retrieves the message, an intercom call is placed to the alternate message source.

11.19 Two possible applications for this feature are: routing messages through a trunk card circuit to allow

keysets (other than AIM, digital, or DVK keysets) to use DTMF tones to retrieve messages, and routing message through a hunt group to make efficient use of voice mail resources. These applications are described below.

11.20 Routing messages through a trunk card circuit: To achieve this function, an unused single-line circuit is programmed as the alternate message source for the voice mail circuits and is then programmed to automatically forward calls to a trunk card circuit that is connected to the voice mail unit. When a user responds to a message left by a voice mail port, the alternate message source station is accessed and the call is automatically forwarded to the trunk card circuit. This leaves the voice mail ports available to receive messages through intercom channels while the trunk card circuit is in use.

11.21 Routing messages through a hunt group: To make efficient use of multi-port voice mail units, the ports are placed in a voice mail hunt group and the voice mail hunt group's pilot number is assigned as the alternate message source for each of the individual voice mail ports. When a user responds to a message left by one of the voice mail ports, the pilot number is automatically dialed and the call circulates through the hunt group until a voice mail port is available. Without the alternate message source hunt group, the call would return only to the port that left the message and would not circulate through the hunt group.

12. OFF-HOOK VOICE ANNOUNCE (OHVA)

12.1 The Off-Hook Voice Announce (OHVA) feature allows an intercom caller (either single-line or keyset) to establish voice contact with the called keyset user, even though the user already has a call in progress on the handset. The called keyset user can then talk freely on both connections, using the handset for the original call and the speakerphone for the OHVA intercom call. Note that the caller on the handset call *will* be able to hear the OHVA call.

12.2 A PC Data Port Module (PCDPM) must be installed on digital keysets to provide the secondary voice path needed for the OHVA feature. The IMX 12- and 24-line keysets and Inter-Tel/DVK keysets do not require any additional equipment.

12.3 The OHVA feature must be enabled in the database. When the system is in the default state, the system flag for this feature is enabled. Each digital keyset, IMX 12/24-line keyset, and DVK keyset can be programmed for *placing* and/or *receiving* OHVA calls, and each eight-line keyset and single-line set can be programmed for *placing* OHVA calls, as desired. (Eight-line keysets and single-line sets cannot receive OHVA calls since they do not have secondary voice path circuitry.) For example, all attendants may be allowed to make, but not receive, OHVA calls, while all other stations are allowed to receive, but not place, OHVA calls. Any combination is available through database programming.

12.4 OHVA calls cannot be processed if the secondary voice path or the speakerphone of the called keyset is not available. This occurs when the keyset has a different OHVA call in progress, has an active data call in progress, is on an active handsfree intercom or outside call, has handsfree disabled, has a headset enabled, or is in do-not-disturb. Also, OHVA calls are not possible if the caller is placing a forced private intercom call.

12.5 TO PLACE AN OFF-HOOK VOICE ANNOUNCE CALL:

- (1) When an intercom call is placed to a busy OHVA-enabled keyset, do not hang up. You hear busy signals until the Camp-On and OHVA Screening timers expire. (If you hear music after the Camp-On timer expires, conditions for an OHVA call were not met and you are camped-on. See page 4-57.)
- (2) When the OHVA Screening timer expires (and if the keyset's secondary voice path is available), you are automatically connected to the called party's speakerphone.

12.6 TO PLACE AN OFF-HOOK VOICE ANNOUNCE CALL (KEYSETS WITH DSS/BLF UNITS ONLY):

NOTE: This method can only be used if the database has been programmed to allow keysets with attached DSS/BLF Units to bypass the Camp-On and OHVA Screening timers. See page 5-54 in PROGRAMMING. This is a useful option for attendant stations.

- (1) When an intercom call is placed (using the DSS/BLF key) to a busy OHVA-enabled keyset, do not hang up.
- (2) Press the DSS/BLF key for that keyset again. If the keyset's secondary voice path is available, you are immediately connected and may speak.

12.7 TO RECEIVE AN OFF-HOOK VOICE ANNOUNCE CALL (OHVA-ENABLED KEYSETS ONLY):

- (1) While on a call using the handset, you hear a camp-on tone (display shows CALL ANNOUNCE FROM EX XXXX [or user name]). Do nothing. When the OHVA Screening timer expires, you hear a double tone (display shows INTERCOM CALL FROM EX XXXX [or user name]). You are connected with the intercom caller via the speakerphone. Your original call remains connected on the handset.

NOTE: If you press the MUTE key while speaking to the caller on the speakerphone, the handset microphone will be muted and the caller on the handset will not hear the OHVA call. Press MUTE again to enable the handset.

- (2) To terminate the OHVA call: Press the lit SPKR key or have the OHVA caller hang up. If you terminate the original call by hanging up the handset, you remain connected to the OHVA call in the handsfree intercom mode.

12.8 TO BLOCK AN OFF-HOOK VOICE ANNOUNCE CALL (OHVA-ENABLED KEYSETS ONLY):

- (1) While on a call using the handset, you hear a camp-on tone (displays CALL ANNOUNCE FROM EX XXXX [or user name]). To cause the intercom call to camp on, press the SPKR or DND key. The IC key flashes.
- (2) If you wish to send do-not-disturb signals to the camped-on call, press the DND key two more times if the DND key was used in step 1, or press the DND key once if the SPKR key was used in step 1.

13. OUTSIDE CALLS

13.1 When a trunk is selected for receiving or placing an outside call, the voice channel is seized and cannot be used by any other station (unless Privacy Release is enabled, see page 4-74, or the Conferencing feature is used, see page 4-76). If the desired trunk is busy, the station user can camp on or request a callback (queue). Other features that apply to both outside and intercom calls are discussed later in this section of the manual. They include placing calls on hold, call waiting, call transfer, reverse transfer, conferencing, and call forwarding. Refer to page 4-24 for an explanation of outgoing-access, allowed-answer, and ring-in assignments. Refer to page 4-31 for an explanation of trunk groups, auto trunks, and the use of the automatic trunk answer and selection feature codes.

A. PLACING OUTSIDE CALLS

NOTE: When placing a call, begin dialing before the Dial Initiation timer expires. If the timer expires, the system drops the trunk connection and sends repeating reorder tones. This prevents a trunk from being tied up accidentally.

13.2 TO PLACE AN OUTSIDE CALL:

- (1) Lift the handset. (Keyset users can dial on hook. Refer to page 4-64.)
- (2) Select an outgoing trunk, using one of the methods below. The associated individual trunk or call key flashes slowly. (If on hook, the SPKR key is lit.)

NOTE: You must have outgoing access to a trunk to seize it.

Keyset: Select a trunk using one of the following methods:

- a. Press an individual trunk key for direct access.
- b. Enter the Automatic Trunk Selection feature code (89) or press the ANSWER key. If no call is ringing or holding, the system selects the highest-numbered available auto trunk.
- c. Enter a select trunk group feature code (e.g., 801-889) or press a trunk group key. This selects a trunk in the chosen trunk group.
- d. Refer to the Least-Cost Routing (LCR) procedure on the next page.

Single-Line Set: Select a trunk using one of the following methods:

- a. Enter the Automatic Trunk Selection feature code (89).
- b. Enter a select trunk group feature code (e.g., 801-889) or press a trunk group key.
- c. Refer to the Least-Cost Routing (LCR) procedure on the next page.

(3) You hear one of the following signals:

- a. **Outside dial tone:** (*If you wish to use your class-of-service account code, press SPCL or FLASH (hookflash) and enter the Optional Account Code feature code (390) then enter your account code. Your usual SCOS is enabled for this call.*) To dial, manually dial, speed dial, or redial the desired telephone number. (Display keysets show the numbers dialed. When the Valid Call timer expires, the display shows the elapsed time and call cost.) *If you hear repeating reorder tones, you dialed a restricted number. Also, if you dial too slowly and the Interdigit timers expire, the call may be dropped, and you will hear repeating reorder tones. If using a keyset that is on hook, you may lift the handset to speak privately. Go to the next step. On keysets, an individual trunk or call key flashes slowly.*
- b. **Single progress tone:** Enter a forced account code (refer to page 4-66). The display shows ACCT#. You hear outside dial tone when the code is accepted. On keysets, an individual trunk or call key flashes slowly. *If you entered your class-of-service account code, your usual SCOS is enabled for this call. Go to the next step.*
- c. **Repeating reorder tones:** You are restricted from the trunk group chosen; choose another trunk group. Or, you are restricted to using LCR only; try again using LCR (see next page). If your call has been blocked because the weekly toll limit has been exceeded, the display shows CALL FAILED - TOLL LIMIT EXCEEDED.
- d. **Intercom dial tone:** You have accessed a dial-repeating E&M trunk. You can dial an extension number to reach a station on the other telephone system. Or, you can enter a valid trunk access code (determined by the other telephone system) and dial and outside telephone number, if allowed.

- e. **Ring signal:** You have accessed an auto ring-in E&M trunk. When the station user answers, you can ask to be transferred to the desired extension number or to an outside telephone number.
- f. **Busy signal:** The chosen trunk, trunk group, or E&M destination is busy. Camp on (see page 4-57), use the Busy Trunk Callback (Queue) feature (see page 4-57), or select another trunk or trunk group.

13.3 TO PLACE A CALL USING LEAST-COST ROUTING:

- (1) Lift the handset.
- (2) **Keypad:** Enter the Least-Cost Routing feature code (9), or press a call key, the OUTGOING key, or the LCR key. You hear a single progress tone followed by silence if LCR is not "transparent." You hear dial tone if LCR is transparent.

Single-Line Set: Press the SLI LCR key, the ESLS OUT key, or enter the Least-Cost Routing feature code (9). You hear a single progress tone followed by silence if LCR is not "transparent." You hear dial tone if LCR is transparent.

NOTE: If required, enter a forced account code. (Display keysets show ACCT#.) You hear a progress tone when the code is accepted. *If your enter your class-of-service account code, your usual SCOS will be enabled for this call.*

- (3) Dial the telephone number. Use the MUTE key to backspace if you make a mistake. Include the area code, if needed. *If desired*, press the pound (#) or asterisk (*) key after dialing to immediately proceed; otherwise there is a slight delay. You hear one of the following signals.

NOTE: When dialing 911 or 1911 emergency numbers, always press # or * after dialing so that the call is processed as quickly as possible.

- a. **Single progress tone (followed by dial tone and digits being dialed, if programmed**

and if LCR is not transparent): Your call is being placed. The associated individual trunk or call key flashes slowly.

- b. **Busy signals, then music:** All of the trunks in the least-expensive facility group are busy. Do one of the following:

- 1. **To wait for the next facility group:** Continue to wait off hook. If programmed, the next facility group is checked for an available trunk after the LCR Advance timer expires (you hear a progress tone and remain camped on if your station is programmed for LCR facility group camp-on). When the system accesses a trunk, you hear dial tone (and possibly digits being dialed). The associated individual trunk or call key flashes slowly on keysets.

- 2. **Request a callback (queue):** If your station is enabled with LCR facility group camp-on, request a busy trunk callback (refer to paragraph 13.11). The system places your station in a queue for one trunk in the least-expensive facility group. When you hear a repeating signal of three tones and a long pause (and display shows GRP #XX [or group name] IS NOW AVAILABLE), lift the handset; keypad users must also press the fast flashing call key or individual trunk key (or the ANSWER key). You hear dial tone and digits being dialed. The associated individual trunk or call key flashes slowly.

- c. **Repeating reorder tones:** You are restricted from the number dialed or from using the route selected. If your call has been blocked because the weekly toll limit has been exceeded, the display shows CALL FAILED - TOLL LIMIT EXCEEDED.

B. RECEIVING OUTSIDE CALLS

13.4 TO RECEIVE AN OUTSIDE CALL:

Keyset:

- (1) When one of the following occurs, lift the handset:
 - a. Repeating long tones and a call key or individual trunk key is flashing at the fast rate: A call is ringing in. (Display keysets show CALL RINGING IN ON GRP #XX [or group name].)
 - b. Intercom call or page announcing a call and a call key or individual trunk key is flashing at the fast rate: A call has been transferred to your station. (Display keysets show GRP #XX [or group name] TRANSFER FROM EX XXXX [or user name].)
 - c. An individual trunk key is flashing at the fast rate, there is no ring signal, and you have allowed answer for the trunk. You may hear ringing on another keyset: Press the fast-flashing individual trunk key as described below or enter the Automatic Trunk Answer feature code (350). (The ANSWER key cannot be used to answer these calls.) Skip step 2.
- (2) Press the fast-flashing individual trunk or call key or press the ANSWER key. The individual trunk or call key flashes slowly during the call.

Single-Line Set:

If you hear a page announcing a transfer and/or repeating long tones, a call is ringing in. Lift the handset; you are connected to the caller.

If you hear a call ringing in on another station and you have allowed answer, lift the handset and enter the Automatic Trunk Answer feature code (350). You are connected to the lowest-numbered trunk ringing in for which you have allowed answer.

13.5 TO RECEIVE A CALL THAT WAS TRANSFERRED TO HOLD:

When you hear a page announcing that an outside call is holding at your station (a call key or individual trunk key is fluttering) do the following.

Keyset: Lift the handset and press the fluttering call key or individual trunk key, or press the ANSWER key. You are connected to the caller.

Single-Line Set: Lift the handset and press the HOLD key or enter the Individual Hold feature code (336). You are connected to the caller.

C. KEYSSET ON-HOOK DIALING AND MONITORING

13.6 A keyset user can dial numbers while on hook, monitor the call (listen to a recorded message, wait for the call to be answered, or wait on hold), and then speak handsfree when answered.

13.7 TO DIAL ON HOOK:

- (1) While on hook, press an available individual trunk key or trunk group key, the OUTGOING key, or the ANSWER key. Or, enter a trunk access code (e.g., 9, 89 or 801-889). The SPKR key lights, you hear outside dial tone (unless using LCR), and the associated call key or individual trunk key flashes slowly.
- (2) Begin dialing the telephone number before the Trunk Pre-Select timer expires. Then press the pound (#) or asterisk (*) key to signal the system to begin sending the dialed digits, or wait for the Short Interdigit timer to expire. (Display keysets show number dialed; after the Valid Call timer expires, it shows elapsed time and call cost.)
- (3) To use the speakerphone: Speak handsfree when the party answers.

To use the handset for privacy: Lift the handset and speak. The SPKR key goes off. You may later transfer back to the speakerphone by pressing the SPKR key and hanging up.

- (4) To terminate the call: *If on hook*, disconnect by pressing the SPKR key. *If off hook*, hang up.

13.8 TO USE ON-HOOK MONITOR:

- (1) While on a call, press the SPKR key and hang up. *If you do not want to be heard*, press the MUTE key or press SPCL and enter the Microphone Mute On/Off feature code (314). You can hear the other party (if the microphone is muted, you cannot be heard). The SPKR key is lit (and the MUTE key is lit if the microphone was muted).
- (2) To return to the conversation: You may lift the handset or speak handsfree. (If the microphone was muted, press the lit MUTE key to speak. The MUTE key goes off.)

D. TRUNK CAMP ON AND BUSY TRUNK CALLBACK (QUEUE)

Camp On

13.9 When a station user attempts to access a busy outgoing trunk or trunk group, the system sends a busy signal. The station user can wait off hook to camp on until the trunk is available.

13.10 TO CAMP ON TO AN OUTGOING TRUNK GROUP:

- (1) When you hear a busy signal after selecting an outgoing trunk, do not hang up. You camp on and hear music until a trunk in the trunk group is available.
- (2) When you hear a single progress tone and outside dial tone, dial the desired telephone number. The associated call key or individual trunk key flashes slowly.

Busy Trunk Callback (Queue)

13.11 If you attempt to access a busy outgoing trunk group and hear a busy signal or if you camp on, you can request a callback (queue) and hang up until the system signals your station that a trunk in the trunk group is available. Each station can place only one queue request at a time. If a second request is made, the first request is cancelled and replaced by the second request.

13.12 Queue callbacks must be answered before the Queue Callback timer expires. If a callback is not answered, the queue is cancelled. If the station is busy when a trunk in the queued trunk group becomes available, the queue request is placed at the end of the queue list.

13.13 TO QUEUE A BUSY OUTGOING TRUNK:

- (1) **Keyset:** When you hear a busy signal while selecting a trunk or if you are camped on, press

the QUE key (or press the SPCL key and enter the Queue Request feature code — 6) and hang up.

Single-Line Set: When you hear a busy signal while selecting a trunk or if you are camped on, press the ESLS QUE key; or press the FLASH key (hookflash), enter the Queue Request feature code (6). Hang up.

- (2) Your station rings (a repeating signal of three tones and a long pause) when the queued trunk is available. (Display keysets show GRP #XX [or group name] IS NOW AVAILABLE.)
- (3) **Keyset:** Lift the handset, press the fast-flashing call key, individual trunk key, or the ANSWER key, and dial the desired telephone number. The associated call key or individual trunk key flashes slowly. If LCR was used when the call was placed originally, the number is dialed automatically.

Single-Line Set: Lift the handset and dial the desired number. If all DTMF decoders are busy when your station is called back, the system sends repeating reorder tones instead of dial tone and the queue is cancelled. If LCR was used when the call was placed originally, the number is dialed automatically.

13.14 TO CANCEL A QUEUE BEFORE THE CALLBACK:

Keyset: While on hook, press the QUE key (or press the SPCL key and enter the Cancel Queue Request feature code — 376).

Single-Line Set: Lift the handset, press the ESLS QUE key or enter the Cancel Queue Request feature code (376), and hang up.

E. ACCOUNT CODES

13.15 There are four types of account codes in the 416/832 System. All account codes are assigned the same character length (4–8 characters) in database programming. The account code types are as follows:

- **Standard account codes** automatically appear in the SMDR report (if programmed) to identify the station that answered or initiated the call. Up to 64 standard account codes can be defined in a standard system and up to 128 in an expanded system. Stations can then be assigned one of the standard account codes during station programming.
- **Forced account codes** are programmed on a station-by-station basis. If required, a forced account code must be entered before the station user is given access to a selected outgoing trunk group (refer to page 4–62, step 3 for procedures). Every station can be assigned a forced account code in the database programming. The account code entered by the station user must match any one of the programmed forced account codes before trunk access is granted. The forced account code appears in the SMDR account code field.
- **Forced account codes for toll calls only** can be programmed for stations with LCR-Only toll restriction in day *and* night modes. When this account code type is enabled, the user only has to enter an account code if the system detects that a toll call has been dialed when LCR is used.
- **Optional account codes** are used to identify calls to and from customers for billing purposes. They can be entered at any time during a call. These user-defined codes are not pre-programmed, but must be the same length as the standard and forced account codes. If entered, optional account codes are printed in the SMDR/SMDA report for that call in place of standard or forced codes that may have been used.
- **Class-of-service account codes:** If the system-wide class-of-service account code option is enabled, individual stations can be assigned account codes that the users can enter at other stations to enable their usual SCOS. When a user is at a station other than his own, he can enter the class of service account code before placing an outgoing call. The system will then check the station circuit that is associated with that account code and apply the appropriate SCOS (it will not apply the trunk access permission or LCR

advance class of service). The class-of-service account code can be entered when the system requests a forced account code (as described in paragraph 13.2 on page 4–62) or by using the Optional Account Code feature code (described below). The SCOS is enabled for one call only. When the call is completed, the station's normal SCOS goes back into effect.

13.16 Forced account codes can be validated or non-validated.

- **Validated:** If the entered code matches one of the pre-programmed forced account codes in the database, the call is allowed. If the code does not match, the call is blocked.
- **Non-Validated:** The code is not checked against any lists and the call is allowed as soon as the code is entered.

13.17 *TO ENTER AN OPTIONAL OR CLASS-OF-SERVICE ACCOUNT CODE WHILE ON AN OUTSIDE CALL:*

NOTE: Optional account codes can be entered at any time during a call. However, a class-of-service account code must be entered before the telephone number is dialed. The last code entered during the call will appear in the SMDA/SMDR report.

- (1) **Keypad:** Press the SPCL key and enter the Optional Account Code feature code (390). (Display keysets show ACCT#.) The outside party does not hear you enter the code.

Single-Line Set: Press FLASH and enter the Optional Account Code feature code (390). The outside party hears music until step 2 is completed.

- (2) Enter the account code using the keypad; keypad users may press an SD key to enter an account code number that has been stored in an outside speed-dial number location. (Display keysets show numbers.) You hear a single progress tone when the code is accepted. Single-line users are reconnected when the system accepts the account code. (If an account code is entered that has fewer than the programmed number of digits, single-line users will return to the call after the Short Interdigit timer expires. Keypad users will hear reorder tones. The code will not appear in the SMDR.)

14. PLACING CALLS ON HOLD

14.1 There are several ways to place intercom and outside calls on hold. While on hold, the caller hears music (if equipped). There are five hold applications in the 416/832 System:

- **Individual hold** places the call on hold at one station. It can then be picked up directly at that station or it can be picked up at another station using the Reverse Transfer feature.
- **System hold** places the call on hold so that it can then be picked up directly at any keyset station that has an individual trunk key for the associated trunk or at the station that placed it on hold using the individual trunk key or call key. (Single-line set users cannot place calls on system hold or pick up calls already on system hold.) Attempting to place a conference on system hold will place the caller(s) on individual hold. Intercom calls cannot be placed on system hold.
- **Consultation hold** allows a single-line set user to pause during a call, use other system features, and then return to the caller by pressing the FLASH key (hookflashing). If a single-line set user attempts to hang up after placing a call on consultation hold, the call recalls the station.
- **Call splitting** allows a station user to place two or more calls on individual hold and then easily split between the calls.
- **Skate-to-hold**, if enabled in the database, allows keyset users to place calls on individual hold when another key is pressed during a call (instead of pressing the HOLD key). When the system is in the default state, pressing another key disconnects calls (skate-to-disconnect).

14.2 If an outside call remains on hold until the Hold timer expires, it recalls the station. If it is still unanswered when the Recall timer expires, it recalls the station's attendant. If the attendant does not answer the recall before the Abandoned Call timer expires, the call is disconnected by the system. (If the station does not have an attendant, or the system is in night mode, the call recalls the station that placed it on hold until the Abandoned Call timer expires and the call is disconnected.) Intercom calls do not recall the attendant.

NOTE: Keyset users can avoid the Hold timer by muting the microphone during a call instead of placing the call on hold. If this is done, the caller will not hear music-on-hold and will not recall the station.

A. INDIVIDUAL HOLD

14.3 TO PLACE AN INTERCOM OR OUTSIDE CALL ON INDIVIDUAL HOLD:

- (1) While on the call:

Keyset: Press the HOLD key (or press the SPCL key and enter the Individual Hold feature code — 336). You hear intercom dial tone and the call key, individual trunk key, or IC key flutters. (NOTE: If the system is programmed with the skate-to-hold option, pressing another key will place the call on hold.)

ESLS: Press the HOLD key. You hear intercom dial tone.

SLI: Press the FLASH key (hookflash) and press the HOLD key or enter the Individual Hold feature code (336). You hear intercom dial tone.

Other Single-Line Sets: Hookflash and enter the Individual Hold feature code (336). You hear intercom dial tone.

- (2) Hang up or place another call.

14.4 TO RETURN TO THE CALLER ON INDIVIDUAL HOLD:

Keyset: Lift the handset. Press the fluttering IC key for intercom calls, or press the fluttering call key or individual trunk key (or the ANSWER key) for outside calls.

Single-Line Set: Lift the handset and press the HOLD key or enter the Individual Hold feature code (336).

B. SYSTEM HOLD

NOTE: Intercom calls cannot be placed on system hold. If you attempt to do so, you will hear reorder tones.

14.5 TO PLACE AN OUTSIDE CALL ON SYSTEM HOLD:

- (1) While on a call, press the SPCL key and enter the System Hold feature code (335). You hear intercom dial tone and the associated call key or individual trunk key flutters.
- (2) Hang up or place another call.

14.6 TO ACCESS A CALL ON SYSTEM HOLD:

At any keyset that shows a fluttering individual trunk key for the call or at the station that placed the call on hold that shows a fluttering individual trunk or call key, lift the handset and press the fluttering key.

C. CONSULTATION HOLD

14.7 TO USE CONSULTATION HOLD (SINGLE-LINE SETS ONLY):

- (1) While on a call, press the FLASH key (hookflash) to place the call on consultation hold. You hear two short tones followed by dial tone.
- (2) You can call another station or enter a feature code. If you attempt to access an outgoing trunk, you will hear reorder tones.

NOTE: If you hang up while the call is on consultation hold, the call will immediately recall your station. If you hang up after dialing an extension number, the call will transfer to that station.

- (3) Return to the caller on hold by pressing the FLASH key (hookflashing).

D. CALL SPLITTING

14.8 KEYSSET CALL SPLITTING:

NOTE: The feature code named Keypad Call Splitting (338) is used only in the Call Transfer feature. To split between calls on individual hold, use the following procedure. The Call Transfer instructions are on page 4-70.

- (1) When two or more calls are on hold, access the first call on hold by pressing the fluttering call key, individual trunk key, or IC key.
- (2) If the system is programmed to place calls on hold when another key is pressed, skip this step. Place the call back on hold by pressing the HOLD key (or pressing the SPCL key and entering the Individual Hold feature code — 336). You hear intercom dial tone and the key flutters again.
- (3) Access the next call by pressing another fluttering call key, individual trunk key, or the IC key.
- (4) Steps 2 and 3 can be repeated as desired.

14.9 SINGLE-LINE SET CALL SPLITTING:

- (1) Place one or more calls on hold:
ESLS: Press the HOLD key for each call. While on the last call, go to the next step.
SLI and Other Single-Line Sets: Press the FLASH key (hookflash) and then the HOLD key or enter the Individual Hold feature code (336) for each call. While on the last call, go to the next step.
- (2) While on the last call, when you are ready to split between calls on hold, press the FLASH key (hookflash) and enter the Call Splitting feature

code (337). That call is placed on hold and you are connected to the first call that was placed on hold in the first step.

- (3) Press the FLASH key (hookflash) and enter the Call Splitting feature code (337) every time you wish to be connected to the next holding call. The current call returns to the end of the list. After pressing the FLASH key, wait at least 2 seconds before pressing it again.
- (4) Hang up to disconnect the current call and cancel call splitting. You can then place or receive calls or return to any remaining calls on hold by lifting the handset and pressing the HOLD key (or entering the Individual Hold feature code — 336).

E. HOLD RECALL

14.10 TO ANSWER A HOLD RECALL:

When you hear a repeating signal of four tones and a pause (display shows HOLD RECALL FROM EX XXXX [or user name] or GP #XX [or group name]), lift the handset. Single-line sets are automatically connected; keypad users may need to press the flashing call or individual trunk key.

F. MICROPHONE MUTE

14.11 Whether handsfree or using the handset, you can temporarily turn off your microphone while on a call. The call is still connected; you can hear the other party, but they cannot hear you. Since the call is not placed on hold, no timer is activated. The MUTE key is lit when the microphone is muted; the light will go off when you press the MUTE key to re-enable the microphone.

14.12 If you press the MUTE key while speaking to an off-hook voice announce caller on the speakerphone, the handset microphone will be muted and the caller on the handset will not hear the OHVA call. When you press MUTE again, the handset microphone is re-enabled.

14.13 MUTING THE KEYSSET MICROPHONE:

- (1) To temporarily turn off your microphone while on a call, press the MUTE key (or press SPCL and enter the Microphone Mute On/Off feature code [314]). The MUTE key is lit. *If off hook*, do not hang up (unless you press the SPKR key first).
- (2) Press the lit MUTE key or enter the feature code to turn the microphone on. The MUTE key goes off.

15. CALL WAITING

15.1 While a station is in use, incoming intercom and outside calls camp on until the busy station is available. The busy party hears a single camp-on tone every 15 seconds (unless the Camp-On Tone timer is changed or camp on tones are disabled at the station). Three station programming flags allow camp-on tones to be enabled or disabled for incoming intercom/trunk calls, E&M calls, and/or DID calls.

15.2 TO RESPOND TO A WAITING CALL USING A KEYSSET:

If, while on a call, you hear a single camp-on tone and see the IC key or a call key or individual trunk key flashing fast, you have a call waiting. (Display keysets show CALL RINGING IN ON GRP #XX [or group name] or INTERCOM CALL FROM EX XXXX [or user name] or EX XXXX [or user name] TRANSFER FROM EX XXXX [or user name] or XXXX RECALL FROM XXXX each time you hear the tone.) Do one of the following:

- (1) *If you wish to end the current call*, hang up. A waiting outside call rings as an incoming call; an intercom call rings as a private call. Answer as usual.

If you wish to place the current call on hold, press the HOLD key (or press the SPCL key and enter the Individual Hold feature code — 336). The call or individual trunk key or IC key flutters (unless an intercom call is camped on; the IC key flashes fast until the camped on call is picked up, then the IC key flutters). Access the waiting call by pressing the flashing call or individual trunk key or IC key.

- (2) **To return to the holding call:** Press the fluttering individual trunk key, call key, or IC key.

15.3 TO RESPOND TO A CALL WAITING USING A SINGLE-LINE SET:

When you hear a single camp-on tone every 15 seconds while you are on a call, another call is waiting. Do one of the following.

- (1) *If you wish to end the current call*, hang up. The call rings at your station. Lift the handset.

If you wish to place the current call on hold, do the following. You will be connected with the waiting caller.

ESLS: Press the HOLD key. You are connected with the waiting caller.

SLI and Other Single-Line Sets: Press the FLASH key (hookflash) and then the HOLD key or enter the Individual Hold feature code (336). You are connected with the waiting caller.

- (2) **To return to the first call on hold:**

If you wish to end the current call, hang up. Return to the holding call by lifting the handset and pressing the HOLD key or entering the Individual Hold feature code (336).

If you wish to place the current call on hold and connect with the original call:

ESLS: Press the HOLD key twice.

SLI and Other Single-Line Sets: Press the FLASH key (hookflash) and then the HOLD key or enter the Individual Hold feature code (336) twice.

15.4 TO MOVE A CAMPED-ON INTERCOM CALL TO DO-NOT-DISTURB:

While on a call, you hear call waiting signals:

Keyset: Press the DND key or enter a Do-Not-Disturb feature code (370 or 372). The DND key lights. The intercom caller is no longer camped on and receives do-not-disturb indications.

Single-Line Set: Press the FLASH key (hookflash) and enter a Do-Not-Disturb feature code (370 or 372). The intercom caller is no longer camped on and receives do-not-disturb indications. Press the FLASH key (hookflash) again to return to the current call.

16. CALL TRANSFER

16.1 There are several feature codes for transferring intercom and outside calls to other stations or to outside telephone numbers. The call transfer options are as follows:

- **Transfer CO Call:** You can transfer outside calls to another station or to an outside telephone number.
- **Transfer Intercom Call:** Intercom calls can be transferred to another station or to an outside telephone number.
- **Transfer To Hold:** Either intercom or outside calls can be transferred to another station and placed on hold using this feature.

16.2 In addition, transfer-to-park locations can be set up by the installer. A transfer-to-park location is a station circuit with an extension number that is not equipped with a station instrument. Calls can be transferred to these locations and then reverse transferred by any station user. If all station circuits are equipped, you cannot assign a transfer-to-park location.

A. TRANSFER TO AN EXTENSION NUMBER

16.3 TO TRANSFER A CALL TO AN EXTENSION NUMBER:

(1) **Keyset:**

If on an outside call, press the XFR key (or press the SPCL key and enter the Transfer CO Call feature code — 345). You hear intercom dial tone.

If on an intercom call, press the SPCL key and enter the Transfer Intercom Call feature code (346). You hear intercom dial tone.

Single-Line Set: While on a call, press the FLASH key (hookflash). You hear two short tones followed by intercom dial tone.

- (2) Dial the desired extension number or press a SPD/BLF key. The number can be a station extension number, 0 for the attendant, a hunt group pilot number, the voice mail system access number, or a transfer-to-park location number.

- a. **Transfer to a station that is forwarded to voice mail:** You hear repeating double tones and the display shows DEST FORWARDED TO VOICE MAIL. You can then hang up to complete the transfer, or return to the caller on transfer hold by doing one of the following:

For an outside or intercom call, press the XFR key twice (or press the SPCL key once and enter the Transfer Call feature code [345] twice).

For an outside call, press the call key or individual trunk key.

- b. **Transfer to voice mail:** You hear a single tone and the system waits for you to enter the mailbox number (display shows ENTER VOICE MAILBOX #). Enter the desired mailbox number.

If you do not enter a mailbox number before you hang up, the caller will be connected to the voice mail unit and must enter the mailbox number after listening to the introductory voice prompts.

If the system is checking for a valid mailbox number and you enter a valid mailbox number, the transfer is completed to voice mail (display shows CALL TRANSFERRED TO VOICE MAIL).

If the system is checking for a valid mailbox number and the number you entered is invalid, you hear reorder tones (display shows INVALID MAILBOX NUMBER ENTERED) and you must enter the correct number.

If the system is not checking for a valid mailbox number, hang up to complete the transfer.

- c. **Transfer-to-park:** If transferring to a transfer-to-park location, hang up to complete the transfer, or transfer the call to hold as described in the second part of step 5. Then page the desired party and announce the call. The party must reverse transfer the call. Note that if the call is not answered, it will recall your station if transferred directly or will recall the called transfer-to-park location's attendant if transferred to hold.

- d. **Transfer to a hunt group:** If transferring the call to a hunt group, the transfer is automatically completed when you dial the pilot number. Hang up.

- (3) *If desired, wait for an answer and announce the call. One of the following occurs:*

- a. *If the call is accepted, go to the next step.*

- b. *If the call is refused, return to the caller:*

Keyset: Do one of the following:

For an outside or intercom call, press the XFR key twice (or press the SPCL key once and enter the Transfer Call feature code [345] twice).

For an outside call, press the call key or individual trunk key.

Single-Line Set: Press the FLASH key (hookflash) once to disconnect the call (or wait for the other party to hang up). Then press the FLASH key again (hookflash) to return to the caller on transfer hold.

c. *If the station is busy or there is no answer:*

To return to the caller: Refer to step b above.

To try another station: Press the XFR key (or press the SPCL key and enter the Transfer CO feature code — 345, or the Transfer Intercom feature code — 346) and dial another extension number.

To complete the transfer: Skip to step 5. Then page the party to announce the transfer.

(4) *(KEYSETS ONLY) If it becomes necessary to split between the called party and the caller waiting to be transferred, you may use the Keyset Call Splitting feature code as follows:*

a. Press the SPCL key and enter the Keyset Call Splitting feature code (338). The station waiting to receive the transfer is placed on hold and you are connected to the party waiting to be transferred.

b. Press the SPCL key and enter 338 again to speak to the station user waiting to receive the transfer and place the party to be transferred on hold.

c. Hang up to complete the transfer.

(5) **To disconnect and complete the transfer:** Hang up, press another call key, or press the IC key to complete the transfer. The call will ring at the station. (Receiving station's display shows XXX TRANSFER FROM XXX or GRP #XX TRANSFER FROM XXX.) If the station is busy, the call camps on and sends call waiting signals.

To transfer the call to hold (KEYSETS ONLY): Press the HOLD key (or press the SPCL key and enter the Individual Hold feature code — 336) to place the call on hold at the called station. The call will not ring or send call waiting signals until the Hold timer expires.

To transfer the call to hold, then make a page (KEYSETS ONLY): Press the PAGE key. The call will automatically be transferred to hold at the called station and you will be connected to the paging network. Enter the desired paging zone code and make your announcement before the Paging timer expires.

B. TRANSFER TO HOLD

16.4 A call transferred to hold at a station does not ring or send a display message while holding. After the Hold timer expires, the station rings or sends call waiting signals. Also, calls transferred to hold do not recall the transferring party; they recall the receiving party's attendant if unanswered after the Hold and Transfer Recall timers expire. Besides the procedure listed below, keyset users have an alternative method for transferring calls to hold; refer to step 5 in the previous procedure.

16.5 TO TRANSFER A CALL TO HOLD:

(1) **Keyset:** While on a call, press the SPCL key and enter the Transfer To Hold feature code (347).

Single-Line Set: While on a call, press the FLASH key (hookflash) and enter the Transfer To Hold feature code (347).

(2) Dial the desired extension number.

(3) *If desired,* wait for an answer and announce the call.

(4) Hang up to complete the transfer.

16.6 TO PICKUP A CALL THAT WAS TRANSFERRED TO HOLD:

If a call was transferred to hold at your station:

Keyset: When your IC key or a call key or individual trunk key is fluttering, lift the handset and press the fluttering key (or the ANSWER key for an outside call). You are connected to the caller.

Single-Line Set: Lift the handset and press the HOLD key or enter the Individual Hold feature code (336). You are connected to the call.

C. TRANSFER RECALLS

16.7 If an outside call is transferred to another station and is not answered before the Transfer Available or Transfer Busy timer expires (and if it was not transferred to hold), the call recalls the transferring station and rings until the Recall timer expires. If still unanswered after the Recall timer expires, it recalls the transferring party's attendant. If the attendant does not answer before the Abandoned Call timer expires, the call is disconnected by the system. If the transferring station has no attendant, the call recalls at the transferring station until the Recall and Abandoned Call timers expire and the call is disconnected by the system. Transferred intercom calls will not recall the transferring station or the attendant.

16.8 TO ANSWER A TRANSFER RECALL:

Keyset: If you hear a repeating signal of four tones and a pause (display shows GRP #XX [or

group name] RECALL FROM EX XXXX [or user name]), lift the handset. Press the medium-flashing call key or individual trunk key, or the ANSWER key if the call is not automatically connected.

Single-Line Set: If you hear a repeating signal of four tones and a pause, lift the handset. You are immediately connected.

D. TRANSFER TO AN OUTSIDE NUMBER OR E&M DESTINATION

NOTE: There *may* be some reduction in voice volume when an outside call is transferred to an outside telephone number depending on the quality of the trunks being used.

16.9 When a trunk is being used by either outside party, the duration of an outside call that is transferred to outside telephone numbers is limited by the Unsupervised CO timer. When this timer expires, the outside parties hear a burst of dial tone. They may then press any DTMF key (before the SL Set Dial Initiation timer expires) to reset the timer. If the timer is not reset, the unsupervised call recalls the primary attendant. If the attendant does not answer the recall before the Abandoned Call timer expires, the call is disconnected by the system.

NOTE: While this system is designed to be reasonably secure against CO trunk misuse by outside callers, there is no implied warranty that it is invulnerable to unauthorized intrusions. If the central office does not provide supervision and disconnect the call when one party hangs up, it is possible for a caller to remain connected to a CO trunk circuit. If this happens, and the caller begins dialing, the call could be placed through the 416/832 System and would then be billed to the system's owner. The system cannot check this type of call for toll restriction and may not register the call in SMDR. This problem could arise when a call is connected to a station, when a call is in an unsupervised conference, when a call is forwarded or transferred to the public network, or when DISA is used for placing outgoing calls.

16.10 TO TRANSFER A CALL TO AN OUTSIDE TELEPHONE NUMBER OR E&M DESTINATION:

(1) **Keyset:**

While on an outside call, press the XFR key. Or press the SPCL key and enter the Transfer CO Call feature code (345).

While on an intercom call, press the SPCL key and enter the Transfer Intercom Call feature code (346).

Single-Line Set: While on a call, press the FLASH key (hookflash) and enter the Transfer CO Call feature code (345) or the Transfer Intercom Call feature code (346).

- (2) Select an outgoing trunk group or E&M trunk group, and continue to the next step. If you hear a busy signal, select another trunk group or camp on and wait for a trunk. Or, return to the caller as follows:

Keyset: Press the fluttering call key or individual trunk key for an outside call; for an outside or intercom call, press the XFR key twice (or press the SPCL key once and enter the Transfer Call feature code [345] twice).

Single-Line Set: Press the FLASH key (hookflash).

- (3) *If using an outgoing trunk:* Dial the desired telephone number.

If using an E&M trunk: Do one of the following:

- a. *If you hear ringing,* wait for the other telephone system to answer. Depending on how the call is answered, ask to be transferred to the desired station or outside telephone number or dial the extension number or trunk access code.
- b. *If you hear dial tone and wish to transfer the call to an extension number on the other telephone system,* dial the desired extension number.
- c. *If you hear dial tone and wish to transfer the call to an outside telephone number,* dial the other telephone system's trunk access code and the desired telephone number.

- (4) One of the following occurs:

- a. *If answered,* announce the call. Hang up, press another call key or individual trunk key, or press the IC key to complete the transfer.
- b. *If the number is busy or there is no answer,* return to the caller as described in step 2.
- c. *If you hear repeating reorder tones,* you dialed a restricted telephone number. Return to the caller as described in step 2.

17. REVERSE TRANSFER AND GROUP CALL PICK-UP

17.1 Calls ringing or recalling at a station, a hunt group, or a transfer-to-park location can be picked up at any other station, using these features. Calls on hold can also be picked up from stations and from transfer-to-park locations.

A. REVERSE TRANSFER

17.2 If more than one call is ringing or holding at the station, a priority list determines which call is reverse transferred. Calls are selected in the following order, and if more than one call of the same type is at the station, the calls are picked up in the order they were received:

1. Outside calls
 - a. direct ring-in calls
 - b. transferred and camped-on calls
 - c. recalls
 - d. calls on individual hold
2. Intercom calls
 - a. ringing calls (incoming, transferred, or recalling)
 - b. holding calls

17.3 *TO REVERSE TRANSFER A CALL FROM A STATION OR THE TRANSFER-TO-PARK LOCATION:*

- (1) Lift the handset and enter the Reverse Transfer (Call Pick-Up) feature code (4). You hear a progress tone.
- (2) Dial the extension number of the station where the call is ringing or holding.
- (3) **Keyset:** *If the system is not programmed for direct connection of reverse transferred calls, press the flashing call, individual trunk, or IC key for a ringing call, or press the fluttering call, individual trunk, or IC key for a call on hold. (For outside calls that are ringing or holding, the ANSWER key may be used instead.)*

Single-Line Set: You are automatically connected to the caller.

17.4 *TO REVERSE TRANSFER A CALL USING THE XFR KEY (KEYSETS ONLY):*

- (1) To pick up a call that is ringing or holding at another station, lift the handset and dial the exten-

sion number of the station where the call is ringing or holding.

- (2) Press the XFR key (or press the SPCL key and enter the Transfer CO Call feature code — 345).
- (3) *If the system is not programmed to automatically connect reverse transferred calls, press the flashing or fluttering call, individual trunk, or IC key. (For outside calls that are ringing or holding, the ANSWER key may be used instead.)*

B. GROUP CALL PICK-UP

17.5 A call ringing in to a hunt group or one of its stations can be picked up at any other station. Users can enter the Reverse Transfer feature code (4) and dial a hunt group's pilot number to pick up a call that is ringing in to the hunt group's pilot number or to any station within that hunt group.

17.6 The system follows the priority list shown below to determine which call is picked up. The system follows the hunt group list (always beginning with the first station on the list) to check each station in the hunt group and then the overflow station for one type of call at a time. If there is more than one call of the same type at the selected station, the call that was received by the station first is picked up. Camped-on calls, holding calls, and queue callbacks cannot be picked up.

1. Ringing outside calls
 - a. direct ring-in calls
 - b. transferred calls
 - c. recalls
2. Ringing intercom calls (incoming, transferred, or recalling)

17.7 *TO PICK UP A CALL THAT IS RINGING AT A HUNT GROUP:*

NOTE: This feature cannot be performed using the XFR key.

- (1) Lift the handset and enter the Reverse Transfer feature code (4). You hear a single progress tone.
- (2) Dial the pilot number of the hunt group where the call is ringing.
- (3) **Keyset:** *If the system is programmed for direct connection of reverse transferred calls, you are immediately connected. If not, press the flashing call, individual trunk, or IC key.*

Single-Line Set: You are automatically connected to the caller.

18. CALL PRIVACY AND PRIVACY RELEASE

18.1 Call Privacy restricts voice channel access to one station at a time. When a voice channel is selected, no other station user can gain access to the channel. However, access to and control of a channel can be passed to another station using the Conference or Transfer features.

18.2 In addition, the database contains an installer-programmable option that can be set to enable Call Privacy on all trunks or to allow keyset users to join an ongoing call by pressing the lit individual trunk key (see PROGRAMMING, page 5-54). Single-line set users cannot join calls, but keyset users can join a call that involves a single-line station. When the system is in the default state, calls on all trunks are private and any user attempting to access a busy trunk will hear busy tones.

18.3 When the Privacy Release feature is enabled, any keyset user may join an ongoing outside call by lifting the handset (or pressing the SPKR key) and pressing the lit individual trunk key (cannot use a call key or trunk group key). Exceptions to this are established conference calls, data calls, calls on individual hold, DISA calls, and calls forced private by the user. If desired, as many as seven stations can participate in one call. When a station user hangs up, only that user is disconnected; all other parties remain connected. (For an explanation of feature restrictions on multi-party calls, refer to the conferencing section on page 4-76.) To queue or camp on to a busy individual trunk (rather than join the con-

versation), a station user must remain on hook and press the busy individual trunk key.

18.4 Even when Privacy Release is enabled system-wide, an individual station user can restore call privacy during an outside call by entering the private call feature code or by placing the station in do-not-disturb. (Note that the station must be placed in do-not-disturb *during* the call to enable privacy; if do-not-disturb is enabled *before* the call, privacy is not enabled.) The call then cannot be joined by other people unless the conferencing feature is used. If the call is transferred or placed on system hold, the privacy restore feature is cancelled. Privacy is retained if the call is put on individual hold.

18.5 There is a programmable option that enables or disables a signal tone (barge confirmation tone) that is heard by the parties on the call whenever another user joins the call.

18.6 TO RESTORE PRIVACY ON A NON-PRIVATE TRUNK:

Keyset: While on an outside call, press the SPCL key and enter the Private CO Call feature code (369), or place the station in do-not-disturb by pressing the DND key or pressing SPCL and entering a Do-Not-Disturb feature code (370 or 372).

Single-Line: While on an outside call, press the FLASH key (hookflash) and enter the Private CO Call feature code (369), or place the station in do-not-disturb by pressing the FLASH key and entering a Do-Not-Disturb feature code (370 or 372).

19. BARGE (KEYSETS ONLY)

19.1 If the Barge feature is enabled system-wide, keyset stations can be programmed (on a station-by-station basis) to use the Barge feature. This permits the keyset user to join an ongoing call by entering the Barge feature code. Another option is available on a station-by-station basis that prevents other stations from barging into calls on the station.

19.2 Only keysets can use the Barge feature to join the conversation of any station (keyset or single-line set) to which the keyset user may make a call. The keyset user may never barge into a station that he or she could not otherwise call, such as a cross-tenant station when the system does not allow cross-tenant traffic.

19.3 A hunt group supervisor may barge on any call that it can monitor; this could conceivably be a station that he or she could not otherwise call.

19.4 Barge is not affected by do-not-disturb mode, the Call Privacy and Private Call features, or ring intercom always. If any of these are programmed on the receiving station, Barge will override them.

19.5 A Barge call will be received through the secondary voice path as an off-hook voice announce call if the station being called is an OHVA-enabled digital keyset, IMX 12/24-line keyset, or DVK keyset and the user is using the handset (using the speakerphone or a headset would block the secondary voice path). Although it uses the secondary voice path, Barge *can* be used if OHVA is not enabled system-wide; the receiving keyset does not have to be programmed to receive OHVA.

19.6 A Barge call will be received as a conference with the ongoing call if the secondary voice path is not available or the keyset user is on one of the following types of calls:

- An intercom call.
- A conference that does not exceed the maximum capacity of parties.
- An outside call using the speakerphone or headset.

19.7 A barge cannot be completed on data calls or calls on conference wait hold. Nor can a barge be completed if the conference resources or voice channels are not available.

19.8 When a keyset party joins a conference call, the parties in the ongoing call hear a single tone (barge confirmation tone). The call then continues as a conference.

19.9 *TO JOIN (BARGE) AN ONGOING CALL FROM A KEYSET:*

If the receiving station does not have an available secondary voice path: When placing an intercom call or while monitoring a call, if you hear busy signals press SPCL and enter the Barge feature code (397). The parties in the ongoing call hear a single tone and you are conferenced with all parties.

If the receiving station has an available secondary voice path: When you hear busy signals while placing an intercom call, press SPCL and enter the Barge feature code (397). You are connected to the keyset user through the secondary voice path (speakerphone) as if you were placing an off-hook voice announce call.

20. CONFERENCE CALLS

20.1 Station users can establish a three- to eight-party conference without operator assistance. A station user can initiate one conference at a time and the system can maintain up to 32 parties in conference calls of up to eight parties each. In addition to the initiating station, the conference can include any combination of up to seven intercom and/or outside calls. The initiating station is considered one of the conferencing parties.

20.2 If a conference is terminated using the Hold feature, the remaining callers hear music while they are waiting. The station user must return to the callers one at a time. If the Hold timer expires, the calls on hold recall the station that placed them on hold in the order they were placed. If still unanswered after the Recall timer expires, they recall the station's attendant.

20.3 While a conference call is in progress, the inside parties cannot dial numbers, enter hookflashes, or use the Call Transfer features. Also, if any inside party exits the conference by pressing the CNF key, the remaining inside parties may not use the Conference Wait or Hold features to exit or terminate the conference.

20.4 Unlike the call privacy release option (page 4-74) where station users can join an ongoing call by lifting the handset and pressing a busy individual trunk key, conferences are private and station users attempting to join an ongoing conference call by pressing a busy individual trunk key will hear busy tones, and may camp on to the trunk.

NOTE: During a conference, some reduction in voice volume may be noticed, depending on CO trunk quality.

A. PLACING A CONFERENCE CALL

20.5 TO PLACE A CONFERENCE CALL:

(1) While on a call:

Keyset: Press the CNF key. The party is on conference wait hold (hears music) and the CNF key flutters. The call key is unlit, or the individual trunk key is lit.

Single-Line Set: Press ESLS CNF key, or press the FLASH key (hookflash) and enter the Con-

ference feature code (5). The party is on conference wait hold (hears music).

NOTE: If you hear a busy signal followed by music, all conference resources are busy. Do one of the following:

To wait for the resources: Remain off hook until you hear intercom dial tone. Then place the second call.

To return to the call:

Keyset: Press the CNF key.

ESLS: Press the HOLD key.

SLI or Other Single-Line Set: Press the FLASH key (hookflash) and press HOLD or enter the Individual Hold feature code — 336.

(2) Place intercom or outside calls to (or access existing calls with) the other parties to be included in the conference and place them on conference wait hold as described in the first step. Call keys are unlit and individual trunk keys are lit.

If connecting the final party, the conference is connected automatically when the CNF key is pressed or when the Conference feature code is entered to connect the final party.

If the conference is to consist of fewer than the maximum number of parties:

Keyset: When all parties are on conference wait hold, press the CNF key again. All parties are connected. (Display keysets show the extension number or trunk identification of up to four of the parties connected in the conference.) The CNF key flashes slowly; call keys are unlit and individual trunk keys are lit.

Single-Line Set: When all parties are on conference wait hold, press the ESLS CNF key, or press the FLASH key (hookflash) and enter the Conference feature code (5). All parties are connected.

B. ADD PARTIES TO A CONFERENCE

20.6 TO ADD PARTIES TO AN EXISTING CONFERENCE (ANY INSIDE PARTY):

NOTE: Only one party in the conference can perform this procedure at a time. This procedure cannot be performed if the maximum number of conference participants has been reached.

Keyset:

- (1) During the conference, press the CNF key. The other parties remain connected. The CNF key flutters.
- (2) Place an intercom or outside call to (or access an existing call with) the other party to be included in the conference and press the CNF key.

If the maximum number of allowed parties are involved, all of them are connected in a conference.

If fewer than the maximum allowed number of parties are involved:

To connect all parties in a conference:
Press the CNF key again.

To add another party: Repeat steps 1 and 2 again.

Single-Line Set:

- (1) During the conference, press the FLASH key (hookflash). The other parties remain connected.
- (2) Place an intercom or outside call to (or access an existing call with) the other party to be included in the conference. Press the ESLS CNF key, or press the FLASH key (hookflash) and enter the Conference feature code (5).

If the maximum number of allowed parties are involved, all of them are connected in a conference.

If fewer than the maximum allowed number of parties are involved:

To connect all parties in a conference:
Press the ESLS CNF key, or press the FLASH key (hookflash) and enter the Conference feature code (5) again.

To add another party: Repeat steps 1 and 2 again.

C. EXITING A CONFERENCE

20.7 There are several options for leaving the conference:

- End the conference by hanging up. The other parties remain connected as long as one is a station (inside party). If there are no stations remaining, the conference is disconnected.
- Place all parties on individual hold (refer to paragraph 20.8). The conference is terminated. You must return to the callers one at a time. To re-establish the conference, repeat the procedures in paragraph 20.5.

NOTE: If a keyset user attempts to place a conference call on system hold, all parties will be placed on individual hold. If a single-line set user attempts to place the conference call on system hold, the user hears reorder tones and the call continues.

- Leave the conference and allow the outside parties to remain connected (refer to paragraph 20.9). You can return to the conference at any time.

NOTE: While this system is designed to be reasonably secure against CO trunk misuse by outside callers, there is no implied warranty that it is invulnerable to unauthorized intrusions. If the central office does not provide supervision and disconnect the call when one party hangs up, it is possible for a caller to remain connected to a CO trunk circuit. If this happens, and the caller begins dialing, the call could be placed through the 416/832 System and would then be billed to the system's owner. The system cannot check this type of call for toll restriction and may not register the call in SMDR. This problem could arise when a call is connected to a station, when a call is in an unsupervised conference, when a call is forwarded or transferred to the public network, or when DISA is used for placing outgoing calls.

20.8 TO PLACE THE OTHER PARTIES ON HOLD:

- (1) During a conference call:

Keyset: Press the HOLD key (or press the SPCL key and enter the Individual Hold feature code — 336). The conference is terminated; the IC and/or call or individual trunk keys flutter and the CNF key goes off. The parties hear music while waiting.

ESLS: Press the HOLD key. The conference is terminated and the parties hear music while waiting.

SLI or Other Single-Line Set: Press the FLASH key (hookflash) and then press the HOLD key or enter the Individual Hold feature code — 336. The conference is terminated and the parties hear music while waiting.

- (2) Return to the parties one at a time:

Keyset: Access one party by pressing the fluttering call or individual trunk key or IC key. Then you can place it on hold, disconnect it, or re-establish the conference (following the procedures in paragraph 20.5). Repeat this step to access the second party.

Single-Line Set: Access one party by pressing the ESLS HOLD key or by pressing the FLASH (hookflash) key and then pressing the HOLD key (or entering the Individual Hold feature code — 336). Then you can place it on hold, disconnect it, or re-establish the conference (following the procedures in paragraph 20.5). Repeat this step to access the second party.

20.9 TO EXIT THE CONFERENCE AND LEAVE THE OTHER PARTIES CONNECTED (ANY INSIDE PARTY):

NOTE: Only one party in the conference can perform this procedure at a time.

Keyset:

- (1) During the conference, press the CNF key and hang up. The CNF key flutters. The call keys are unlit, but individual trunk keys remain lit to indicate the outside calls that remain in the conference. If a station remains connected in the conference, the IC key does not light to indicate that a station is involved.
- (2) **To return to the conference:** Lift the handset and press the CNF key again.

NOTE: If all remaining parties are outside parties and the Conference Hold timer expires while you are out of the conference, one of the parties may reset the timer by pressing any DTMF key. If the timer is not reset, the parties recall your station. You hear recall tones (four tones and a pause) and the CNF key flashes at the medium rate (display shows CONFERENCE HOLD RECALL). Press the CNF key to return to the conference. If the recall is not answered before the Recall and Abandoned Call timers expire, the conference will be disconnected; it will not recall the attendant.

Single-Line Set:

- (1) During the conference, press the FLASH key (hookflash) and hang up.
- (2) **To return to the conference:** Lift the handset and press the ESLS CNF key or enter the Conference feature code (5).

NOTE: If the Conference Hold timer expires while you are out of the conference, one of the outside parties may reset the timer by pressing any DTMF key. If the timer is not reset, the parties recall your station. You hear recall tones (four tones and a pause). Lift the handset to answer the recall. If the recall is not answered before the Recall and Abandoned Call timers expire, the conference will be disconnected; it will not recall the attendant.

21. SYSTEM FORWARDING

21.1 System Forwarding provides the ability to program the system so that calls ringing at a station will follow a database-programmed "forwarding path" that routes the call based on the type of call and the status of the intended station. (The station feature Call Forwarding can also be used at stations with System Forwarding.) Several terms will be used to describe this feature, including:

- **Principal Station:** Original station being called.
- **Forwarding Point:** A destination (station, voice mail port, or hunt group) to which the call is directed when the principal station is unavailable. Each forwarding path can contain up to four forwarding points.
- **Forwarding Path:** The sequence of forwarding points to which the call will be sent. Forwarding paths are programmed in the database. Up to 200 unique paths can be programmed for a standard system (400 for an expanded system). Each station can have up to three forwarding paths.

21.2 Two system timers are used with this feature:

- **System Forwarding Initiate:** This timer determines how long a call will ring (unanswered) at the principal station before moving to the first forwarding point. The default value is 15 seconds and the range is 2-255 seconds.
- **System Forwarding Advance:** When the forwarding point is a station, this timer determines how long the call will ring (unanswered) before moving to the next forwarding point. The default value is 15 seconds and the range is 2-255 seconds. (If the forwarding point is a hunt group, the hunt group Overflow timer is used.)

21.3 For each forwarding path assigned to the station, the system checks the following three criteria to determine if and when a call should be forwarded:

- **Type of incoming call:** Any combination of the following seven types of calls can be forwarded:
 - Ringing outside calls
 - Transferred outside calls
 - Recalling outside calls
 - DISA/automated attendant calls
 - DID calls
 - E&M calls
 - Intercom calls

- **Station status:** The system recognizes four different types of station status.

— *No Answer:* If the call is not answered at the principal station before the System Forwarding Initiate timer expires, the system advances the call to the forwarding path.

— *Busy:* If the principal station is busy, the system immediately advances the call to the forwarding path. Both "No Answer" and "Busy" can be selected together to form a "Not Available" status.

— *Do Not Disturb:* If the principal station is in do-not-disturb, the system immediately sends the call to the forwarding path.

— *Immediate:* The system immediately sends the call to the forwarding path. The principal station user cannot answer the forwarded call, but can reverse transfer it.

- **Day-mode/night-mode status of the station's tenant group:** The mode of a station's tenant group is used to determine if a forwarding path is used. Either day mode, night mode, or both may be specified.

21.4 For example, during the day, the "principal" may want direct ring-in or transferred calls to ring at his station. If he does not answer them, the calls would follow the forwarding path to a forwarding point hunt group. If the hunt group does not answer his calls, the calls would continue on the forwarding path and go to his voice mailbox (another forwarding point).

21.5 If the principal station is a keyset, the "ring principal once" option can be set that will signal the principal station when a call begins to follow the forwarding path. The signal to the principal station consists of a display (XXXXXXXX SENT TO FWD PATH) and a single burst of ring tone. The call cannot be answered at the principal station, but can be reverse transferred.

21.6 If a call rings in to multiple stations, and one or more of those stations has system forwarding, the call will not follow any of the forwarding paths.

21.7 If a principal station or a station forwarding point is a member of a hunt group, calls placed to the hunt group's pilot number are unaffected by system forwarding. The hunt group calls will be received at the station as usual and will not enter the system forwarding path.

Handsfree Announce System Forward Option

21.8 When the a call is transferred to the principal station by another station user *and the principal station's system forward is set for the "no answer" station status*, a system-wide option determines what the caller hears. If the "handsfree announce system forward" option is enabled, the transferring station user will place a handsfree call to the principal station and can announce the transfer; the *System Forwarding Initiate* timer does not start until the transfer is completed. (An exception to this is if intercom calls are programmed to be sent to the forwarding path, in which case the handsfree announce option is overridden and the intercom call from the transferring station enters the forwarding path.) If the option is disabled, the intercom call from the transferring station automatically enters the forwarding path; the station user hears ringing and can announce the call only if it is answered. Regardless of the option setting, if the transfer is sent to a hunt group forwarding point, the transfer will be completed automatically and the transferring station user will hear intercom dial tone. If the transfer follows the system forward path to a voice mail station, the transfer is completed immediately and the principal station's mailbox number is automatically dialed.

Individual Station Forwarding Points

21.9 The ringing duration at each station forwarding point is determined by the System Forwarding Advance timer (defaults to 15 seconds). If the station forwarding point is busy, the call will camp-on until the System Forwarding Advance timer expires and then it moves to the next forwarding point.

21.10 If the station forwarding point is in do-not-disturb, the forwarding path will bypass that station and immediately send the call to the next forwarding point.

21.11 A station forwarding point can place calls or transfer calls to the principal.

Hunt Group Forwarding Points

21.12 If a forwarding point is a hunt group, a call following the forwarding path will not be sent to the announcement station or overflow station; it will advance to the next forwarding point if not answered before the hunt group Overflow timer expires.

21.13 The ringing duration within hunt group forwarding points is determined by the No Answer Advance timer.

21.14 If all stations in a hunt group forwarding point have Do-Not-Disturb or Hunt Group Remove enabled, the call will camp on until the Overflow timer expires. The call will then be sent to the next forwarding point. The call will not be sent to the hunt group's overflow or announcement station.

Call Forwarding And System Forwarding

21.15 A call follows only the forwarding path of the principal, even if a forwarding point has call forward enabled or has a forwarding path of its own. The call that originated at the principal station will follow only the principal station's forwarding path.

21.16 If the principal station has call forward enabled (using the FWD key or one of the Call Forwarding feature codes), the call forward overrides System Forwarding.

21.17 If the principle station *receives* a manually forwarded call (not a system forward), that call will follow the principal station's system forwarding path.

21.18 If an infinite forward loop results from the combination of forwards and system forwarding paths, the station that was originally intended to receive the call will ring, even if the station is in do-not-disturb.

Unanswered Calls

21.19 If a call that is following a system forwarding path is not answered or all forwarding points are in do-not-disturb or busy, its final destination depends on the type of call as shown below.

TYPE OF CALL	ALL FWD POINTS ARE BUSY OR DO NOT ANSWER	ALL FWD POINTS ARE IN DO-NOT-DISTURB
Intercom	Rings at the last forwarding point until it is answered or the caller hangs up.	Call never leaves the principal station. Caller hears do-not-disturb signals if <i>immediate</i> forwarding is enabled. If <i>no answer</i> or <i>if busy</i> is enabled, caller hears ringing.
Direct ring-in	Returns to the principal station and rings until it is answered or the caller hangs up.	Rings at the principal station until it is answered or the caller hangs up.
Transfer from a station	Recalls the transferring station when the <i>System Forwarding Advance timer</i> expires at the last forwarding point.	Recalls the transferring station when the <i>System Forwarding Initiate Timer</i> expires.
Transfer via automated attendant	Recalls the automated attendant's recall destination when the <i>System Forwarding Advance timer</i> expires at the last forwarding point.	Recalls the automated attendant's recall destination when the <i>System Forwarding Initiate timer</i> expires.

22. CALL FORWARDING

22.1 With call forwarding, a station user can route incoming intercom and outside calls (including direct ring-in calls and DID calls) to another station, to a hunt group, or to an outside telephone number, if allowed by toll and trunk restrictions. The four forwarding options are:

- **Forward all calls:** All incoming calls are immediately forwarded.
- **Forward if no answer:** Incoming calls are forwarded if they are not answered before the Forward No Answer timer expires.
- **Forward if busy:** Incoming calls are immediately forwarded if the station is busy.
- **Forward if no answer or busy:** Incoming calls are forwarded immediately if the station is busy, or forwarded if calls are not answered before the Forward No Answer timer expires.

22.2 If forward all calls is enabled, display keysets show the call forwarding status and destination until the request is cancelled. If one of the conditional forwards is enabled (no answer, busy, or no answer/busy), display keysets show the forward status for five seconds and then return to normal. If the station receiving the forward is a display keyset, it shows XXXX FORWARD FROM EX XXXX [or user name] for each forwarded call received.

22.3 Station users can chain forwards from station to station providing the forwards do not form a loop. The conditional forward features (if busy, if no answer, if busy/no answer) may form a loop that the system cannot detect until a call is placed to the forwarding station. For example, if two station users forward their calls to each other using the Call Forward If Busy feature, the system accepts the requests. However, if a call rings in while both stations are busy, the forwards create an illegal loop. In this case, the call camps on to the called station.

22.4 If more than one station has ring in for a trunk group, direct ring-in calls on that trunk group will forward to extension numbers, but not outside numbers or voice mail ports. The display of the keyset receiving the forwarded call will show it as a direct ring-in call, not as a forwarded call, and the call or individual trunk key flashes to show ring in. (The individual trunk key also flashes on the keyset that is being forwarded.)

22.5 Calls cannot be forwarded to restricted outside telephone numbers or to stations in do-not-disturb. If the station that programmed to receive your forwarded calls is later placed in do-not-disturb, intercom callers will

see the receiving station's do-not-disturb display, but the call will be forwarded.

22.6 If your station is in do-not-disturb and you have call forwarding programmed, the call is still forwarded. If you enabled call forward no answer, intercom callers will see the do-not-disturb display that you programmed before the call is forwarded.

22.7 Call forwarding overrides system call forwarding at the principal station.

22.8 Queue callbacks and recalls do not forward, except that a recall at the attendant's station will forward to another station.

FWD Key

22.9 Keypad users may program their FWD key with any of the four options listed in paragraph 22.1. In the default configuration, the FWD key is programmed to forward all calls.

22.10 A keypad's FWD key is lit when the station is programmed for call forwarding.

Forwarding To An Outside Number Or E&M Destination

22.11 When programming a station for call forward to an outside telephone number or E&M destination, a select trunk group feature code is programmed before the telephone number. If the station is called while the selected trunk group is busy, the call will not be forwarded. An intercom caller will hear busy signals. An outside call will ring at the forwarded station until the call is answered or the caller hangs up.

22.12 The forwarding station's (not the intercom caller's) trunk and toll restrictions are checked when the call is forwarded to an outside number.

NOTE: While this system is designed to be reasonably secure against CO trunk misuse by outside callers, there is no implied warranty that it is invulnerable to unauthorized intrusions. If the central office does not provide supervision and disconnect the call when one party hangs up, it is possible for a caller to remain connected to a CO trunk circuit. If this happens, and the caller begins dialing, the call could be placed through the 416/832 System and would then be billed to the system's owner. The system cannot check this type of call for toll restriction and may not register the call in SMDR. This problem could arise when a call is connected to a station, when a call is in an unsupervised conference, when a call is forwarded or transferred to the public network, or when DISA is used for placing outgoing calls.

22.13 If using an E&M trunk that is connected to another telephone system, and forwarding to an outside

number through the other system, the E&M trunk access code is entered, followed by the other system's trunk access code (which the 416/832 has been programmed to absorb as described on page 4-26), and the telephone number. Then, when a call is forwarded, the system automatically pauses after the E&M trunk access code, for the duration of the Pause Digit timer, before dialing the rest of the number.

22.14 When an outside call is forwarded to an outside number using a loop start trunk, the Unsupervised CO timer is activated. When the timer expires, both parties hear a burst of dial tone. Either party can reset the timer by pressing any DTMF key. If the timer is not reset, the call recalls the attendant. If the attendant does not answer the recall before the Abandoned Call timer expires, the call is disconnected.

NOTE: There *may* be some reduction in voice volume when an outside call is forwarded to an outside telephone number, depending on central office trunk quality.

22.15 If the Weekly Toll Limit feature is enabled and a station is forwarded to a toll number that is being disallowed due to the weekly limit being exceeded, calls will be handled as follows:

- An intercom caller will hear reorder tones and see a CALL FAILED - TOLL LIMIT EXCEEDED display.
- A direct ring-in outside call will ring at the station until it is answered or the caller hangs up.
- Calls through DISA or an automated attendant will ring at the station until the Transfer Available timer expires before being sent to the appropriate recall destination.
- Transferred calls will remain at the transferring station.
- Calls from a voice computer will be sent to the attendant.

Forwarding Calls To An Extension, Outside Number, Or E&M Destination

22.16 TO FORWARD CALLS:

(1) Keyset:

To use the FWD key: While on or off hook, press the FWD key to forward calls according to FWD key programming. *If on hook*, the SPKR key is lit. (Display keysets show PROGRAM FORWARD.)

To use a call forward feature code: While on or off hook, press the SPCL key and enter one of the

following feature codes. *If on hook*, the SPKR key is lit. (Display keysets show PROGRAM FORWARD.)

- a. Call Forward All Calls (355)
- b. Call Forward If No Answer (356)
- c. Call Forward If Busy (357)
- d. Call Forward If No Answer Or Busy (358)

Single-Line Set: Lift the handset enter one of the feature codes listed above.

- (2)** *If forwarding to an intercom number*, dial the extension number of the station to receive the calls, the voice mail access number, or 0 for the attendant. (Or, keysets can press the MSG key to forward calls to the assigned message center.) If you dialed an invalid extension number, your display shows FORWARD TO INVALID NUMBER and you hear reorder tones.

If forwarding to an outside telephone number, dial a trunk access code (e.g., 801-889 or 89) and then the desired telephone number. If you entered an invalid trunk group feature code or dialed a restricted number, you hear repeating reorder tones. (Display keysets show FORWARD TO RESTRICTED TRUNK.)

If forwarding to an outside telephone number via an E&M trunk, dial the E&M trunk group feature code, then dial the other system's trunk access code and the desired outside telephone number. The system automatically enters a pause and the display keysets show an "S" to indicate a short pause. If you entered an invalid E&M trunk group feature code or dialed a restricted number, you hear repeating reorder tones. (Display keysets show FORWARD TO RESTRICTED TRUNK.)

If forwarding to an extension on the other telephone system via an E&M trunk, dial the E&M trunk group feature code and then the desired extension number. If you entered an invalid E&M trunk group feature code or dialed a restricted number, you hear repeating reorder tones. (Display keysets show FORWARD TO RESTRICTED TRUNK.)

- (3) Keyset:** *If off hook*, hang up. *If on hook*, press the SPKR key (SPKR key goes off). You hear a progress tone and the FWD key is lit (display shows FWD [condition] TO XXXX). If you attempted to forward calls to a station that is unconditionally forwarded to your station, your display shows SYSTEM DETECTED FORWARD LOOP and you hear repeating reorder tones.

Single-Line Set: Hang up.

22.17 TO CANCEL ANY CALL FORWARD REQUEST:

Keypad: Press the lit FWD key (the key goes off). *If on hook*, press the lit SPKR key (the key goes off), or *if off hook*, hang up. You hear a progress tone. (Display keysets show CANCEL ANY CALL FORWARD.)

Single-Line Set: Lift the handset, enter the cancel any Call Forward feature code (359), and hang up.

Forwarding To The Message Center

22.18 Keypad users have a simple method for forwarding calls to their designated message center. The user presses the FWD key and then the MSG key. Calls forwarded through the keypad are then sent to the keypad's designated message center.

22.19 TO QUICKLY FORWARD CALLS TO YOUR MESSAGE CENTER (KEYSETS ONLY):

While on or off hook, press the FWD key and then the MSG key. (Display keysets show FWD

[condition] TO EX XXXX [or user name]). *If on hook*, press the lit SPKR key (the key goes off). *If off hook*, hang up.

Forwarding To Voice Mail

22.20 If the station is forwarded to the voice mail unit or if the message center is a voice mail unit, the keypad user's "mailbox" is automatically dialed when the voice mail unit answers the forwarded call. In fact, whenever any station (keypad or single-line) is forwarded to a designated voice mail unit, the station's assigned "mailbox" is automatically dialed when the voice mail unit answers the forwarded call.

22.21 If a chain of forwarded stations ends in voice mail, the mailbox of the first station in the chain will be selected when the voice mail unit answer the call.

NOTE: If a trunk group is assigned direct ring in to multiple stations, and one of those stations is forwarded to a voice mail unit, incoming calls on that trunk group are not forwarded to the voice mail unit.

23. SPEED DIALING

23.1 Three 416/832 features provide speed-dialing. They are as follows:

- **System Speed Dialing:** Up to 400 (500 in the expanded system), 32-digit system or tenant-specific speed-dial numbers can be stored in system memory.
- **Station Speed Dialing:** Each station user can program individual speed-dial numbers. Single-line set users can store up to 10, 16-digit numbers. Keypad users can store 10 outside telephone numbers (up to 16 digits each) and 10 extension numbers (up to four digits each).
- **System Directory (Intercom and Outside):** The intercom directory enables display keypad users to "look up" intercom extension numbers and user names. The outside directory enables display keypad users to "look up" system speed-dial numbers and associated names. (This feature is available only in the *Extended* software packages.)

A. SYSTEM SPEED DIALING

23.2 Speed dialing allows station users to dial stored telephone numbers quickly. Up to 400, 32-digit system or tenant-specific speed-dial numbers can be stored in system memory (500 in the expanded system). Through database programming or the designated speed-dial programming station, each individual number can be designated in the database as available to all stations (tenant group 0) or available only to stations within a certain tenant group. If desired, an identifying name can also be stored with each speed-dial number. (See also the System Directory feature on page 4-90.)

23.3 To keep system speed-dial numbers confidential, some or all of them can be programmed as non-display numbers (see PROGRAMMING, page 5-75). Non-display numbers can be used by any station user (as long as the number is assigned to the user's tenant group), but can only be displayed on the programming station's keypad. (Non-display numbers cannot be redialed or saved as station speed-dial numbers.) Non-display numbers *will* appear in the SMDR report when dialed.

23.4 System speed-dial numbers are subject to toll restriction unless a system-wide option has been enabled that allows any station to dial any system speed-dial number regardless of that station's SCOS.

23.5 The system speed-dial numbers are stored using location codes (000-399 on standard systems, 000-499 on expanded systems). When dialed, the numbers ap-

pear on a display keypad unless they have been programmed as non-display numbers. Display keypad users can also view system speed-dial numbers and names without dialing (unless the numbers are designated for another tenant group or designated as non-display); however, with non-display numbers only the name is displayed.

23.6 The system speed-dial numbers and names are stored on the hard disk and will not be erased in the event of a power failure.

Programming System Speed Dial Numbers

23.7 The system speed-dial numbers and names are programmed by the installer or at any attendant station. However, attendants can only program or view numbers that are accessible system wide or in their particular tenant group. In addition to the attendant stations, one display keypad can be designated as the system speed-dial programming station to program or view all system speed-dial numbers and all tenant-specific speed-dial numbers. When the system is in the default state, the primary attendant station is the designated system speed-dial programming station.

23.8 The system speed-dial numbers can contain up to 32 digits each and can include hookflashes and/or short or long pauses for dialing a series of numbers. For example, the speed-dial number can contain an SCC local number, a pause, an access code, and the telephone number. For using E&M trunks, the other systems' trunk access codes, followed by a pause, may be included in speed-dial numbers. The lengths of the hookflash and the pause are determined by the programmable CO Hookflash and Pause Digit timers.

23.9 To program system speed-dial numbers, use one of the following methods:

- Use the keypad to manually dial the number. If you make a mistake, press the MUTE key to backspace.
- Press the REDIAL key to enter the last number dialed or saved at the station (up to 32 digits).
- Press one of the SD keys on the keypad to enter the outside telephone number (up to 16 digits) programmed under that key.

23.10 To program speed-dial names, keypad keys are used to enter the desired letters, numbers, and punctuation. The number of times a key is pressed determines which character is entered. For example, 77776444844 would enter "SMITH". When adjoining characters are located under the same key, press the FWD key once to advance to the next character. For example, 5666 FWD 66337777 would enter "JONES". Refer to the chart be-

low to program speed-dial names. (Note that letters correspond to the letters printed on the keypad keys.)

KEY	NUMBER OF TIMES KEY IS PRESSED				
	1	2	3	4	5
1	.	-	,	&	1
2	A	B	C	>	2
3	D	E	F	/	3
4	G	H	I	"	4
5	J	K	L	[	5
6	M	N	O	]	6
7	P	Q	R	S	7
8	T	U	V	;	8
9	W	X	Y	Z	9
0	'	%	=	?	0

23.11 TO PROGRAM OR CHANGE SYSTEM SPEED-DIAL NUMBERS AND NAMES (ATTENDANTS AND THE DESIGNATED SYSTEM SPEED-DIAL PROGRAMMING KEYS ONLY):

NOTE: If you make a mistake, use the MUTE key to backspace. Or, lift and replace the handset (the name and number in memory remains unchanged); then start over.

- (1) While on hook, press the SYS SPD key (or press SPCL and enter the Program System Speed-Dial feature code — 020). (Display keysets show PROGRAM SYSTEM SPEED DIAL.)
- (2) Enter the speed-dial location code (000– 499). (The MSG key is lit and the display shows the name and number or, if one does not exist, NO OUTSIDE #.) If you do not continue to the next step, the display times out after the Long Interdigit timer expires and you must start over.
- (3) *If you wish to program a name or change the existing name, enter or change the name for the speed-dial number using your keypad. Refer to the chart on this page. If necessary, use the MUTE key to back up and erase existing characters.*
If the existing name is correct, or you do not wish to program a name, proceed to the next step.
- (4) Press the MSG key (it will go out and the cursor will move to the top line). Enter or change the number (up to 32 digits) to be stored using the keypad, one of the SD keys, or the REDIAL key. *If necessary, use the MUTE key to back up and erase existing numbers. (Display keysets show the number as it is entered.) To include pauses or*

hookflashes in the number, press the SPCL key once for a hookflash (F), twice for a short pause (S), and three times for a long pause (L). You may not exceed 32 digits.

- (5) Press any trunk access key (call, individual trunk, ANSWER, or OUTGOING) to save the number. You hear a single progress tone when the number is accepted. (Display keysets show PROGRAM SYSTEM SPEED DIAL.)
- (6) **To enter or change additional numbers:** Repeat steps 2 through 5 for each number to be entered or changed.

To end the programming session: Lift and replace the handset or wait for the display to return to the date and time (when the Long Interdigit timer expires).

23.12 TO ERASE SYSTEM SPEED-DIAL NAMES AND/OR NUMBERS (ATTENDANTS AND THE DESIGNATED SYSTEM SPEED-DIAL PROGRAMMING KEYS ONLY):

- (1) While on hook, press the SYS SPD key (or press SPCL and enter the Program System Speed-Dial feature code — 020). (Display keysets show PROGRAM SYSTEM SPEED DIAL.)
- (2) Enter the speed-dial location code (000– 499). (The MSG key is lit and the display shows the name and number.)
- (3) You may erase the name only, the number only, or both:
 - a. *If you wish to erase the name, press the MUTE key repeatedly until the name is erased.*
 - b. *If you wish to erase the number, press the MSG key, then press the MUTE key repeatedly until the number is erased.*
- (4) Press any trunk access key (call, individual trunk, ANSWER, or OUTGOING). You hear a single progress tone when accepted. (Display keysets show PROGRAM SYSTEM SPEED DIAL.)
- (5) **To enter or change additional numbers:** Repeat steps 2 through 4 for each number to be erased.
To end the programming session: Lift and replace the handset or wait for the display to return to the date and time (when the Long Interdigit timer expires).

Viewing System Speed-Dial Numbers

23.13 TO VIEW SYSTEM SPEED-DIAL NUMBERS AND NAMES AT ATTENDANT STATIONS AND THE DESIGNATED SPEED-DIAL PROGRAMMING STATION:

NOTE: If you make a mistake, lift and replace the handset; then start over.

(1) **Using the Keypad:**

- a. While on hook, press the SYS SPD key (or press SPCL and enter the System Speed-Dial feature code — 381). (Display keysets show PROGRAM SYSTEM SPEED DIAL.) You hear a confirmation tone.
- b. Enter the desired location code (000–499). (The display shows the programmed name and number.)

Using a DSS/BLF Unit with Speed-Dial Keys: While on hook, press the desired speed-dial key.

- (2) Wait for the display to return to the date and time (when the long Interdigit timer expires) or lift and replace the handset. Then repeat the procedure for each number to be viewed.

23.14 TO VIEW SYSTEM SPEED-DIAL NUMBERS AND NAMES AT ANY DISPLAY KEYSSET:

(1) **Using the Keypad:**

- a. While on hook, press the SYS SPD key (or press SPCL and enter the System Speed-Dial feature code — 381). (Display keysets show REVIEW SYSTEM SPEED DIAL.) You hear a confirmation tone.
- b. Enter the desired location code (000–499). (Display keysets show the programmed name and number. Or, if it is a non-display number, the display shows the name and NON DISPLAY #.)

Using a DSS/BLF Unit with Speed-Dial Keys: While on hook, press the desired speed-dial key.

- (2) Wait for the display to return to the date and time (when the Long Interdigit timer expires) or lift and replace the handset. Then repeat the procedure for each number to be viewed.

Dialing System Speed-Dial Numbers

23.15 TO DIAL SYSTEM SPEED-DIAL NUMBERS:

- (1) Lift the handset and select an outgoing trunk.

(2) **Keypad:**

- a. Press the SYS SPD key (or press SPCL and enter the System Speed-Dial feature code — 381). You hear a confirmation tone.
- b. Enter the location code (000–499) for the desired number. The number is automatically dialed. (Display keysets show the number dialed unless it is a non-display number.) If you hear reorder tones, your station is restricted from dialing the selected number.

DSS/BLF Unit with Speed-Dial Keys: Press the desired speed-dial key. The number is automatically dialed. (Display keysets show the number dialed unless it is a non-display number.) If you hear reorder tones, your station is restricted from dialing the selected number.

Single-Line Set:

- a. Press ESLS SYS SPD key, or press the FLASH key (hookflash) and enter the System Speed-Dial feature code (381). You hear a confirmation tone.
- b. Enter the location code (000–499) for the desired number. The number is automatically dialed. If you hear reorder tones, your station is restricted from dialing the selected number.

B. STATION SPEED DIALING

23.16 For convenience, each station user can program individual speed-dial numbers. Single-line set users can store up to 10, 16-digit numbers using speed-dial location codes (0-9). Keypad users can store 10 outside telephone numbers (up to 16 digits each) and 10 extension numbers (up to four digits each; see paragraph 23.18 below), using IC/CO speed-dial (SD) keys or location codes 0-9. Together, the lamps in the keypad SD keys create a busy lamp field that indicates the status of the stations programmed under the keys (refer to the lamp status chart on page 4-47). Extension numbers can be either station extension numbers or hunt group pilot numbers.

Programming Station Speed-Dial Numbers

23.17 When entering the outside telephone numbers, use one of the following methods:

- Use the keypad to manually dial the number.
- On a keypad, press the REDIAL key to enter the last number (up to the first 16 digits) dialed or saved at the station.
- On a keypad, press the SYS SPD key and enter the system speed-dial location code (000-499) to store one of the system speed-dial numbers in a station speed-dial location. (If the number is over 16 digits, only the first 16 digits are stored.) Non-display system speed-dial numbers cannot be stored in keypad station speed-dial locations.

23.18 A three-digit station extension number can be preceded with a pound (#) to always speed dial private intercom calls to the station. Or, a "4" may be entered before a three-digit station extension number or hunt group pilot number to quickly reverse transfer (pick up) calls from that station or hunt group. If either of these options is used, normal handsfree intercom calls cannot be placed using that station speed-dial location or SD key. Also, when an extension number is preceded by a "4," the SD key will not show the station's status. This option cannot be used if the system has four-digit extension numbers.

23.19 Station users can also program pauses and/or hookflashes into the stored outside telephone numbers. For example, the number can contain an SCC local number, a pause, and an access code. For using E&M trunks, speed-dial numbers may contain the other system's trunk access code if it is followed by a pause. When programming speed-dial numbers, each hookflash and each pause is considered one digit. The durations of the hookflash and the pause are determined by the programmable CO Hookflash and Pause Digit timers.

23.20 If desired, station speed-dial numbers can be used for dialing the voice mail unit password code. Store the code in an outside number location. Then, after the call to the voice mail unit is connected, dial the outside location that contains the password code.

23.21 The station speed-dial numbers are stored on the hard disk and will not be erased by unplugging the station instrument or by a power failure.

23.22 TO PROGRAM STATION SPEED-DIAL NUMBERS USING A KEYPAD:

One extension number and one outside telephone number can be stored under each of the 10 SD keys/location codes.

NOTE: If you make a mistake, lift and replace the handset; then start over. The number in memory remains unchanged. Or, use the MUTE key to backspace.

- (1) **Keypads with SD keys:** While on hook, press the SD key to be programmed. (Display keypads show PROGRAM STATION SPEED DIAL # and the key number.)

Keypads without SD keys: While on hook, press SPCL and enter the Station Speed-Dial Programming feature code (383). You hear a progress tone. Then dial the speed-dial location code (0-9). (Display keypads show PROGRAM STATION SPEED DIAL # and the key number.)

- (2) Dial the extension number (up to four digits) or telephone number (up to 16 digits, including pauses and hookflashes) to be stored. Refer to paragraph 23.17. (Display keypads show the number.) *To include pauses or hookflashes in an outside telephone number, press the SPCL key once for a hookflash (F), twice for a short pause (S), and three times for a long pause (L). You may not exceed 16 digits. Do not program hookflashes or pauses in extension numbers, or you will receive reorder tones when trying to dial them.*
- (3) *If you entered an extension number, press the IC key. You hear a single progress tone when the system has accepted the number. (Display keypads show both numbers stored under the SD key.)*

If you entered an outside telephone number, press any call or individual trunk key. You hear a single progress tone when the system has accepted the number. (Display keypads show both numbers stored under the SD key.)

- (4) Wait five seconds for the display to return to the date and time. Repeat steps 1 through 3 for each additional number to be stored.

23.23 TO PROGRAM STATION SPEED-DIAL NUMBERS USING A SINGLE-LINE SET:

Up to 10 numbers can be stored using speed-dial location codes 0-9. If you make a mistake, hang up and start over.

- (1) Lift the handset and enter the Station Speed-Dial Programming feature code (383) or press the ESLS PGM SPD key. You hear a confirmation tone.
- (2) Dial the speed-dial location code (0-9). You hear a confirmation tone.
- (3) Dial the telephone number (up to 16 digits, including pauses and hookflashes) to be stored and hang up. *To include pauses or hookflashes in the number*, press the FLASH (hookflash) key once for a hookflash (F), twice for a short pause (S), and three times for a long pause (L). Each pause or hookflash counts as one digit. Wait 2 seconds after pressing the FLASH key before pressing it again; the system only recognizes one FLASH every 2 seconds.
- (4) Hang up.
- (5) Repeat steps 1 through 4 for each number to be stored.

23.24 TO ERASE A STATION SPEED-DIAL NUMBER:

Repeat the programming procedures, but do not dial a number (skip step 2 in the keyset instructions, or step 3 in the single-line instructions).

Viewing Station Speed-Dial Numbers

23.25 TO VIEW THE STORED NUMBERS (ON A DISPLAY KEYSET):

- (1) While on hook, press the desired SD key twice. (Display keysets show the currently stored numbers.)
- (2) *If desired*, press other SD keys once to view their numbers. (If the date and time displays, the program has timed out; repeat the first step.)

Dialing Station Speed-Dial Numbers

23.26 TO DIAL A STATION SPEED-DIAL NUMBER:

- (1) Lift the handset.
- (2) *If placing an outside call*, select an outgoing trunk or use LCR. *If placing an intercom call*, skip this step.
- (3) **Keysets with SD keys:** Press the SD key of the desired number. The number is dialed. (Display keysets show the number.)

Keysets without SD keys: Press the SPCL key, enter the Station Speed-Dial feature code (382), and then enter the location code (0-9). The number is dialed. You hear a confirmation tone.

ESLS: Press the STN SPD key. You hear a confirmation tone. Then dial the location code (0-9). The number is dialed.

Other Single-Line Sets: Press the FLASH key (hookflash) and then press the SLI STN SPD key or enter the Station Speed-Dial feature code (382). You hear a confirmation tone. Then dial the location code (0-9). The number is dialed.

24. OPTIONAL SYSTEM DIRECTORY — INTERCOM AND OUTSIDE (KEYSETS ONLY)

NOTE: This feature is available only in the *Extended* software packages.

24.1 The intercom directory enables display keyset users to “look up” intercom extension numbers and user names. The outside directory enables display keyset users to “look up” system speed-dial numbers and associated names.

24.2 Once the desired extension number/name or system speed-dial number/name has been selected, the user may automatically dial the number, store the number in a station speed-dial location, select a different number/name, terminate the directory routine, or switch to the other directory. A directory search can be performed when a call is waiting on conference or transfer hold at the station, if necessary.

24.3 The intercom directory is automatically updated whenever user names and/or extension number information is reprogrammed (see PROGRAMMING pages 5-28 and 5-58). The outside directory is updated whenever a system speed-dial number or name is reprogrammed (see PROGRAMMING page 5-76).

24.4 To use the directory, the user enters a letter, a string of letters, or a valid extension number. If searching for a name, the full name need not be entered. The system will find the closest match and show the number and its associated name on the keyset display. Or, the user can press the asterisk (*) or pound (#) keys to scroll backward or forward alphabetically through the stored list of names. (It is not possible to scroll through the extensions by number.)

24.5 Keypad keys are used to enter the desired letters, numbers, and punctuation. The station user can switch between numeric and alphanumeric modes. (Numeric mode = MSG key unlit; alphanumeric mode = MSG key lit.) In alphanumeric mode, the number of times a key is pressed determines which character is entered. For example, 77776444844 would enter “SMITH.” When adjoining characters are located under the same key, press the FWD key once to advance to the next character. For example, 5666 FWD 66337777 would enter “JONES.” Refer to the following chart. The letters correspond to the letters printed on the keypad keys.

KEY	NUMBER OF TIMES KEY IS PRESSED				
	1	2	3	4	5
1	.	-	,	&	1
2	A	B	C	>	2
3	D	E	F	/	3
4	G	H	I	"	4
5	J	K	L	[	5
6	M	N	O	]	6
7	P	Q	R	S	7
8	T	U	V	;	8
9	W	X	Y	Z	9
0	'	%	=	?	0

NOTE: The character values for key number 1 above are not the same as those used for custom programming do-not-disturb messages (see page 4-95). This is due to the loss of the pound (#) key and asterisk (*) key character values.

A. INTERCOM DIRECTORY

24.6 TO PERFORM AN INTERCOM DIRECTORY SEARCH:

- (1) While on or off hook, press SPCL and enter the System Intercom Directory feature code (307). The MSG key lights (and the SPKR key lights if on hook) and the display shows INTERCOM NAME: on the top line, while the cursor is located on the bottom line.
- (2) Enter up to seven alpha and/or numeric characters for the extension number or user name. If searching for a name, the whole name does not have to be entered. You may switch between modes by pressing the MSG key (lit = alphanumeric, unlit = numeric).
 - a. *In numeric mode (MSG key unlit):* Press the keypad keys to enter a valid extension number. Press MUTE to backspace, if necessary.
 - b. *In alphanumeric mode (MSG key lit):* Press the keypad keys to enter the desired characters. Refer to the chart above. Press FWD once to advance or twice to leave a space. Press MUTE to backspace.
- (3) *If desired,* press the pound (#) key to scroll forward alphabetically through the directory or press the asterisk (*) key to scroll backward. If this method is used, skip step 4 and proceed to step 5.

- (4) Press the pound (#) or asterisk (*) key to begin the search. The closest match will be displayed on your keyset. If you entered an invalid extension number, you will hear reorder tones. Repeat step 2.
- (5) *If desired*, store the selected extension number in a station speed-dial location by pressing the desired SD key. You hear confirmation tone when the number is accepted.
- (6) **To automatically dial the extension number:** Press the IC key. If an intercom call is camped on and the IC key is lit, pressing the IC key accesses the waiting call and terminates the Directory feature.

To search for a different extension number or user name: Repeat steps 2 and 4.

To terminate the directory routine: *If off hook*, hang up. *If on hook*, press the SPKR key.

To switch to the outside directory: Press a non-flashing call or individual trunk key or the ANSWER or OUTGOING key. (Outside directory instructions are given below.) If a call is ringing in or holding on the selected trunk, pressing the flashing call key, flashing individual trunk key, or ANSWER key will answer the call and terminate the directory function.

B. OUTSIDE DIRECTORY

24.7 TO PERFORM AN OUTSIDE DIRECTORY SEARCH:

- (1) While on or off hook, press SPCL and enter the System Outside Directory feature code (308). The MSG key lights (and the SPKR key lights if on hook) and the display shows OUTSIDE NAME: on the top line, while the cursor is located on the bottom line.
- (2) **To enter a name:** Enter alphanumeric characters (up to 16) for the speed-dial name. You do not have to enter the whole name. Press the keypad keys to enter the desired characters. Refer to the chart on page 4-90. Press the FWD key once to

advance or twice to leave a space. Press the MUTE key to backspace.

To scroll through the directory: Press the pound (#) key to scroll forward alphabetically through the directory or press the asterisk (*) key to scroll backward. *If this method is used*, skip step 3 and proceed to step 4.

- (3) Press either the pound (#) or asterisk (*) key to begin searching. The closest match will be displayed on your keyset. If you selected a non-display number, NON DISPLAY # will appear on the top line and the name (if assigned) will appear on the bottom line; the number is not displayed.

- (4) *If desired*, store the selected system speed-dial number in a station speed-dial location by pressing the desired SD key. You hear a confirmation tone when the number is accepted.

NOTE: If the system speed-dial number is longer than 16 digits, only the first 16 digits will be stored in the station speed-dial location. Also, if the number is a non-display number, it cannot be stored.

- (5) **To automatically dial the speed-dial number:** Press an individual trunk key, the OUTGOING or ANSWER key, or a trunk group key. *If off hook*, lift the handset when the call is answered. If a call is ringing in or holding on the selected trunk, pressing the flashing individual trunk key or the ANSWER key will answer the call and terminate the directory function.

To search for a different system speed-dial number: Repeat steps 2 and 3.

To terminate the directory routine: *If off hook*, hang up. *If on hook*, press the SPKR key.

To switch to the intercom directory: Press the IC key. (Intercom directory instructions are given on page 4-90.) If an intercom call is camped on and the IC key is flashing, pressing the IC key accesses the waiting call and terminates the Directory feature.

25. HOUSE PHONE

25.1 This feature provides users with the ability to place a pre-designated intercom or outside call simply by lifting the handset (or pressing the SPKR key if it is a keyset) on a designated house phone. There are several applications for this feature, such as:

- **Courtesy paging phone:** Visitors hear pages instructing them to pick up the house phone (such as the paging phones used in airport terminals). When they lift the handset, they are connected to a pre-programmed station user who can give them a message or connect them to a call.
- **Emergency phone:** The house phone can be programmed to automatically place a call to an emergency number (such as 911). This could save time in an emergency.
- **Service phone:** Customers can use the house phone(s) to place orders or receive special services from the lobby. For example, the house phone would automatically dial the extension number of a service representative (or hunt group number of the service department).
- **Intercom network:** House phones could be placed in specific locations throughout a building (such as examination rooms in a doctor's office) and could be programmed to access a specific station or group of stations (such as a nurses' station).

25.2 Any station may be designated as a house phone in database programming (see PROGRAMMING, page

5-38), however this feature is usually assigned to single-line sets. The primary attendant should not be a house phone, nor should any Attendant Computer Console station.

25.3 The number dialed by the house phone is determined by the station's speed-dial programming. The number programmed through the database or in station speed-dial location 1 is automatically dialed during day mode, and the number in location 2 is dialed during night mode. This number can be either an extension number or an outside telephone number. If it is an outside number, it must be preceded with a select trunk group feature code (and a pause if necessary).

25.4 If the house phone is a keyset, speed-dial programming should be terminated by pressing a call key, or individual trunk, or trunk key as if an outside number was being stored, even when storing an extension number. Other station information (such as user name, extension number, SCOS, etc.) for the house phone is programmed as usual.

25.5 Once the house phone status has been programmed, the speed-dial number can only be changed while on hook (if it is a keyset) or through database programming because lifting the handset will cause the station to dial the designated number.

25.6 Incoming calls take precedence over outgoing calls. If using a single-line set or a keyset programmed for automatic trunk access (see page 4-52), any ringing call is automatically answered when the handset is lifted or the SPKR key is pressed.

26. REDIALING

26.1 The Redial feature stores the last telephone number dialed at the station (manually or speed-dialed numbers up to 48 digits). If the station user reaches a busy number or is disconnected, or if there is no answer, the number can be redialed easily.

26.2 Only one telephone number can be stored in the station's redial memory at one time. With keysets, this number can be stored in one of two ways, depending on keyset programming.

- **Last Number Dialed:** The last number manually dialed or speed dialed is automatically stored. It changes every time the user dials a telephone number. The number is redialed using the procedure in paragraph 26.9. This is the default value of the Redial feature and the REDIAL key.
- **Last Number Saved:** The last number dialed is manually stored by the keyset user. Dialing other numbers does not change the number saved. It only changes when a new number is saved, using the procedure in paragraph 26.8. The number is redialed using the procedure in paragraph 26.9. This is programmed with the Last Number Saved feature code.

26.3 There are three feature codes that affect the Redial feature. The Redial feature code (380) performs the redial function (on keysets and ESLs, this code is programmed under the REDIAL key; on SLIs the code is under the REDL key.) The Program Redial Mode feature codes (320 and 321) determine the mode of the redial feature code for keysets (Last Number Dialed Or Last Number Saved). The ESLs and SLI REDIAL key mode cannot be changed; it is always last number dialed.

26.4 System speed-dial numbers cannot be redialed at any station if they have been programmed as non-display numbers.

26.5 If using an E&M trunk, the Redial feature remembers the other system's trunk access code and automatically inserts a pause after the code when it is redialed.

26.6 A system programming flag allows the programmer to specify whether all dialed digits or just the digits

that make up the valid call are displayed and stored in the redial buffer. If desired, the "extra" digits used for dial-up banking machine, voice mail, automated attendant, or other purposes can be suppressed so that only the telephone number digits are displayed and stored in redial memory. Suppressing the extra digits prevents entries, such as PIN numbers and other codes, from being displayed when they are dialed. (see page 5-69 in programming.)

26.7 TO PROGRAM THE KEYSSET REDIAL MODE:

NOTE: When in the default state, the keyset Redial mode is programmed for Last Number Redial (320).

- (1) While on hook, press the SPCL key.
- (2) Enter the feature code to program Last Number Dialed (320) or Last Number Saved (321) redial mode. You hear confirmation tone.

26.8 TO SAVE A NUMBER ON A KEYSSET PROGRAMMED FOR LAST NUMBER SAVED (321):

NOTE: The saved number is replaced each time you repeat this procedure.

- (1) When you wish to save an outside telephone number, hang up to disconnect the call.
- (2) Remain on hook and press the REDIAL key (or press SPCL and enter the Redial feature code — 380). You hear a confirmation tone.
- (3) **To redial the number:** Use the procedure in the next paragraph.

26.9 TO REDIAL A NUMBER:

- (1) Lift the handset and select an outgoing trunk.
- (2) **Keyset:** Press the REDIAL key (or press SPCL and enter the Redial feature code — 380). The number is dialed and displayed.

ESLs: Press the REDIAL key. The number is dialed.

SLI: Press the FLASH key and then the REDL key or enter the Redial feature code (380). The number is dialed.

Other Single-Line Set: Hookflash and enter the Redial feature code (380). The number is dialed.

27. PAGING

27.1 The Paging feature allows announcements to be made through keyset internal speakers. Optional paging equipment (amplifiers and paging speakers) may also be installed on external paging ports or relays to provide paging for an external area, such as a warehouse or loading dock (see INSTALLATION, page 3-141).

27.2 External paging circuitry is available by converting up to nine unused single-line (SLC) or trunk circuits. Trunk and single-line circuits can be converted for external paging use in the Page Zones window (page 5-70 in PROGRAMMING).

27.3 There can be up to 10 paging zones. When the system is in the default state, all keysets are assigned to paging zone 1 to provide an all-page zone. Keysets and external paging ports/relays can be assigned to any, all, or none of the paging zones, as desired.

27.4 Pages are not heard if the keyset has been removed from paging (using the feature code as described in paragraph 28.2) in do-not-disturb, is ringing, or is in use. Also, keyset background music and external speaker music are interrupted for pages.

27.5 *TO MAKE A PAGE:*

- (1) Lift the handset.
- (2) **Keyset:** Press the PAGE key (or enter the Page feature code — 7).

Single-Line Set: Enter the Page feature code (7).

- (3) Enter the zone code (0-9) for the desired zone.
- (4) After the single progress tone, make your page before the Paging timer expires. If you hear reorder tones, there are no stations or external zones in the selected page zone, the necessary system resources are busy, or the paging zone is being used by another station. Users cannot camp on to or queue the paging system.
- (5) Hang up.

28. REMOVE FROM PAGING

28.1 A keyset user can prevent the keyset from receiving pages or allow it to receive pages again using these feature codes. If the keyset is assigned to more than one page zone, all zones are removed or replaced; the user cannot toggle individual zones.

28.2 *TO HALT OR ENABLE ZONE PAGES:*

- (1) While on or off hook, press SPCL.
- (2) Enter the Page Remove feature code (332) to prevent the keyset from receiving pages or enter the Page Replace feature code (333) to allow the keyset to receive pages. You hear a confirmation tone. (Or use the Page Remove/Replace On/Off feature code [334] to toggle the pages on or off.)
- (3) *If off hook,* hang up.

29. DO-NOT-DISTURB

29.1 Placing a station in do-not-disturb halts all pages, incoming intercom calls, camped-on calls, and transferred calls to that station. Queue callbacks, recalls, and direct ring-in calls are not blocked. Another user calling the station while it is in do-not-disturb hears a repeating signal of four fast tones and a pause (display keysets show the do-not-disturb message); the user cannot camp on, but can queue or leave a message at the station.

29.2 If desired, individual stations can be prevented from using do-not-disturb by disabling the Do-Not-Disturb option in the database (see PROGRAMMING, page 5-28). Another option concerns do-not-disturb breakthrough. Normally, calls to a station through DISA, the automated attendant, or a voice computer are not blocked by placing the station in do-not-disturb. If desired, individual stations can be set to prevent these calls from breaking through do-not-disturb (see PROGRAMMING, page 5-28).

29.3 If a hunt group station is in do-not-disturb, calls to the user's hunt group do not cause the keyset to ring, but the individual trunk key will flash if all other stations in the hunt group are busy, forwarded, have hunt group remove enabled, or are in do-not-disturb. Hunt group announcement stations and overflow stations cannot block hunt group calls by using do-not-disturb.

29.4 Keyset stations may be given Do-Not-Disturb Override permission. These stations, when reaching a station in do-not-disturb, can enter the Do-Not-Disturb Override feature code (373) and place an intercom call. Single-line stations cannot be enabled to use the Do-Not-Disturb Override feature.

29.5 When a station is placed in do-not-disturb, the user may select one of 20 system-stored messages that will appear on the top line of the display (unless do-not-disturb is enabled while the user is on a call or off hook, in which case message 1 is automatically selected). An attendant can reprogram messages 02-20 with messages, up to 16 characters each. When a station in do-not-disturb is called by a display keyset user, the caller sees the selected message.

29.6 Default do-not-disturb messages are programmed as follows:

01 DO-NOT-DISTURB	11 OUT OF OFFICE
02 IN MEETING UNTIL	12 OUT UNTIL
03 IN MEETING	13 WITH A CLIENT
04 ON VACATION 'TIL	14 WITH A GUEST
05 ON VACATION	15 WITH A PATIENT
06 CALL ME AT	16 UNAVAILABLE
07 CALL ME AFTER	17 IN CONFERENCE
08 AWAY AT	18 AWAY FROM DESK
09 ON BREAK	19 GONE HOME
10 OUT OF TOWN 'TIL	20 OUT TO LUNCH

29.7 The second line of the message can be customized with a numeric/alphanumeric message of up to 16 characters. The customized message is entered as described in the following paragraphs.

29.8 When programming a customized do-not-disturb message, the station is automatically in numeric mode. The keypad keys are used to enter numbers 0-9, the pound (#) key is used for entering a hyphen (-), and the asterisk (*) key is used for entering a colon (:). For example, 1*00 would enter "1:00" in numeric mode.

29.9 Keyset users can enter alphanumeric mode by pressing the MSG key (the key lights). Keypad keys are used to enter the desired letters, numbers, and punctuation. The number of times a key is pressed determines which character is entered. For example, 33377744432999 would enter "FRIDAY." When adjoining characters are located under the same key, press the FWD key once to advance to the next character. For example, 6 FWD 666 FWD 6632999 would enter "MONDAY." Refer to the chart below to program messages in alphanumeric mode. (Note that letters correspond to the letters printed on the keypad keys.)

KEY	NUMBER OF TIMES KEY IS PRESSED				
	1	2	3	4	5
1	@	+	&	<	1
2	A	B	C	>	2
3	D	E	F	/	3
4	G	H	I	"	4
5	J	K	L	[	5
6	M	N	O	]	6
7	P	Q	R	S	7
8	T	U	V	;	8
9	W	X	Y	Z	9
0	'	%	=	?	0
*	*	!	\$	(:
#	#	,	.)	-

29.10 When using either mode, keyset users may use the SD keys (digits stored in the outside number location) and/or the REDIAL key to enter stored numbers or messages. Speed-dial numbers can be chained together when entering messages that require more than 16 keystrokes to create the desired message. When programming a message in speed-dial memory (outside number location), use the SPCL key in place of the FWD key to advance or insert spaces.

29.11 TO ENABLE DO-NOT-DISTURB MODE AT YOUR STATION:

- (1) **Keyset:** While on hook, press the DND key (or press SPCL and enter a Do-Not-Disturb feature code — 370 or 372). The DND key lights. (Display keysets show SELECT DND MESSAGE.)
Single-Line Set: Lift the handset and enter the Do-Not-Disturb feature code (370) or the Do-Not-Disturb On/Off feature code (372). You hear a progress tone.

- (2) **To select message 01 (DO-NOT-DISTURB):**

Keyset: Press the SPKR key, lift and replace the handset, or allow the programming mode to time out.

Single-Line Set: Hang up, press the FLASH key, or allow the programming mode to time out.

To select any of the 20 pre-programmed messages: Enter the desired number (01-20). Display keyset users may scroll through the messages by pressing the pound (#) key to go forward or the asterisk (*) key to go backward (the display shows the selected message). If you enter an invalid message number, you will hear reorder tones and must try again.

- (3) **To terminate programming:**

Keyset: Press the SPKR key, lift and replace the handset, or allow the programming mode to time out.

Single-Line Set: Hang up, press the FLASH key, or allow the programming mode to time out.

To customize the second line of the message: Use any combination of the following methods:

- a. **Remain in numeric mode:** Press the keypad keys to enter the desired number. Use the pound key (#) for a hyphen (-) and the asterisk key (*) for a colon (:). Keyset users can press the FWD key once to leave a space, or press the MUTE key to backspace.
- b. **Change to alphanumeric mode (keysets only):** Press the MSG key (the key lights), then enter the desired characters. Refer to the chart on the previous page. Keyset users can press the FWD key once to advance or twice to leave a space, or press the MUTE key to backspace.
- c. **Use speed-dial and/or redial numbers (keysets only):** In either numeric or alphanumeric

mode, press one of the SD keys, and/or press the REDIAL key to enter the stored characters. You may chain numbers together.

- (4) **Terminate programming:**

Keyset: Press the SPKR key, lift and replace the handset, or allow the programming mode to time out. (Display keysets show selected message. Date and time appear on the second line if there is no customized message.)

Single-Line Set: Hang up, press the FLASH key, or allow the programming mode to time out.

29.12 TO CANCEL DO-NOT-DISTURB:

Keyset: While on hook, press the lit DND key (or press SPCL and enter the cancel Do-Not-Disturb feature code — 371 or Do-Not-Disturb On/Off feature code — 372). The key goes off and the display returns to date and time.

Single-Line Set: Lift the handset, enter the cancel Do-Not-Disturb feature code (371) or the Do-Not-Disturb On/Off feature code (372), and hang up.

29.13 TO PLACE YOUR BUSY STATION IN DO-NOT-DISTURB WHILE A CALL IS CAMPED ON:

If, while on a call, you hear call waiting signals and you wish to let the caller know you do not want to be disturbed:

Keyset: Press the DND key (or press SPCL and enter a Do-Not-Disturb feature code — 370 or 372). The key lights. The intercom caller is no longer camped on and receives do-not-disturb indications.

Single-Line Set: (*This procedure will interrupt your call in progress.*) Press the FLASH key (hookflash) and enter the Do-Not-Disturb feature code (370) or the Do-Not-Disturb On/Off feature code (372). The intercom caller is no longer camped on and receives do-not-disturb indications. Press the FLASH key (hookflash) again to return to the current call.

29.14 DO-NOT-DISTURB OVERRIDE (KEYSETS WITH THIS FEATURE ENABLED ONLY):

If your keyset is enabled for Do-Not-Disturb Override and you hear do-not-disturb tones when placing an intercom call, you may use the following procedure to break through do-not-disturb and complete the call.

When you hear do-not-disturb tones while placing an intercom call, press the SPCL key and enter the Do-Not-Disturb Override feature code (373). If the called station is idle, the call rings as a private intercom call. If the called station is busy, your call camps on.

30. HOOKFLASH

30.1 Single-line set users are required to hookflash to access some system resources. Or, a hookflash may be required for keyset and single-line users to access certain telephone company features, such as call waiting. The duration of the hookflash can be changed by reprogramming the CO Hookflash timer (default value is 600ms).

30.2 The Hookflash feature can be enabled or disabled on a trunk group-by-trunk group basis.

NOTE: The ESLS and SLI FLASH key does not generate a hookflash over trunks. You must use this procedure.

30.3 *TO SEND A TIMED HOOKFLASH WHILE ON AN OUTSIDE TRUNK:*

Keyset: Press the SPCL key and enter the Hookflash feature code (330).

Single-Line Set: Press the FLASH key (hookflash) and enter the Hookflash feature code (330).

31. CANCEL MISCELLANEOUS OPERATIONS

31.1 A station user can cancel Do-Not-Disturb, Handsfree Disable, Call Forward Requests, Queue Request, Page Remove, Hunt Group Remove, And Background Music features all at once by entering a single feature code.

31.2 *TO CANCEL MISCELLANEOUS OPERATIONS:*

Keyset: While on or off hook, press the SPCL key and enter the Cancel Miscellaneous Operations feature code (395). You hear a confirmation tone. *If off hook*, hang up.

Single-Line Set: Lift the handset, enter the Cancel Miscellaneous Operations feature code (395). You hear dial tone. Hang up.

32. REMINDER MESSAGES (KEYSETS ONLY)

32.1 Reminder messages are set, like an alarm clock, to signal a keyset station at a specified time. The user can select the message and time up to 24 hours in advance. Twenty different reminder messages are available. These messages can be reprogrammed by the installer or any attendant. Up to 120 reminder messages can be requested per system.

32.2 At the programmed time, the reminder message signals the station with eight short tones. A display keyset shows the message until it is cancelled; a non-display keyset receives tones only. If the station is busy, the user still hears the tones and the message displays for 10 seconds during the call, then the display returns after the user hangs up. (Reminder displays interrupt, but do not affect, programming.)

32.3 Messages can be changed by the installer or any attendant, if desired. They are limited to 16 characters. The default messages are:

01 MEETING	11 CALL ENGINEERING
02 STAFF MEETING	12 CALL MARKETING
03 SALES MEETING	13 CALL ACCOUNTING
04 CANCEL MEETING	14 CANCEL DND
05 APPOINTMENT	15 CANCEL CALL FWD
06 PLACE CALL	16 TAKE MEDICATION
07 CALL CLIENT	17 MAKE RESERVATION
08 CALL CUSTOMER	18 REVIEW SCHEDULE
09 CALL HOME	19 LUNCH
10 CALL CORPORATE	20 REMINDER

32.4 TO REQUEST REMINDER MESSAGES:

NOTE: Lift and replace the handset to stop the process without selecting a message.

- (1) While on hook, press the SPCL key.
- (2) Enter the Reminder Message feature code (305). (Display keysets show PROGRAM REMINDER MESSAGE.)
- (3) To select a specific message: Enter the two-digit message code (01-20). (Display keysets show selected message.)

To scroll through the messages: View the available messages by pressing the pound (#) key to scroll forward or pressing the asterisk (*) key to scroll backward. Each message displays for one second before another can be selected.

- (4) While the desired message is displayed, enter the time that you wish to receive the message:
 - a. Enter the hour and minutes (e.g., 900 for 9:00).
 - b. Press the asterisk (*) key for AM or press the pound (#) key for PM. You hear a progress tone when it is accepted.

NOTE: If an invalid time is entered, you hear reorder tones and the message request is cancelled. (Display keysets show ERROR! INVALID TIME ENTERED.)

32.5 TO RECEIVE A REMINDER MESSAGE:

At the selected time, you hear eight short tones and the message displays.

- (1) *If your station is idle*, go to the next step.

If you are on a call, the message will display for 10 seconds. After you hang up, the reminder message returns and must be cleared.

If you are programming your keyset, the programming function is interrupted. The message will display for 10 seconds. After programming is completed, the reminder message will return and must be cleared.

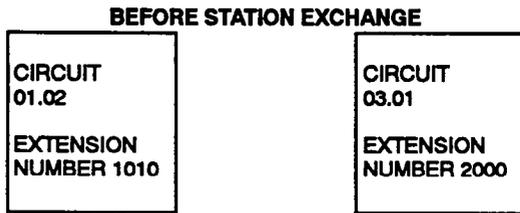
- (2) **To clear the message:** Remain on hook and press the asterisk (*) key.

32.6 TO CANCEL ALL OF YOUR REMINDER MESSAGE REQUESTS:

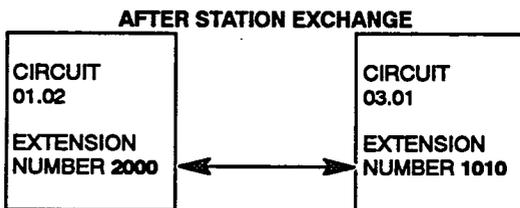
While on hook, press the SPCL key and enter the Cancel Reminder Message feature code (306). You cannot view or cancel individual messages.

33. OPTIONAL STATION EXCHANGE FEATURE

33.1 This programmable station feature allows a station user to exchange the extension numbers of two station circuits. This swaps the database and user programmed features of the extension numbers between two station circuits without the need for database programming. The circuit number of the station locations are unchanged, but the extension numbers are changed, as illustrated below.



Circuit Number 01.02 has all of the database and user programming of Extension Number 1010. Circuit Number 03.01 is programmed as Extension Number 2000.



Circuit Number 01.02 becomes Extension Number 2000.
Circuit Number 03.01 becomes Extension Number 1010.

33.2 All database-programmed station features (such as, DSS/BLF Unit assignment, trunk access, station flags, toll restriction, username, etc.) as well as all user programming (speed-dial numbers, call forwarding, do-not-disturb, reminder messages, etc.) will stay with the extension number during an exchange.

33.3 Any station that will be involved in a station exchange must have the Station Exchange station flag enabled and a programmed Station Exchange Password. If a station user attempts an exchange in which one or both extension numbers do not have the flag enabled, the exchange will not be allowed. If the user does not enter a valid password after entering the Station Exchange feature code, the exchange will not be allowed. Refer to pages 5-28 and 5-31 in PROGRAMMING.

NOTE: Programmers should use *extension numbers* and not station circuit numbers when programming stations. Because the Station Exchange feature can be used to change the extension numbers of station circuits, circuit numbers are not reliable references.

33.4 Exchanges can be made only between similar stations. That is, digital keysets of any size can ex-

change with other digital keysets of any size, analog keysets of any size can exchange with other analog keysets of any size, and single-line stations can exchange with other single-line stations. Examples of allowed and disallowed station exchanges include the following:

Allowed Exchanges:

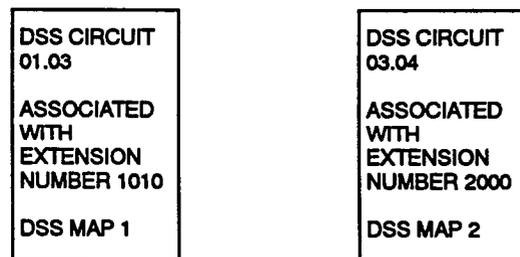
- Standard Digital Keypad station with an Executive Digital Keypad station
- IMX 24-Line Keypad (or Inter-Tel/DVK 24-Line Keypad) station with an IMX 8-Line Keypad (or Inter-Tel/DVK 8-Line Keypad) station
- Two Single-Line stations

Disallowed Exchanges:

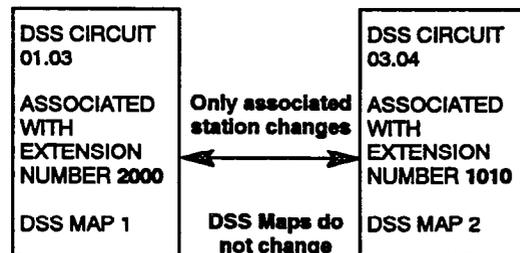
- Any Digital Keypad station with any Analog Keypad station
- Any Keypad station with any Single-Line station

33.5 DSS/BLF Units follow the same analog-to-analog and digital-to-digital exchange rule as keysets. If one station in the exchange is equipped with a DSS/BLF and the other is not the exchange is allowed and the DSS/BLF Unit will remain operational at its assigned station circuit. Any DSS/BLF Units involved in an exchange will retain their key map assignments, but will be associated with their keypad's new extension number. That is, the DSS/BLF key maps will not be exchanged when the keypad extension numbers change.

DSS UNITS BEFORE STATION EXCHANGE



AFTER STATION EXCHANGE



33.6 Examples of allowed and disallowed DSS/BLF Unit exchanges include the following:

Allowed Exchanges:

- Digital Keypad with Digital DSS/BLF Unit with another Digital Keypad with or without a Digital DSS/BLF Unit
- Analog Keypad with Analog DSS/BLF Unit with another Analog Keypad with or without an Analog DSS/BLF Unit

Disallowed Exchanges:

- A Digital Keypad with Digital DSS/BLF Unit with an Analog Keypad with or without an Analog DSS/BLF Unit

33.7 Attendant Computer Console stations can be exchanged with other Console stations or with Analog Keypad stations. They cannot exchange with Digital Keypad stations or Single-Line stations. **NOTE:** Exchanges between a console and keypad station will cause the keypad to lose station speed-dial locations 1-3. This is because those locations are automatically modified by the system for use by the console. Speed-dial locations 1-3 will remain functional at the console station.

33.8 One of the station circuits used in the station exchange can be a "park" location (a circuit that is not equipped with a circuit card or phone). However, this is not required; two fully equipped stations can be exchanged as long as they meet the programming and station-type criteria discussed above. **NOTE:** Park locations are included in the system port count (416 or 832) even if they are not physically connected to a station circuit.

33.9 Neither station involved in the exchange can have a call in progress, ringing, or recalling when an exchange is attempted. There can be calls on hold or hunt group calls can be camped on, recalling, or ringing. If the exchange is denied, the user hears reorder tones.

33.10 Two possible applications for this feature include the following:

- **Multiple users of one station location:** When several people use the same phone, each person can have his or her own station programming. For example, if three workers on different shifts use the same office they can use their own extension numbers during their shifts. At the beginning of the shift, the worker would enter the Station Exchange feature code and password to swap the office's default extension number with his own, which is kept in a park position. During his shift, he can program and use his

phone as desired. At the end of the shift, he would exchange again to place his extension number back in the park position and return the default extension to the office. The next worker would then bring in his or her individual extension.

- **A user who changes offices periodically:** If a worker spends a portion of the day in one location and then moves to another location, he or she can use the Station Exchange feature to take his or her station programming to the new location. The user can either move the extension in and out of a park location, or simply exchange the two locations each time he or she changes.

NOTE: If a database save/restore is performed on the system, any stations that have been exchanged are returned to their original programmed state.

33.11 TO EXCHANGE STATIONS:

- (1) To bring a new extension number to your present location, press SPCL and enter the Station Exchange feature code (303). You hear a confirmation tone. The display shows STN EXCHANGE WITH EXT.

If the station you are using is not programmed for Station Exchange, you hear reorder tones and the station returns to idle state.

- (2) Enter the extension number you wish to bring to the station you are using. You hear a confirmation tone. The display shows the number you dialed.

You will hear reorder tones and must start over if any of the following occur:

- You entered an invalid extension number
- The extension number that you entered is not programmed for Station Exchange
- You entered an extension number of mismatched station device type (digital vs. analog, or keypad vs. single-line)
- You entered an extension number of a station that is not idle

- (3) Enter the Station Exchange Password for the extension number entered in step 2. When the password is accepted, you hear a confirmation tone. The station you are using is reset to reflect the database and user programming of the extension number selected in step 2.

If you entered an invalid password, you hear reorder tones and must start over.

34. OPTIONAL DATA DEVICE ATTACHMENTS (KEYSETS ONLY)

34.1 A customer-provided, modem-equipped data device (such as a data terminal or a personal computer) may be attached to any IMX 12/24-line keyset or any Inter-Tel/DVK keyset that has an optional Data Port Module installed. A data device may also be attached to any digital keyset with a PC Data Port Module (PCDPM) and a Modem Data Port module (MDPM) installed. (See SPECIFICATIONS, page 2-28, and INSTALLATION, pages 3-109, 3-113, and 3-121, for more information.) IMX 8-line keysets cannot have data device attachments because this feature requires a secondary voice path which is only available on digital keysets, IMX 12/24-line keysets, and Inter-Tel/DVK keysets.

NOTE: Because incoming calls must be transferred to the data path by pressing the DATA key, the auto-answer feature on modems cannot be used to answer data calls to a keyset.

34.2 Data calls can be placed to an intercom or outside number using the keyset or a keyboard attached to the data device. If using a keyboard, the voice channel is automatically connected to the data device when it comes off hook. If using the keyset to place the call, the keyset user presses the DATA key to connect the trunk or intercom voice channel to the data device. By entering a feature code, data calls may be monitored through the handset without interfering with the data transmission (the microphone is muted).

34.3 Data calls are transmitted over the keyset's secondary voice path (the MDPM voice path on digital keysets). This leaves the primary voice path available for normal keyset operation. Receiving off-hook voice announce (OHVA) calls during a data call is not possible since the data call is using the secondary voice path.

34.4 The modem-equipped data device is connected to the keyset by plugging the data device's line cord (normally intended for connection to a standard trunk) into the modular jack on the keyset's optional Data Port Module or PCDPM.

34.5 TO ACCESS A REMOTE DATA DEVICE USING A TRUNK:

- (1) **To use the handset:** Lift the handset.
To use the speakerphone: While on hook, press the SPKR key.
- (2) Select an outside trunk and dial the telephone number of the data device to be accessed. The call or individual trunk key flashes and the display shows the call cost and elapsed time of the call.

- (3) When you hear modem tone, press the DATA key. The call key is unlit or the individual trunk key is lit. *If using the speakerphone*, the SPKR key goes off, the DATA key flutters, and the display returns to date and time. *If using the handset*, the DATA key flashes slowly.
- (4) *If using the handset*, hang up. The call key remains unlit or the individual trunk key remains lit, the DATA key flutters, and the display returns to date and time.
- (5) Operate the data device according to the manufacturer's instructions.

If you wish to return the data call to the primary voice path, press the DATA key. The call or individual trunk key is lit and the call cost and elapsed time are displayed.

34.6 TO ACCESS A REMOTE DATA DEVICE USING THE INTERCOM:

- (1) **To use the handset:** Lift the handset.
To use the speakerphone: While on hook, press the SPKR key.
- (2) Dial the extension number of the data device to be accessed.
- (3) Notify the receiving party that you wish to connect the data device. When the called party activates the remote data device by pressing the DATA key, you hear modem tone. Or, if the extension number you dialed accesses an auto-answer modem connected to a single-line circuit, you will hear modem tone immediately.

NOTE: If the receiving party wishes to transfer the call to another party, the transfer must be completed before the caller completes the next step.

- (4) Press your DATA key. If using the speakerphone, the SPKR key goes off and the DATA key flutters. If using the handset, the DATA key flashes slowly.
- (5) *If using the handset*, hang up. The DATA key flutters.
- (6) Operate the data device according to the manufacturer's instructions.

34.7 TO ACCESS A REMOTE DATA DEVICE WHILE ON A CALL:

- (1) When you hear modem tone, press the DATA key. (If on an outside call, the call key is unlit or the individual trunk key is solidly lit). If using the speakerphone, the SPKR key goes off and the DATA key flutters (and, if on an outside call, the display returns to date and time). If using the handset, the DATA key flashes slowly.
- (2) *If using the handset*, hang up. (If on an outside call, the call key is unlit or the individual trunk key is solidly lit). The DATA key flutters (and, if on an outside call, the display returns to date and time).
- (3) Operate the data device according to the manufacturer's instructions.

34.8 TO ACCESS A REMOTE DATA DEVICE USING AN ATTACHED MODEM-EQUIPPED DATA DEVICE:

- (1) Following the procedures of your data device's communications software, instruct the device to dial an extension number, or a trunk access code and a telephone number, of the data device to be accessed. The call will be processed as though dialed from the keyset and will be automatically connected when answered. The DATA key is lit until dialing is completed, then it flutters. If the resources are busy, the data device will not camp on, but will receive continuous busy tones.
- (2) Operate the data device according to the manufacturer's instructions.

NOTE: You cannot access system features (other than intercom and trunk access) by entering feature codes through the data device keyboard.

34.9 TO MONITOR A DATA CALL IN PROGRESS:

- (1) While a data transmission is active, lift the handset, press SPCL, and enter the Data Port Monitor feature code (341). The DATA key flashes slowly. (If connected to a trunk, the call key remains unlit or the individual trunk key remains lit and the display shows the call cost and elapsed time of the call.)
- (2) You may listen to the data call without interfering with the data transmission (the handset microphone is muted). Hang up to discontinue monitoring the data transmission; the data call is still in progress and the DATA key flutters.

34.10 TO TERMINATE DATA DEVICE CONNECTION:

To have the data device disconnect the call: Using the appropriate commands for the data device, instruct it to disconnect from the call.

To use the keyset before disconnecting the call: While on or off hook:

- a. Press the lit DATA key. The DATA key goes off. *If desired*, speak to the party at the site of the remote data device. This can only be done if the modem at the site of the remote data device can be turned off without disconnecting the trunk.
- b. **To disconnect:** *If off hook*, hang up. *If on hook*, press the SPKR key.

35. ATTENDANT FEATURES

35.1 This section describes the attendant-only features including the functions of the Direct Station Selection/Busy Lamp Field (DSS/BLF) Unit. (Attendant Computer Console instructions are located in the manual that is provided with the unit.)

35.2 All attendant stations must be equipped with keysets and should have displays in order to identify ring-in and recall sources. Also, for increased call-processing capabilities, attendant stations are generally equipped with optional DSS/BLF Units or Attendant Computer Consoles. DSS/BLF Units are described below; for Attendant Computer Console information, refer to the manual provided with the unit. See page 4-50 for a complete description of DSS/BLF Units.

35.3 See page 4-50 for a complete description of DSS/BLF Units. For DSS/BLF Units with speed-dial keys, see page 4-87 for operating instructions.

NOTE: Keyset stations do not have to be assigned as attendant stations in order to use a DSS/BLF Unit. However, all keysets with DSS/BLF Units need to be identified in database programming (see PROGRAMMING, page 5-136).

A. USING THE DSS/BLF UNIT

35.4 PLACING AN INTERCOM CALL USING A DSS/BLF UNIT:

- (1) Lift the handset or press the SPKR key.
- (2) *If you wish to place a private call to a keyset, press the pound (#) key.*
- (3) Press the desired DSS/BLF key.

If calling a keyset with handsfree answering enabled, you are immediately connected.

If placing a private call, calling a hunt group, calling a single-line set, or calling a keyset with the handsfree feature disabled, you hear repeating double tones until the call is answered.

- (4) If the system is enabled for immediate DSS/BLF Unit off-hook voice announce, do not hang up when calling a busy keyset. Press the DSS/BLF key again. If the keyset's secondary voice path is available, you are immediately connected for an off-hook voice announce call and may speak. (For more information concerning the Off-Hook Voice Announce feature, refer to page 4-61.)

35.5 TRANSFERRING CALLS:

- (1) *If on an outside call, press the desired DSS/BLF key (or press the XFR key and dial a station or voice mail extension number, a hunt group pilot number, or a transfer-to-park location number). The call is placed on transfer hold.*

If on an intercom call, press the SPCL key and enter the Transfer Intercom Call feature code (346). Then press the desired DSS/BLF key (or dial a station or voice mail extension number, a hunt group pilot number, or a transfer-to-park location number).

- a. **Transfer to a station that is forwarded to voice mail:** *If transferring to a station that is forwarded to voice mail, you hear repeating double tones and the display shows DEST FORWARDED TO VOICE MAIL. You can then hang up to complete the transfer, or return to the caller on transfer hold by doing one of the following:*

For an outside or intercom call, press the XFR key twice (or press the SPCL key once and enter the Transfer Call feature code [345] twice).

For an outside call, press the call key or individual trunk key.

- b. **Transfer to voice mail:** *If transferring to the voice mail unit, you hear a single tone and the system waits for you to enter the mailbox number (display shows ENTER VOICE MAILBOX #). Enter the desired mailbox number.*

If you do not enter a mailbox number before you hang up, the caller will be connected to the voice mail unit and must enter the mailbox number after listening to the introductory voice prompts.

If the system is checking for a valid mailbox number and you enter a valid mailbox number, the transfer is completed to voice mail (display shows CALL TRANSFERRED TO VOICE MAIL).

If the system is checking for a valid mailbox number and the number you entered is invalid, you hear reorder tones (display shows INVALID MAILBOX NUMBER ENTERED) and you must enter the correct number.

If the system is not checking for a valid mailbox number, hang up to complete the transfer.

- c. **Transfer-to-park:** If transferring to a transfer-to-park location, hang up to complete the transfer, or transfer the call to hold as described in the second part of step 4. Then page the desired party and announce the call. The party must reverse transfer the call. Note that if the call is not answered, it will recall your station if transferred directly or will recall the called transfer-to-park location's attendant if transferred to hold.
- d. **Transfer to a hunt group:** If transferring the call to a hunt group, the transfer is automatically completed when you dial the pilot number. Hang up.

(2) *If desired*, wait for an answer and announce the call. One of the following occurs:

- a. *If the call is accepted*, continue to step 3.
- b. *If the call is refused, the station is busy or there is no answer*: Skip to step 4 or do one of the following.

To return to the caller: Do one of the following.

For an outside or intercom call, press the XFR key twice (or press the SPCL key once and enter the Transfer Call feature code [345] twice).

For an outside call, press the call key or individual trunk key.

To try another station: Press the XFR key (or press the SPCL key and enter the Transfer CO feature code — 345, or the Transfer Intercom feature code — 346) and dial another extension number.

(3) *If it becomes necessary to split between the called party and the caller waiting to be transferred*, you may use the Keypad Call Splitting feature code as follows:

- a. Press the SPCL key and enter the Keypad Call Splitting feature code (338). The station waiting to receive the transfer is placed on

hold and you are connected to the party waiting to be transferred.

- b. Press the SPCL key and enter 338 again to speak to the station user waiting to receive the transfer and place the party to be transferred on hold.

- c. Hang up to complete the transfer.

(4) **To complete the transfer:** Hang up, press another call key, or press the IC key to complete the transfer. The call will ring at the station. (Receiving station's display shows XXX TRANSFER FROM XXX or GRP #XX TRANSFER FROM XXX.) If the station is busy, the call camps on and sends call waiting signals.

To transfer the call to hold: Press the HOLD key (or press the SPCL key and enter the Individual Hold feature code — 336) to place the call on hold at the called station. The call will not ring or send call waiting signals until the Hold timer expires.

To complete the transfer and then make a page: Press the PAGE key. The call will automatically be transferred to hold at the called station and you will be connected to the paging network. Enter the desired paging zone code and make your announcement before the Paging timer expires.

35.6 TO REVERSE TRANSFER (PICK UP) A CALL RINGING OR HOLDING AT ANOTHER STATION:

- (1) Lift the handset or press the SPKR key.
- (2) **EITHER**, Press the DSS/BLF key of the station where the call is ringing or holding and then press the XFR key.

OR, Enter the Reverse Transfer feature code (4) and then press the DSS/BLF key of the station where the call is ringing.

- (3) If the system is not programmed to automatically connect reverse transfers, press the call or individual trunk key or IC key. The key is fluttering if the call was on hold or flashing if the call was ringing.

B. ATTENDANT RECALL

35.7 When a call is placed on hold or is transferred from one station to another, certain system timers limit the amount of time the call may remain unattended. After that time, the call recalls the station that transferred it or placed it on hold. If the call remains unanswered at the station until the Recall timer expires, it recalls the station's attendant. If the attendant station is busy, the call camps on and the display shows the source of the recall. If the call is not answered before the Abandoned Call timer expires, the system disconnects the call.

35.8 If a station user transfers or forwards an outside call to an outside telephone number and a loop start trunk is involved (this does not apply to ground start trunks), the call is limited by the Unsupervised CO timer. When the timer expires, one of the outside parties can reset the timer by pressing any DTMF key. If the timer is not reset, the call recalls the primary attendant station and causes the CNF key to flash. (Display key-sets show UNSUPERVISED CO RECALL.) This serves two purposes:

- It allows the attendant to monitor the length of CO-to-CO calls. When a CO-to-CO call recalls, the attendant can disconnect the call or allow it to continue.
- If the callers hang up before the attendant receives the recall, the system may not have disconnected the trunks because a disconnect was not received from the central office. The attendant must disconnect the call.

35.9 A recall signals the attendant's station with a display message, a recall ring signal (a repeating signal of four tones and a pause), and a call or individual trunk key flashing at the medium rate. If there is no attendant, or if the system is in night mode, the call recalls the station that transferred the call or placed it on hold until the Abandoned Call timer expires; then the call is disconnected.

35.10 If the attendant has calls forwarded, recalls from stations follow internal call forward requests. Recalls do not forward to outside telephone numbers, but recall the attendant's station until they are answered or the Abandoned Call timer expires. Placing the attendant's station in do-not-disturb does not block recalls or direct ring-in calls.

35.11 TO ANSWER A HOLD OR TRANSFER RECALL FROM AN OUTSIDE CALL:

When you see a hold or transfer recall display (HOLD RECALL FROM GRP #XX [or group name] RECALL FROM EX XXXX [or user name]) and hear a recall ring signal (a repeating signal of four tones and a pause):

- (1) Lift the handset or press the SPKR key.
- (2) Press the medium-flashing call key or individual trunk key or press the ANSWER key. If more than one trunk is recalling, pressing the ANSWER key accesses the outside call indicated on the display.

35.12 TO ANSWER A HOLD RECALL FROM AN INTERCOM CALL:

When you see a hold recall display (HOLD RECALL FROM XXX) and hear a recall ring signal (a repeating signal of four tones and a pause):

EITHER, Lift the handset or press the SPKR key, then press the IC key.

OR, For quick handsfree operation, simply press the IC key.

NOTE: If you are busy when the intercom call recalls, it will camp on. The IC key flashes at the medium rate, but you do not hear recall ring signals.

35.13 TO ANSWER AN UNSUPERVISED OUTSIDE CALL RECALL:

When you see the unsupervised recall display (UNSUPERVISED CO RECALL), hear a recall ring signal (a repeating signal of four tones and a pause), and see the CNF key flashing at the medium rate:

- (1) Lift the handset and press the CNF key to connect with both trunks. (If you have automatic CO call access, you do not need to press the CNF key.) The CNF key flashes slowly and the display shows CONFERENCE WITH GRP #XX GRP #XX.
- (2) Check to see if the trunk is still being used.
- (3) *If the parties are still talking*, press the CNF key again and hang up to return the parties to their conversation. The CNF key flutters. You can enter the conference at any time by pressing the fluttering CNF key. When the Conference-Hold timer expires, the conference recalls your station again.

If the parties have hung up, hang up to disconnect the call.

C. PLACING THE SYSTEM IN NIGHT MODE

35.14 Each attendant can place the associated tenant group in night mode to change the allowed-answer and ring-in assignments to the night lists. The primary attendant can place the entire system (all tenant groups) in day or night mode. There is no hold or transfer attendant recall during night mode. Hold and transfer recalls ring at the station that transferred them or placed them on hold. If a recall is not answered before the Abandoned Call timer expires, the call is disconnected. Unsupervised call recalls and unassigned DID trunks will continue to ring at the primary attendant's station in night mode.

35.15 Night transfer relays are activated when the system is placed in night mode and turned off when the system is placed in day mode. Night relays are pro-

grammed in the database (see page 5-73 in PROGRAMMING, and 2-14 in SPECIFICATIONS for more information).

35.16 *TO TURN NIGHT MODE ON OR OFF:*

While on hook, press the SPCL key and enter the Night Ring On/Off feature code (010). You hear a single confirmation tone. If placing the system in night mode, the display shows SYSTEM IS NOW IN NIGHT RING until the night mode is canceled (this appears on all attendant's displays if the primary attendant placed the system in night mode). If placing the system in day mode, your display shows SYSTEM IS NOW IN DAY MODE for five seconds (if the primary attendant placed the system in day mode the night mode display is cleared at all other attendant stations).

D. PROGRAMMING SPECIFIC STATION INFORMATION

35.17 Due to employee movement, change of status, turnover, etc., certain specific station information, such as user name, tenant group, department number, and serving attendant may need to be changed. This can be done from any attendant station. When programming numbers, the attendant's station is automatically in numeric mode; when programming the user name, the station is automatically in alphanumeric mode. Press the MSG key to switch back and forth between alphanumeric and numeric mode.

35.18 In numeric mode, the keypad keys are used to enter numbers 0-9, the pound (#) key is used for entering a hyphen (-), and the asterisk (*) key is used for entering a colon (:). For example, 1*00 would enter "1:00" in numeric mode.

35.19 In alphanumeric mode, keypad keys are used to enter the desired letters, numbers, and punctuation. The number of times a key is pressed determines which character is entered. For example, 533266 would enter "JEAN." When adjoining characters are located under the same key, press the FWD key to advance to the next character. For example, 66FWD6667776 would enter "NORM." Refer to the chart below to program information in alphanumeric mode. (Note that letters correspond to the letters printed on the keypad keys.)

KEY	NUMBER OF TIMES KEY IS PRESSED				
	1	2	3	4	5
1	@	+	&	<	1
2	A	B	C	>	2
3	D	E	F	/	3
4	G	H	I	"	4
5	J	K	L	[	5
6	M	N	O	]	6
7	P	Q	R	S	7
8	T	U	V	;	8
9	W	X	Y	Z	9
0	'	%	=	?	0
*	*	!	\$	(:
#	#	,	.)	-

35.20 TO PROGRAM SPECIFIC STATION INFORMATION:

- (1) While on hook, press the SPCL key and enter the Program Station Data feature code (022). (Display keysets show PROGRAMMING EXT.)
- (2) Enter the extension number (do not use the DSS/BLF key) of the station that is to be reprogrammed and press SPCL. You will hear a

confirmation tone and the display shows USER-NAME: EX XXXX (or the user name if it exists).

- (3) To enter a new user name: Use one of the following methods.
 - a. *Alphanumeric mode (MSG key lit):* Press the keypad keys to enter the desired characters. (Refer to the chart.) You may press the FWD key once to advance or twice to leave a space. Press the MUTE key to backspace.
 - b. *Numeric mode (MSG key unlit):* Press the keypad keys to enter the desired number. Use the pound key (#) for a hyphen (-) and the asterisk key (*) for a colon (:). Press the FWD key once to leave a space, or press the MUTE key to backspace.

To erase the current name: Repeatedly press the MUTE key until the lower portion of the display shows NONE.

To leave the information the same: Proceed to the next step.

- (4) Press the SPCL key to update the database and advance to the next prompt. You will hear a confirmation tone and the display shows TENANT GROUP X (and, if programmed, the tenant group name will display on the second line).

- (5) To enter a new tenant group number: Press the pound (#) key to scroll forward through the list or the asterisk (*) key to scroll backward.

To leave the information the same: Proceed to the next step.

- (6) Press the SPCL key to update the database and advance to the next prompt. You will hear a confirmation tone and the display shows DEPARTMENT XX (and, if programmed, the department name will display on the second line).

- (7) To enter a new department number: Press the pound (#) key to scroll forward through the list or the asterisk (*) key to scroll backward.

To leave the information the same: Proceed to the next step.

- (8) Press the SPCL key to update the database and advance to the next prompt. You will hear a confirmation tone and the display shows ATTENDNT: EX XXXX (or NONE).

NOTE: This display will not appear if the station being programmed is an attendant.

- (9) **To enter a new serving attendant number:** Enter the number using the keypad (it is automatically in the numeric mode).
- To erase the current attendant:** Repeatedly press the MUTE key until the lower portion of the display shows NONE.
- To leave the information the same:** Proceed to the next step.
- (10) Press the SPCL key to update the database and advance to the next prompt. You will hear a confirmation tone and the display shows PROGRAMMING EXT.
- (11) **To program another station:** Repeat the process with another extension number.
- To terminate the programming sequence:** Lift and replace the handset or allow the timer to expire. The display will return to date and time.

E. PROGRAMMING SYSTEM REMINDER MESSAGES

35.21 The stored system reminder messages can be changed from any attendant's keyset. (See page 4-98 for information concerning their use.) When the system is in the default state, the 20 reminder messages listed below are programmed. Attendants can delete them or change them to any other value (up to 16 characters).

01 MEETING	11 CALL ENGINEERING
02 STAFF MEETING	12 CALL MARKETING
03 SALES MEETING	13 CALL ACCOUNTING
04 CANCEL MEETING	14 CANCEL DND
05 APPOINTMENT	15 CANCEL CALL FWD
06 PLACE CALL	16 TAKE MEDICATION
07 CALL CLIENT	17 MAKE RESERVATION
08 CALL CUSTOMER	18 REVIEW SCHEDULE
09 CALL HOME	19 LUNCH
10 CALL CORPORATE	20 REMINDER

35.22 When programming, the attendant's station is automatically in alphanumeric mode. Press the MSG key to switch back and forth between alphanumeric and numeric mode.

35.23 In numeric mode, the keypad keys are used to enter numbers 0-9, the pound (#) key is used for entering a hyphen (-), and the asterisk (*) key is used for entering a colon (:). For example, 1*00 would enter "1:00" in numeric mode.

35.24 In alphanumeric mode, keypad keys are used to enter the desired letters, numbers, and punctuation. The number of times a key is pressed determines which character is entered. For example, 33377744432999 would enter "FRIDAY." When adjoining characters are located under the same key, press the FWD key once to advance to the next character. For example, 6 FWD 666 FWD 6632999 would enter "MONDAY." Refer to the following chart to program information in alphanumeric mode. (Note that letters correspond to the letters printed on the keypad keys.)

KEY	NUMBER OF TIMES KEY IS PRESSED				
	1	2	3	4	5
1	@	+	&	<	1
2	A	B	C	>	2
3	D	E	F	/	3
4	G	H	I	"	4
5	J	K	L	[	5
6	M	N	O	]	6
7	P	Q	R	S	7
8	T	U	V	;	8
9	W	X	Y	Z	9
0	'	%	=	?	0
*	*	!	\$	(:
#	#	,	.)	-

35.25 TO PROGRAM A REMINDER MESSAGE:

NOTE: Lift and replace the handset to stop the process without selecting a message.

(1) While on hook, press the SPCL key and enter the Program System Reminder Messages feature code (023). Display shows PROGRAM REMINDER MESSAGE.

(2) To select a specific message: Enter the two-digit message code (01-20). Display shows selected message.

To scroll through the messages: Press the pound (#) key to scroll forward or press the asterisk (*) key to scroll backward. Each message displays for one second before another can be selected.

(3) To enter a new message: Use one of the following methods.

a. *Alphanumeric mode (MSG key lit):* Press the keypad keys to enter the desired characters. Refer to the chart. You may press the FWD key once to advance or twice to leave a space. Press the MUTE key to backspace.

b. *Numeric mode (MSG key unlit):* Press the keypad keys to enter the desired number. Use the pound key (#) for hyphen (-) and the asterisk key (*) for colon (:). Press the FWD key once to leave a space, or press the MUTE key to backspace.

To erase the current message: Press the MUTE key repeatedly until the display shows NONE.

To leave the message the same: Lift and replace the handset. (You will exit the programming sequence and your display will return to date and time.)

(4) Press the SPCL key to update the database. You will hear a confirmation tone and the display shows PROGRAM REMINDER MESSAGE.

(5) To program another message: Repeat steps 2 through 4 for another message.

To terminate the programming sequence: Lift and replace the handset, allow the timer to expire, or press the SPKR key, IC key, or any trunk access key. (Display returns to date and time.)

**F. PROGRAMMING SYSTEM
DO-NOT-DISTURB MESSAGES**

35.26 The stored system do-not-disturb messages can be changed from any attendant station. (See page 4-95 for information concerning their use.) When the system is in the default state, the 20 do-not-disturb messages listed below are programmed. Attendants can delete or change messages 02-20 to any value (up to 16 characters). Message number 01 (DO-NOT-DISTURB) cannot be changed.

01 DO-NOT-DISTURB	11 OUT OF OFFICE
02 IN MEETING UNTIL	12 OUT UNTIL
03 IN MEETING	13 WITH A CLIENT
04 ON VACATION 'TIL	14 WITH A GUEST
05 ON VACATION	15 WITH A PATIENT
06 CALL ME AT	16 UNAVAILABLE
07 CALL ME AFTER	17 IN CONFERENCE
08 AWAY AT	18 AWAY FROM DESK
09 ON BREAK	19 GONE HOME
10 OUT OF TOWN 'TIL	20 OUT TO LUNCH

35.27 When programming, the attendant's keypad is automatically in alphanumeric mode. Press the MSG key to switch back and forth between modes.

35.28 In numeric mode, the keypad keys are used to enter numbers 0-9, the pound (#) key is used for entering a hyphen (-), and the asterisk (*) key is used for entering a colon (:). For example, 1*00 would enter "1:00" in numeric mode.

35.29 In alphanumeric mode, keypad keys are used to enter the desired letters, numbers, and punctuation. The number of times a key is pressed determines which character is entered. For example, 33377744432999 would enter "FRIDAY." When adjoining characters are located under the same key, press the FWD key once to advance to the next character. For example, 6 FWD 666 FWD 6632999 would enter "MONDAY." Refer to the following chart to program information in alphanumeric mode. (Note that letters correspond to the letters on the keys.)

KEY	NUMBER OF TIMES KEY IS PRESSED				
	1	2	3	4	5
1	@	+	&	<	1
2	A	B	C	>	2
3	D	E	F	/	3
4	G	H	I	"	4
5	J	K	L	[	5
6	M	N	O	]	6
7	P	Q	R	S	7
8	T	U	V	;	8
9	W	X	Y	Z	9
0	'	%	=	?	0
*	*	!	\$	(:
#	#	,	.)	-

35.30 TO PROGRAM A DO-NOT-DISTURB MESSAGE:

NOTE: If you make a mistake while programming, lift and replace the handset to stop the process without selecting a message. Then, start over.

- (1) While on hook, press the SPCL key and enter the Program System Do-Not-Disturb Messages feature code (024). (Display keysets show PROGRAM DND MESSAGE.)
- (2) To select a specific message: Enter the two-digit message code (02-20). Display shows selected message.

To scroll through the messages: Press the pound (#) key to scroll forward or press the asterisk (*) key to scroll backward. Each message displays for one second before another can be selected.

NOTE: DND message number 01 (DO-NOT-DISTURB) cannot be changed.

- (3) To enter a new message: Use one of the following methods.
 - a. *Alphanumeric mode (MSG key lit):* Press the keypad keys to enter the desired characters. Refer to the chart. You may press the FWD key once to advance or twice to leave a space. Press the MUTE key to backspace.
 - b. *Numeric mode (MSG key unlit):* Press the keypad keys to enter the desired number. Use the pound key (#) for hyphen (-) and the asterisk key (*) for colon (:). Press the FWD key once to leave a space, or press the MUTE key to backspace.

To erase the current message: Press the MUTE key repeatedly until the display shows NONE.

To leave the message the same: Lift and replace the handset. (You will exit the programming sequence and your display will return to date and time.)

- (4) Press the SPCL key to update the database. You will hear a confirmation tone and the display shows PROGRAM DND MESSAGE.
- (5) To program another message: Repeat steps 2 through 4 for another message.

To terminate the programming sequence: Lift and replace the handset, allow the timer to expire, or press the SPKR key, IC key, or any trunk access key. (Display returns to date and time.)

G. SETTING TIME OF DAY AND DATE

35.31 Occasionally, the system time or date needs to be reset (for example, for daylight-saving time). Any attendant can change the date and time message that appears on all display keysets and in the SMDA and SMDR reports.

35.32 TO SET THE TIME OF DAY AND DATE:

NOTE: If you make a mistake, lift and replace the handset, then start over. If an invalid date or time is entered, the keyset displays **ERROR! INVALID TME/DTE ENTERED;** you must start over.

- (1) While on hook, press the SPCL key and enter the Set Time Of Day feature code (021). (Display keysets show SET TIME OF DAY.)
- (2) Use the keypad keys to enter the time in hours and minutes. Then press the asterisk (*) key for AM or the pound (#) key for PM. For example, enter 900* for 9:00AM or 230# for 2:30PM. (Display keysets show SET DATE MM-DD-YYYY.)
- (3) Use the keypad keys to enter the month, day, and year. For example, press 01011986 for 01-01-1990. You may backspace to correct entries by pressing the MUTE key. (When finished, display shows SET DAY OF WEEK SUN.)
- (4) Select the day of week by scrolling through the selections. Press the pound (#) key to go forward or the asterisk (*) key to go backward. When the desired day is displayed, press the SPKR key or lift and replace the handset to terminate programming. Check the date and time of day on the display.

H. REMOTE HUNT GROUP REMOVE/REPLACE

35.33 An attendant can temporarily halt (or restore) hunt group calls for any or all stations that have dial-zero access to that attendant's station. The attendant uses the Remote Hunt Group Remove/Replace feature codes as described below.

35.34 TO REMOVE OR REPLACE A STATION'S HUNT GROUP CALLS:

- (1) While on hook, press the SPCL key.
- (2) Enter one of the following feature codes:
 - a. Remote Hunt Group Replace (032) to restore hunt group calls.
 - b. Remote Hunt Group Remove (033) to halt hunt group calls.
- (3) Dial the extension number or press the DSS/BLF key of the desired station.

I. REMOTE STATION FEATURE CANCEL

35.35 An attendant can cancel Call Forward and/or Do-Not-Disturb for any or all stations that have dial-zero access to that attendant's station.

35.36 TO CANCEL FEATURES:

- (1) While on hook, press the SPCL key.
- (2) Enter one of the following feature codes:
 - a. Cancel all station do-not-disturb requests (012)
 - b. Cancel all station forward requests (013)
 - c. Cancel all station DND/FWD requests (014)
 - d. Cancel station do-not-disturb request (015)
 - e. Cancel station forward request (016)
 - f. Cancel station DND/FWD request (017)
- (3) *If clearing an individual station (using code 015, 016, or 017), dial the extension number or press the DSS/BLF key after entering the feature code.*

J. GENERATING AN SMDA REPORT

35.37 A programming option can be enabled that allows the attendant to generate an SMDA report on demand. The content of the report is determined by the programmed SMDA format as described on page 4-115. Printing reports using this method does not clear the accumulated data.

35.38 TO GENERATE AN SMDA REPORT:

While on hook, press SPCL and enter the Attendant SMDA feature code (025). The report begins printing via the port designated in the database.

K. PAGING SPEAKER BACKGROUND MUSIC (PRIMARY ATTENDANT ONLY)

35.39 The primary attendant can turn background music on and/or off for the external paging speakers. Music is interrupted by pages. The music channel for the external paging speakers is set in database programming (refer to page 5-67 in PROGRAMMING).

35.40 TO TURN BACKGROUND MUSIC ON OR OFF:

While on hook, press the SPCL key and enter the Paging Speaker Background Music feature code (018). Enter the desired external port number (1-9) to toggle the music on or off, or enter 0 to turn off all ports.

L. SYSTEM ALARM REPORTING

35.41 The system's alarm reporting feature detects equipment failures, determines the impact, and classifies the problem as a major or minor alarm. Minor alarms are indicated on the primary attendant's station display and can be programmed to appear on all attendants' keysets. Both major and minor alarms are printed in the error report printout. Major alarm messages appear on all display keysets. Attendants using Attendant Computer Consoles will receive an **ALARM STATUS DISPLAY** (refer to the manual supplied with the unit).

35.42 The first four minor alarms indicate problems that can be corrected without calling service personnel. All other minor alarms require attention from service personnel. Refer to page 6-7 in **TROUBLESHOOTING** for a listing of the possible alarms and their meanings.

35.43 *TO RESPOND TO A MINOR SYSTEM ALARM FROM ANY ALARM DISPLAY STATION:*

- (1) When a minor alarm indication appears (**WARNING! SYSTEM ALARM #XX**), write down the alarm number, alarm message, date, and time.
- (2) While on hook, clear the message displayed by pressing the SPCL key and entering the Clear System Alarm feature code (019).
- (3) *If the alarm message is #05 or #10 or higher, contact service personnel.*
- (4) *If the alarm message is #01-04, correct the problem:*
 - a. **#01 STATION XXX OFF-HOOK:** The indicated station remained off hook and inactive until the Inactivity Alarm timer expired. The SMDR also indicates which station is off hook. The station's key on DSS/BLF Units and on other stations' SD keypads flutters continuously. Have the station user replace the handset in the cradle. The alarm will automatically clear when the station user hangs up.

NOTE: Calls being transmitted over the secondary voice path are not affected or interrupted by an off-hook alarm condition.

- b. **#02, #03, or #04 PRINTER TIMEOUT:** The indicated printer is not functioning properly. Check that the cable and the power cord are connected and that it has paper and ribbon.
- c. **#30 TOLL SECURITY FEATURE EXPIRED:** This alarm indicates that the Weekly Toll Limit feature is no longer in effect. It can be re-enabled only by Inter-Tel Services personnel.
- d. **#31 TOLL SECURITY LIMIT EXCEEDED and #34 TOLL SECURITY LIMIT AT 80%:** The weekly limit for one or both types of monitored calls is 80% or 100% depleted. The programmer can set the limit to a higher value or reset it to zero. (When either of these alarms is displayed, any further alarms will not overwrite the display.)
- e. **#32 TOLL SECURITY DATA CHANGED:** This indicates that the weekly toll limit information has been changed in the database.
- f. **#33 DISA SECURITY LIMIT EXCEEDED:** This indicates that a DISA caller has entered an invalid password three consecutive times. DISA will not answer that trunk for five minutes after the third invalid password has been entered.

35.44 A major alarm message, **WARNING! MAJOR ALARM**, appears on all display keysets in the event of a major system reset. If the major alarm appears on a group of keysets, the associated KSC board has failed. (Or 8-line AIM keysets have been installed on KSC-D circuits that are not programmed as "dual" circuits.) The warning might also appear on a single keyset if the keyset is defective. Major alarms require immediate attention from service personnel.

M. PLACING A TRUNK OUT OF SERVICE FOR MAINTENANCE

35.45 If requested to do so by service personnel, attendants can place individual trunks out of service by entering a feature code. This temporarily unequips the trunk in database programming, but does not affect incoming signals on the trunk. To outside callers, the trunk will appear to be functioning and callers will hear ringing. However, users cannot access the trunk for receiving or placing calls until the attendant places the trunk back into service by entering another feature code.

35.46 The advantage of using this feature instead of removing the trunk in the database, is that all programming for the trunk is preserved and the trunk returns to complete functionality as soon as it is returned to service and no additional programming is required.

NOTE: Each T1C is equipped with a "make busy" switch for removing all circuits on the card from service and placing them back in again. Pressing the switch will light its LED and begin the process of "busing out" each circuit not in use. The circuits that are in use are then busied out as soon as the users hangs up.

35.47 If the attendant has an individual trunk key for the trunk, the CO Trunk Maintenance feature code can be used to place the trunk out of and into service. If the attendant does not have an individual trunk key, the trunk can only be placed out of service while the attendant is connected to that trunk and a call key is used. The call key cannot be used to place the trunk back in service. *All trunks* that were placed out of service can be returned to service at once by entering the Remove All Trunks From Maintenance feature code.

35.48 *TO PLACE A TRUNK OUT OF SERVICE FOR MAINTENANCE USING AN INDIVIDUAL TRUNK KEY (WHILE ON HOOK):*

- (1) While on hook, press SPCL and enter the CO Trunk Maintenance feature code (027). The display shows SPECIFY TRUNK FOR MAINTENANCE.
- (2) Press the individual trunk key associated with the circuit you wish to remove from service. (If the programming mode times out before you press a key, the display shows TRUNK IMPROPERLY SPECIFIED and you must start over.)

35.49 *TO PLACE A TRUNK IN SERVICE AGAIN USING AN INDIVIDUAL TRUNK KEY (WHILE ON HOOK):*

- (1) While on hook, press SPCL and enter the CO Trunk Maintenance feature code (027). The display shows SPECIFY TRUNK FOR MAINTENANCE.
- (2) Press the associated individual trunk key for the trunk to be returned to service.

35.50 *TO PLACE A TRUNK OUT OF SERVICE FOR MAINTENANCE USING A CALL KEY (WHILE ON A CALL):*

- (1) While on a call, press SPCL and enter the CO Trunk Maintenance feature code (027).
- (2) Hang up. The trunk is placed out of service.

35.51 *TO PLACE ALL TRUNKS IN SERVICE:*

While on hook, press SPCL and enter the Remove All Trunks From Maintenance feature code (028).

36. RECORD KEEPING AND MAINTENANCE FEATURES

A. CALL COST ACCOUNTING

36.1 The Call Cost Accounting feature estimates the cost of outgoing and incoming calls, displays it on the keysets, and prints it in the SMDR reports. The cost is based on the type of call, telephone number dialed, the elapsed time of the call, the day of the week, and the time of day. A table in the database supplies the rates for all types of calls, including multiplicative factors for evening and weekend rate changes on outgoing calls. The equation for calculating call cost is:

Daytime Rate X Multiplicative Factor X Connect Time.

36.2 The multiplicative factor adjusts the daytime per-minute call cost for evening and weekend rates of outgoing calls. For example, the evening call cost multiplier is 0.65 if calls are 35% less expensive after 5:00PM. The daytime rate (D), evening (E) multiplicative factor, and night/weekend (N/W) multiplicative factors are used on the following schedule:

	SUN	MON	TUE	WED	THU	FRI	SAT
8 AM TO 5 PM	N/W	D	D	D	D	D	N/W
5 PM TO 11 PM	E	E	E	E	E	E	N/W
11 PM TO 8 AM	N/W						

NOTE: The 416/832 System's Call Cost Accounting feature is intended to provide a *cost estimate* that is applied to the various classes of calls. Due to the wide variation in charges among network carriers, the system's call cost calculation cannot be used as a prediction of actual charges. This feature can only be used as a management tool to *estimate* call cost.

36.3 If call cost is set to zero, call cost will not display during the call and the SMDR printout will show \$00.00.

36.4 All outgoing calls using a trunk that is *not subject to toll restriction* are classified as one of the following

call types for call cost calculation (call cost type is programmed in the database).

- Free
- Local
- Toll Local
- Toll Long Distance
- Operator/International

36.5 When a trunk that is *subject to toll restriction* is used, call cost type is determined according to the digits dialed, as follows:

- **Free:** Any call within a PBX (a trunk access code is not dialed) is a free call.
- **Local:** The following calls are classified as local calls:
 - Calls to N11 or 1N11 (where N is 2-9), except 411 or 1411
 - Any call to area code 800
 - All 7-digit or 10-digit calls within a home area code to office codes that are allowed in User Group 1
 - Any call that does not begin with 1, and does not fall into any of the other call cost categories
- **Toll Local:** The following calls are classified as toll local calls:
 - Any calls to 411 or 1411
 - All 7-digit or 10-digit calls within a home area code to office codes that are restricted in User Group 1
 - Any call that begins with 1, that does not fall into any of the other call cost categories
- **Toll Long Distance:** Any call to an area code other than a home area code is classified as a toll long distance call.
- **Operator/International:** Any call starting with 0 or containing only 0 is classified as operator/international (0, 0+, 01+, 011+).

B. STATION MESSAGE DETAIL ACCOUNTING (SMDA)

NOTE: This feature is available only in the *Extended* software packages.

36.6 Station Message Detail Accounting (SMDA) is a system feature that provides management and accounting records for estimating the telephone company's charges. This information can be used to analyze system traffic and employee productivity.

36.7 This data can be recorded on a customer-provided printer or alternate device, such as a magnetic tape or floppy disk. The device is connected to the peripheral connector panel on the back of the equipment cabinet and must be placed within 50 feet (15 meters) of the equipment cabinet. It can be the same device used for the SMDR report. If so, the SMDR information is buffered (up to 427 records) while the SMDA report prints. Refer to SPECIFICATIONS, page 2-36, for details.

36.8 Each of the 16 SMDA reports divides incoming and outgoing calls and can be automatically generated daily, weekly, or monthly. They can also be generated on demand through the attendant station using the attendant SMDA feature code or through database programming (refer to page 5-139 in PROGRAMMING). Reports can include the information outlined in the following sections.

Account Code Reports

36.9 Call information can be printed for up to 415 account codes in a standard system (up to 831 in an expanded system). Each time a standard, forced, class-of-service, or optional account code is used, the system opens a "record" for that code. Every time a call is placed that uses that code, the call data is added to the record for that account code. If more than the maximum number of codes are used, the last record (number 416 or 832) is used for the overflow record. That is, if 421 different codes are used in a standard system, call data for the last six will be combined in record 416. For each account code, information includes the total number of calls handled, total and average duration of calls, and the total and average cost of calls.

Summary Reports

36.10 Call information can be selected for the system units listed below. Information includes the total number of calls handled, number of incoming and outgoing calls, total and average duration of incoming and outgoing calls, total and average cost of incoming and outgo-

ing calls, and number of users (unless otherwise indicated).

- **System:** SMDA prints call information for the entire system, including:
 - Number of transfers and recalls
 - Average answer time
 - Number of unanswered calls
 - Average ring time (unanswered)
 - Number of equipped trunks
 - DISA calls
- **Hunt groups:** Total number of calls, total ringing call duration, and average ringing duration are shown for calls to each hunt group. The ringing duration is the amount of time the call spent circulating (unanswered) through the hunt group. If a call recalls and then is transferred back to the hunt group, it is not counted as an additional call, but it will add to the ringing duration figure. A call sent to the hunt group by any station other than a recall destination will add to the call count.
- **Tenant groups:** Call information is printed separately for each tenant group.
- **Tenants and departments:** Call information for each tenant group is divided into departments.

Detailed Reports

36.11 These reports can show call information for all users, listed by system, tenant group, or tenant/department. Separate reports are also available by tenant/department, individual stations, or trunks. The following call information can be requested:

- **System, tenant, or tenant/department by call cost:** Total and average cost of calls for users in the selected group of stations, including:
 - Station circuit numbers
 - Extension numbers
 - User names
- **System, tenant, or tenant/department by call duration:** Total and average duration of calls for the selected group of stations, including:
 - Station circuit numbers
 - Extension numbers
 - User names

- **System, tenant, or tenant/department by number of calls:** Total number of calls for the selected group of stations, including:

- Station circuit numbers
- Extension numbers
- User names

- **Tenant/department listed by station number:** Includes the following for all stations in each department of each tenant group.

- Number of calls
- Incoming and outgoing call duration
- Incoming and outgoing call cost
- Number of users
- Station circuit numbers
- Extension numbers
- User names

- **Listed by selected station:** Includes the following for selected stations:

- Number of calls
- Incoming and outgoing call duration
- Incoming and outgoing call cost
- Number of users

- Station circuit numbers
- Extension numbers
- User names

- **Listed by selected trunk:** Includes the following for selected trunks:

- Trunk circuit number
- Number of incoming and outgoing calls
- Average answer time
- Number of unanswered calls
- Average ring time for unanswered calls
- Total cost and duration of incoming and outgoing calls
- Average duration and cost of incoming and outgoing calls

36.12 When programming the output, the installer can choose to clear the SMDA information after each report or let it remain in the memory to be accumulated and included in all later reports. This gives the customer the option of having limited or comprehensive reports.

36.13 The SMDA output reports are printed in the format shown in the following figures. Figure 4-2 on the next page shows the account code report format, Figure 4-3 on page 4-118 shows the summary report format, and Figure 4-4 on page 4-120 shows the detailed report. All reports are 80 characters wide. The number of days included in each report is set during programming.

FIGURE 4-2. SMDA ACCOUNT CODE REPORT FORMAT

Detailed Account Code Report 00:00 Mon-01-Jan-1990
Data Collection Period Began 00:00 Mon-01-Jan-1990

Report by Account Code
Reports listed by Account Number

1. Account Code [number or overflow record]
Total Number of Calls Handled X,XXX,XXX
Number of Incoming Calls XXX,XXX
Number of Outgoing Calls XXX,XXX

Total Duration of Calls Handled H,HHH:MM:SS
Duration of Incoming Calls HHH:MM:SS
Ave. Duration of Incoming Calls H:MM:SS
Duration of Outgoing Calls HHH:MM:SS
Ave. Duration of Outgoing Calls H:MM:SS

Total Cost of Calls Handled \$X,XXX.XX
Cost of Incoming Calls \$XXX.XX
Ave. Cost of Incoming Calls \$XX.XX
Cost of Outgoing Calls \$XXX.XX
Ave. Cost of Outgoing Calls \$XX.XX

NOTE: When a maximum value has been reached (65,535 records per account code, 4,660 hours, and/or \$167,772.15) the value starts over at 0.

FIGURE 4-3. SMDA SUMMARY REPORT FORMAT

Station Message Detail Accounting 00:00 Mon-01-Jan-1990
Data Collection Period Began 00:00 Mon-01-Jan-1990

System Summary Report

Total Number of Calls	X,XXX,XXX
Number of Incoming Calls	XXX,XXX
Number of Outgoing Calls	XXX,XXX
Number of Transfers/Recalls	XXX,XXX
Average Answer Time	H:MM:SS
Number of Unanswered Calls	XX,XXX
Average Ring Time -- Unanswered	H:MM:SS
Total Duration of Calls	H,HHH:MM:SS
Duration of Incoming Calls	HHH:MM:SS
Ave. Duration of Incoming Calls	H:MM:SS
Duration of Outgoing Calls	HHH:MM:SS
Ave. Duration of Outgoing Calls	H:MM:SS
Total Cost of Calls	\$X,XXX.XX
Cost of Incoming Calls	\$XXX.XX
Ave. Cost of Incoming Calls	\$XX.XX
Cost of Outgoing Calls	\$XXX.XX
Ave. Cost of Outgoing Calls	\$XX.XX
Total Number of DISA Calls	X,XXX,XXX
Total Duration of DISA Calls	H,HHH:MM:SS
Ave. Duration of DISA Calls	H:MM:SS
Total Cost of DISA Calls	\$X,XXX.XX
Ave. Cost of DISA Calls	\$XX.XX
Number of Users	XXX
Number of Equipped CO Trunks	XX

Station Message Detail Accounting 00:00 Mon-01-Jan-1990
Data Collection Period Began 00:00 Mon-01-Jan-1990

Summary Report for Hunt Group

Hunt Group 01:

Total Number of Calls Handled	X,XXX,XXX
Total Duration of Ringing Calls	H,HHH:MM:SS
Ave. Duration of Ringing Calls	H:MM:SS

Hunt Group 02:

FIGURE 4-3. SMDA SUMMARY REPORT FORMAT (CONT'D)

Station Message Detail Accounting 00:00 Mon-01-Jan-1990
Data Collection Period Began 00:00 Mon-01-Jan-1990

Summary Report for Tenant

Tenant 01: [tenant name]

Total Number of Calls Handled	X,XXX,XXX
Number of Incoming Calls	XXX,XXX
Number of Outgoing Calls	XXX,XXX
Total Duration of Calls Handled	H,HHH:MM:SS
Duration of Incoming Calls	HHH:MM:SS
Ave. Duration of Incoming Calls	H:MM:SS
Duration of Outgoing Calls	HHH:MM:SS
Ave. Duration of Outgoing Calls	H:MM:SS
Total Cost of Calls Handled	\$X,XXX.XX
Cost of Incoming Calls	\$XXX.XX
Ave. Cost of Incoming Calls	\$XX.XX
Cost of Outgoing Calls	\$XXX.XX
Ave. Cost of Outgoing Calls	\$XX.XX
Number of Users	XXX

Summary Report for Tenant/Department

Tenant 01: [tenant name]

Department 01: [department name]

Total Number of Calls Handled	X,XXX,XXX
Number of Incoming Calls	XXX,XXX
Number of Outgoing Calls	XXX,XXX
Total Duration of Calls Handled	H,HHH:MM:SS
Duration of Incoming Calls	HHH:MM:SS
Ave. Duration of Incoming Calls	H:MM:SS
Duration of Outgoing Calls	HHH:MM:SS
Ave. Duration of Outgoing Calls	H:MM:SS
Total Cost of Calls Handled	\$X,XXX.XX
Cost of Incoming Calls	\$XXX.XX
Ave. Cost of Incoming Calls	\$XX.XX
Cost of Outgoing Calls	\$XXX.XX
Ave. Cost of Outgoing Calls	\$XX.XX
Number of Users	XXX

Department 02: [department name]...

FIGURE 4-4. SMDA DETAILED REPORT FORMAT

Station Message Detail Accounting 00:00 Mon-01-Jan-1990
Data Collection Period Began 00:00 Mon-01-Jan-1990

Detailed System Report
or, Detailed Report for Tenant
or, Detailed Report for Tenant/Department

Sorted by Total Cost

1. Station Circuit XX.Y EXXXX [user name]
Total Cost of Calls Handled \$X,XXX.XX
Cost of Incoming Calls \$XXX.XX
Ave. Cost of Incoming Calls \$XX.XX
Cost of Outgoing Calls \$XXX.XX
Ave. Cost of Outgoing Calls \$XX.XX

or, Sorted by Total Duration

1. Station Circuit XX.Y EXXXX [user name]
Total Duration of Calls Handled H,HHH:MM:SS
Duration of Incoming Calls HHH:MM:SS
Ave. Duration of Incoming Calls H:MM:SS
Duration of Outgoing Calls HHH:MM:SS
Ave. Duration of Outgoing Calls H:MM:SS

or, Sorted by Number of Calls

1. Station Circuit XX.Y EXXXX [user name]
Total Number of Calls Handled X,XXX,XXX
Number of Incoming Calls XXX,XXX
Number of Outgoing Calls XXX,XXX

FIGURE 4-4. SMDA DETAILED REPORT FORMAT (CONT'D)

Station Message Detail Accounting 00:00 Mon-01-Jan-1990
Data Collection Period Began 00:00 Mon-01-Jan-1990

Detailed Report for Tenant/Department
Listed by Station Number

Tenant 01: [tenant name]

Department 01: [department name]

1. Station Circuit XX.Y EXXXX [user name]

Total Number of Calls Handled	X,XXX,XXX
Number of Incoming Calls	XXX,XXX
Number of Outgoing Calls	XXX,XXX
Total Duration of Calls Handled	H,HHH:MM:SS
Duration of Incoming Calls	HHH:MM:SS
Ave. Duration of Incoming Calls	H:MM:SS
Duration of Outgoing Calls	HHH:MM:SS
Ave. Duration of Outgoing Calls	H:MM:SS
Total Cost of Calls Handled	\$X,XXX.XX
Cost of Incoming Calls	\$XXX.XX
Ave. Cost of Incoming Calls	\$XX.XX
Cost of Outgoing Calls	\$XXX.XX
Ave. Cost of Outgoing Calls	\$XX.XX

Detailed Report for Selected Stations
Stations Listed By Circuit Number

1. Station Circuit XX.Y EXXXX [user name]

Total Number of Calls Handled	X,XXX,XXX
Number of Incoming Calls	XXX,XXX
Number of Outgoing Calls	XXX,XXX
Total Duration of Calls Handled	H,HHH:MM:SS
Duration of Incoming Calls	HHH:MM:SS
Ave. Duration of Incoming Calls	H:MM:SS
Duration of Outgoing Calls	HHH:MM:SS
Ave. Duration of Outgoing Calls	H:MM:SS
Total Cost of Calls Handled	\$X,XXX.XX
Cost of Incoming Calls	\$XXX.XX
Ave. Cost of Incoming Calls	\$XX.XX
Cost of Outgoing Calls	\$XXX.XX
Ave. Cost of Outgoing Calls	\$XX.XX

FIGURE 4-4. SMDA DETAILED REPORT FORMAT (CONT'D)

Station Message Detail Accounting 00:00 Mon-01-Jan-1990
Data Collection Period Began 00:00 Mon-01-Jan-1990

Detailed Report for Selected CO Trunks
CO Trunks Listed by Circuit Number

1. CO Circuit XX.Y

Total Number of Calls	X,XXX,XXX
Number of Incoming Calls	XXX,XXX
Number of Outgoing Calls	XXX,XXX
Average Answer Time	H:MM:SS
Number of Unanswered Calls	XX,XXX
Average Ring Time -- Unanswered	H:MM:SS
Total Duration of Calls	H,HHH:MM:SS
Duration of Incoming Calls	HHH:MM:SS
Ave. Duration of Incoming Calls	H:MM:SS
Duration of Outgoing Calls	HHH:MM:SS
Ave. Duration of Outgoing Calls	H:MM:SS
Total Cost of Calls	\$X,XXX.XX
Cost of Incoming Calls	\$XXX.XX
Ave. Cost of Incoming Calls	\$XX.XX
Cost of Outgoing Calls	\$XXX.XX
Ave. Cost of Outgoing Calls	\$XX.XX

C. STATION MESSAGE DETAIL RECORDING (SMDR)

36.14 Station Message Detail Recording (SMDR) is a system feature that provides a detailed record of outgoing calls and can include incoming calls. An outgoing call lasting longer than the programmed Valid Call timer is recorded; however, if the call was transferred to a station or placed on hold, the Valid Call timer is not checked and the call is recorded. The Valid Call timer does not affect incoming calls; if the incoming call option is selected in the database, all incoming calls are recorded.

36.15 Station call data can be recorded on a customer-provided printer or an alternate device, such as a magnetic tape or floppy disk. This output device is connected to the peripheral connector panel on the back of the equipment cabinet and must be placed within 50 feet (15 meters) of the equipment cabinet. It can be the same device used for SMDA. If so, the SMDR information is buffered (up to 427 messages) while the SMDA report prints. Refer to SPECIFICATIONS, page 2-36, for details.

36.16 Selectable SMDR options can include any combination of the following:

- Incoming calls
- Outgoing non-toll local calls (including "free" calls on unrestricted trunks and internal E&M calls)
- Outgoing toll calls (7-digit, 10-digit, operator-assisted, or international calls)
- DISA calls
- Blocked DISA calls (*Extended* software package)
- DID calls
- Conference calls
- System ring-in messages that show how long calls ring before being answered

End-Of-Dialing Digits In Reports

36.17 A programming flag is included in the SMDR report programming prompts that allows the programmer to specify whether all dialed digits or just the digits that make up the valid call appear in the SMDR report. If desired, the "extra" digits used for dial-up banking machine, voice mail, automated attendant, or other

purposes can be suppressed so that only the telephone number digits are recorded in the report. (This flag is not affected by the system-wide flag that suppresses digits for the keyset displays and redial buffer, described on page 5-69.)

36.18 The programmer can determine whether absorbed digits and toll field digits appear in the SMDR printout. As an example, assume the following number was dialed: 89 (other system's trunk access code) - 10288 (equal access) - 1 (toll field) - 602 (area code) - 961-9000 (seven-digit number). The absorbed digits (the other system's trunk access code) can be suppressed so that only 102881-602-961-9000 appears. Or, all but the first digit in each toll field can be suppressed to print 89-11-602-961-9000. The absorbed digits and the toll fields can all be suppressed to show 11-602-961-9000.

36.19 A programming flag is included in the SMDR report programming prompts that allows the programmer to specify whether all dialed digits or just the digits that make up the valid call appear in the SMDR report and are stored in the redial buffer. If desired, the "extra" digits (dialed after the end of dialing the telephone number) used for dialing banking machine, voice mail, automated attendants, or other purposes can be suppressed so that only the telephone number digits are recorded in the report and stored in redial memory.

36.20 The programmer can determine which equipped station(s) will be included in the report. However, if DISA calls, conference calls, and ring-in diagnostics options are enabled, all are recorded (even when they involve stations not selected in the database for recording).

36.21 To allow SMDR to give a more accurate representation of elapsed time, an option can be enabled that records the elapsed time of calls in seconds instead of minutes. For calls up to 999 seconds (about 16.67 minutes) long, the ELAPSED TIME field will show "S=XXX" (XXX represents the number of seconds). For calls lasting longer than 999 seconds, ELAPSED TIME will show "HH:MM" (hours and minutes rounded up to the nearest minute).

36.22 The SMDR output report is printed as shown in Figure 4-5 on the following page. A page heading (with the day of the week, date, month, year and column headings) is generated at midnight, when the clock cycles from 2359 to 0000 hours (international time).

FIGURE 4-5. SMDR REPORT FORMAT

TYP	EXT#	USRNAME	TRUNK	DIALED DIGITS	START	ELPST	COST	ACCT CODE
XXX	XXXX	AAAAAAA	XX.XX	XX.....XX	HH:MM	HH:MM	\$XX.XX	XXXXXXXX

TYP Call type abbreviations for:

- Incoming calls (IN)
- Outgoing local calls (LOC)
- Outgoing "free" calls (000)
- Seven-digit outgoing toll calls (T7)
- Ten-digit outgoing toll calls (T10)
- Operator-assisted/international calls (TOI)
- DISA calls (DSA) and Conference calls (CNF)
- Blocked DISA calls (BLK)
- Ring in (blank field)

EXT The extension number (XXXX) of the last station to handle the call. For a CO-to-CO call, this field shows the second trunk involved (XX.X). For a ring-in record, it shows the extension number of the station that answered, or it shows **** if the call was unanswered. For a blocked DISA call, it shows the primary attendant's extension number if the call was answered by the attendant or the DISA caller hung up; if the call was reverse-transferred from the attendant, it shows the station that picked up the call.

USRNAME User's name as programmed. This field is blank if no user name is programmed.

TRUNK The circuit number of the trunk used during the call.

DIALED DIGITS The first 28 digits of the telephone number dialed, including hyphens between the toll field, area code, office code, etc. An asterisk (*) at the end of the dialed digits field indicates that either there was a long enough break in loop current to disconnect the call (the IC-CO Disconnect or CO-CO Disconnect timer expired), or the outside party hung up before the station user hung up. Some digits may be suppressed (see the previous page for an explanation). "RING" appears for a ring-in record. If a call is blocked by weekly toll limits, the record will show only those digits that determined that it was a blocked call type. For example, if 1-602-961-XXXX is a blocked number, only 1-602-961 will appear in the record.

START Time the call was placed or answered is shown in 24-hour time (00:00 - 23:59) rounded up to the nearest minute.

ELPST Call length from the beginning of the call until disconnect. Elapsed time is rounded up to the nearest minute to show hours and minutes. If the option is enabled that shows call duration in seconds, calls up to 999 seconds (about 16.67 minutes) long appears as S=XXX (XXX represents the number of seconds) and calls lasting longer than 999 seconds appear as HH:MM (hours and minutes rounded up to the nearest minute). For ring-in records, S=XXX indicates the ring-in time in seconds.

COST Approximate cost of the call (XXX.XX), based on the database information, rounded to the nearest cent.

ACCT CODE A standard, forced, class-of-service, or optional account code (4-8 digits). A class-of service or optional account code overrides installer-programmed standard or forced account codes. The field is blank if no account code was used.

D. SYSTEM ERROR REPORTING

36.23 The system has a self-diagnostic feature that checks for minor and major faults within the central and peripheral equipment. When a failure is detected, the software determines the impact of the problem and classifies it as a major or minor alarm. A major alarm requires immediate attention from service personnel; the system is not operable. A minor alarm can be as simple as a loose printer cable or power cord, or the printer running out of paper or ribbon.

36.24 A minor alarm sends a message to the system attendant(s) programmed to receive alarms and to the error message port (if programmed). Both minor and major alarms are recorded through the serial ports (if the ports are connected to output devices). A fault history report is available on demand to service personnel through database programming (however, minor alarms #01 - #04 do not appear in the history report).

36.25 Minor alarm messages print in the format shown below. The message indicates the time the error message was printed, the type and number of the alarm, and an explanation of the error.

```
+++ 00:00 MINOR ALARM #XX  
      [32-character message]  
*** 00:00 [Field Service Diagnostics message]  
--- 00:00 [Engineering Diagnostics message]
```

36.26 User-serviceable minor alarms are:

- **#1 EXT XXX STATION OFF-HOOK:** A station remained off hook and inactive until the Inactivity Alarm timer expired. Replace the handset in its cradle at the station indicated.

NOTE: This message will appear only if the database option that broadcasts station off-hook alarms is enabled.

- **#02 SMDR PRINTER TIMEOUT, #03 ERROR PRINTER TIMEOUT, or #04 SMDA PRINTER TIMEOUT:** The printer possibly has a loose cable or power cord, or it has run out of ribbon or paper.

- **#30 TOLL SECURITY FEATURE EXPIRED:** This alarm indicates that the Weekly Toll Limit feature is no longer in effect. It can be re-enabled only by Inter-Tel Services personnel.
- **#31 TOLL SECURITY LIMIT EXCEEDED and #34 TOLL SECURITY LIMIT AT 80%:** The weekly limit for one or both types of monitored calls is 80% or 100% depleted. The programmer can set the limit to a higher value or reset it to zero. (When either of these alarms is displayed, any further alarms will not overwrite the display.)
- **#32 TOLL SECURITY DATA CHANGED:** This indicates that the weekly toll limit information has been changed in the database.
- **#33 DISA SECURITY LIMIT EXCEEDED:** This indicates that a DISA caller has entered an invalid password three consecutive times. DISA will not answer that trunk for five minutes after the third invalid password has been entered.

36.27 All other minor alarms, which require attention from service personnel, field service diagnostics, and engineering diagnostics are explained in TROUBLESHOOTING, beginning on page 6-7.

36.28 A major alarm occurs when a problem has caused a malfunction. The message appears on all display keysets affected and, the designated serial port. A complete list of error messages is located in the TROUBLESHOOTING section.

E. POWER FAILURE CAPABILITIES

36.29 The Matrix and Expansion Cards contain relay contacts that can be used for power failure transfer that allows one or more single-line sets to access predetermined trunks in the event of a processor board failure or a power failure. Additional equipment is required. Refer to SPECIFICATIONS, page 2-14, for more information.

PROGRAMMING

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1. INTRODUCTION

1.1 This section of the 416/832 manual explains how to program the system. The system is fully functional when defaulted and only requires programming to meet the customer's special needs. Programming functions are divided among several "windows" so that specific features can be programmed easily.

NOTE: Programmers must be properly certified on the 416/832 System to receive technical support.

A. SYSTEM SOFTWARE PACKAGES

1.2 Software is available in five "packages" that provide different combinations of features. The available software packages include the following:

- **MF-Rated, Basic:** This package includes all basic features, including Least-Cost Routing (LCR), Hunt Groups, and Direct Inward Dialing (DID). It does not include Toll Security Features, Intercom/Outside Directory, Automated Attendant, Station Message Detail Accounting (SMDA), T1, or E&M.
- **MF-Rated, Extended:** This package provides every feature in this manual except T1 and E&M.
- **MF-Rated, Extended Plus T1 and E&M:** This package provides every feature described in this manual including T1 and E&M.
- **KF-Rated, Extended Plus T1 and E&M:** This package has all of the features described in this manual except Least-Cost Routing (LCR). Also, users are limited to accessing only the trunk group's highest numbered trunk when a trunk group key is pressed or a trunk group access code is entered. When programming a KF-rated system, LCR will still appear in the Applications Menu on page 5-15, but if selected, an error message is presented to remind the programmer of its absence. The LCR feature code and description have not been removed from any screens but, the system ignores any reference to LCR.

1.3 The IMX 416/832 has an additional software package that has all of the features described in this manual, plus it allows the GX station instruments to be installed on the system. (Refer to Appendix A in the back of the manual for complete information.)

1.4 To determine which software package is installed, press the ALT key and the SPACE BAR while viewing any screen. "About..." will appear in reverse video at the top of the screen. Then press RETURN. A window appears that shows the part number of the software. To exit, press RETURN again.

B. SYSTEM SIZE

1.5 The system size (standard or expanded) is determined by the system software disks that are used during installation. Refer to page 5-4 for software installation instructions.

1.6 When the system is first powered up, one of three default configurations (A, B, or C) will be used to assign extension numbers to the station circuits. In all configurations, the Matrix Card is assigned to slot 27 and the Expansion Card is assigned to slot 54; these assignments cannot be changed. No other slots in the expansion cabinet are given default configurations. The three default configurations are:

- If configuration A is used, slots 1-20 are KSCs and slots 21-26 are LGCs.
- If configuration B is used, slots 1-10 are KSCs, slots 11-19 are SLCs, and slots 20-26 are LGCs.
- If configuration C is used (IMX Systems only), slot 1 is a KSC, 2-10 are DKSCs, 11-19 are SLCs, and 20-26 are LGCs.

C. PLAN THE PROGRAMMING SESSION

1.7 Determine the features that need to be programmed to meet the customer's needs. Then refer to the specific programs and program planning sheets. For example, if the customer wants to use the Hunt Group feature, refer to the programming information on page 5-61 and the program planning sheet on page 5-212.

2. SYSTEM SET-UP FOR PROGRAMMING

2.1 There are three methods that can be used for programming the 416/832 System.

- On-site programming with the 416/832 monitor and keyboard
- Programming using a stand-alone personal computer
- Remote programming using a modem connection

2.2 Each is described separately in the following pages. Only one programming session can be in operation at a time.

2.3 For remote or stand-alone programming, the computer must be an IBM* AT-compatible personal computer with a minimum of: MS-DOS 3.3, 300- or 1200-baud modem, 5 megabytes memory available on the hard disk drive, 640k RAM (with minimum 512k available), and a 1.2 megabyte 5¼-inch floppy disk drive (double sided/high density) and a monochrome

monitor (CGA is not recommended). A mouse is optional.

*IBM and AT are registered trademarks of International Business Machines Corporation.

2.4 The PC used for stand-alone and/or remote programming must have the appropriate Stand-Alone/Remote Programming software installed. There are separate Applications Setup disk sets for the standard (416) and expanded (832) system configurations. If used for stand-alone programming, the PC must also have a default database loaded on the hard drive (the system database information is later transferred to the 416/832 System using Save/Restore via modem connection or direct on-site connection). The software version on the remote or stand-alone PC must match the version of the system database being programmed.

NOTE: The programming PC must have a *config.sys* file with the following command lines: "buffers=30" and "files=20". Also, when installed, the new system software automatically includes the command "device=c:\dos\setver.exe" in the *config.sys* file, which is required for proper MS-DOS 5.0/6.0/6.2 operation. If the software is installed on a system that still uses MS-DOS 3.3, an error message (stating an invalid config.sys command has been detected) is displayed during the power-up sequence. The message can be ignored; the software is compatible with all four versions of DOS.

On-Site Programming

2.5 Refer to the SPECIFICATIONS section, page 2-36, for monitor and keyboard specifications. When the system is turned on, the monitor will automatically display an Inter-Tel logo screen. The instructions beginning on page 5-12 explain how to use the keyboard for programming.

Stand-Alone Programming

2.6 A personal computer (PC) can be used for programming the 416/832 System. To use a PC in this manner, the Stand-Alone/Remote Programming software must be loaded on drive C. The system database information is stored on double-sided/high density floppy disks and is later transferred to the 416/832 System using Save/Restore. This section includes the following instructions that apply to stand-alone programming:

- Initial installation of Stand-Alone/Remote software (see paragraph 2.9)
- Upgrade of a 416/832 database for stand-alone programming (refer to page 5-7)
- Installing a printer driver for stand-alone report printing (refer to page 5-8)

- Beginning the stand-alone programming session (refer to page 5-7)

Remote Programming Using A Modem

2.7 The 416/832 database can be programmed over the telephone lines using a remote PC and a 300/1200 baud modem. Remote programming requires Stand-Alone/Remote Programming software loaded on the remote PC. This section includes the following instructions that apply to remote programming:

- Initial installation of Stand-Alone/Remote software (see paragraph 2.9)
- Connecting the remote programming session (refer to page 5-9)

2.8 To access the system modem, the single-line port on the Matrix Card must be connected to the system Modem Card jack labeled "wall" using a mod-to-mod line cord. The modem can then be accessed using one of the following methods:

- Have the system attendant, automated attendant, or a station user transfer remote programming calls to the modem extension (defaults to 2600).
- Set up a direct ring-in to the modem extension on one trunk for day and/or night modes.
- Use a DISA trunk and dial the modem extension number.

A. INITIAL INSTALLATION OF STAND-ALONE/REMOTE SOFTWARE

2.9 TO INSTALL THE STAND-ALONE/REMOTE SOFTWARE (INITIAL INSTALLATION):

- (1) Insert the Installation Disk (disk 1) in the floppy disk drive.
- (2) At the C:\> prompt, type "a:" and press the RETURN (or ENTER) key. (The monitor displays the A drive programming prompt "A:\>".)
- (3) At the A:\> prompt, type "setup" and press RETURN. (The monitor displays the two installation options — Full or Stand-Alone/Remote.)
- (4) Use the up or down arrow keys to highlight "S" (for stand-alone/remote) and then press RETURN. (The monitor displays information concerning the setup program.)
- (5) After reading the information, press RETURN. (The monitor displays the default directory name "C:\AP".)

NOTE: If using MS-DOS 5.0 or above with the extended memory (*himem.sys*) file set up for use

with another application, the monitor may display a message about reconfiguring the PC to optimize system performance. Disregard the message and continue with the installation.

- (6) Press RETURN to accept the default directory name, or edit the name as desired and then press RETURN. (The monitor displays a list of PC types.)
- (7) Use the up or down arrow keys to highlight the type of PC being used and then press RETURN. (The monitor displays the determined hardware configuration.)
- (8) *If the hardware configuration is correct as displayed*, use the up or down arrow keys to highlight "No Change" and then press RETURN. (The monitor displays an extended memory option.)

If the hardware configuration is not correct, or if you wish to change the displayed configuration:

- a. Use the up or down arrow keys to highlight the item you wish to change and then press RETURN. (The monitor displays a list of types of that item.)
- b. Use the up or down arrow keys to highlight the appropriate type and then press RETURN. (The monitor again displays the hardware configuration.)
- c. To change additional items, repeat steps 8a and 8b. Once the configuration is correct as displayed, use the up or down arrow keys to highlight "No Change" and then press RETURN. (The monitor displays an extended memory option.)

NOTE: If installing a mouse on the PC, ensure that the COM port assigned to the mouse is not being used by any other device.

- (9) Use the up or down arrow keys to highlight "N" (for no extended memory) and then press RETURN. (The monitor displays a printer/plotter installation option.)
- (10) *If you do not wish to install a special printer/plotter driver*, use the up or down arrow keys to highlight "C" (for continue setup) and then press RETURN.

If you wish to install a special printer/plotter driver:

- a. Use the up or down arrow keys to highlight "I" (for install a printer or plotter) and then

press RETURN. (The monitor displays a list of printers/plotters.)

- b. Use the up or down arrow keys to highlight the printer/plotter type that most closely matches your printer/plotter and then press RETURN. (The monitor displays a list of ports.)
 - c. Use the up or down arrow keys to highlight the port on which your printer/plotter is installed and then press RETURN. (The monitor again displays a printer/plotter installation option.)
 - d. To install additional printer/plotter drivers, repeat steps 10a through 10c. When all of the desired printer/plotter drivers are installed, use the up or down arrow keys to highlight "C" (for continue setup) and then press RETURN.
- (11) *If installing standard-size system software*, the monitor displays the three default database options — A, B, C (IMX), or Personal. Use the up or down arrow keys to highlight the desired default database option and then press RETURN. (The software looks for an existing database, then the files from the Installation Disk are copied onto the hard disk drive. When finished, the monitor displays "Insert the Applications Setup Disk (2) in the following drive".)

If installing expanded system software, the software looks for an existing database, then the files from the Installation Disk are copied onto the hard disk drive. (When finished, the monitor displays "Insert the Applications Setup Disk (2) in the following drive".)

- (12) Remove the Installation Disk, then insert the Applications Setup Disk (disk 2) in the floppy disk drive and press RETURN. (The files from the Applications Setup Disk are copied onto the hard disk drive. When finished, the monitor displays "Insert the Applications Software Disk (3) in the following drive".)

NOTE: Do not change the displayed drive (A:).

- (13) Remove the Applications Setup Disk, then insert the Applications Software Disk (disk 3) in the floppy disk drive and press RETURN. (The files from the Applications Software Disk are copied onto the hard disk drive.)

- (14) *If the special printer/plotter driver installation option was not selected in step 10*, the monitor displays "Insert the Appropriate Database Disk in the following drive." Remove the Applications Software Disk.

If the special printer/plotter driver installation option was selected in step 10, the monitor displays "Insert the CP Software Disk (4) in the following drive."

- a. Remove the Applications Software Disk.
- b. Insert the Call Processing Software Disk (disk 4) in the floppy disk drive and press RETURN. (The files from the Call Processing Software Disk are copied onto the hard disk drive. When finished, the monitor displays "Insert the Appropriate Database Disk in the following drive".)

c. Remove the Call Processing Software Disk.

(15) Insert the Database Disk (disk 5, 6, or 7 depending on the system software being installed) or a customized database disk in the floppy disk drive and press RETURN. (The files from the database disk are copied onto the hard disk drive.)

(16) If the special printer/plotter driver installation option was not previously selected (back in step 10), the software makes a backup copy of the new database, then the monitor displays an AUTOEXEC.BAT file update option. Remove the Database Disk.

If the special printer/plotter driver installation option was previously selected (back in step 10), the monitor displays "Insert the Printer Driver Disk (7 or 8) in the following drive".

- a. Remove the Database Disk.
- b. Insert the Printer Driver Disk (disk 7 or 8, depending on the system software being

installed) in the floppy disk drive and press RETURN. (The files from the Printer Driver Disk are copied onto the hard disk drive. When finished, the software makes a backup copy of the new database, then the monitor displays an AUTOEXEC.BAT file update option.)

c. Remove the Printer Driver Disk.

(17) To allow the installation software to automatically update or create the AUTOEXEC.BAT file, use the up or down arrow keys to highlight "Y" (for yes) and then press RETURN. (The monitor displays "SETUP HAS NOW BEEN COMPLETED SUCCESSFULLY.")

To manually update or create the AUTOEXEC.BAT file, read the information displayed on the monitor, use the up or down arrow keys to highlight "N" (for no), and then press RETURN. (The monitor displays "SETUP HAS NOW BEEN COMPLETED SUCCESSFULLY.") Edit or create the AUTOEXEC.BAT file to include:

- a. C:\AP (or other directory name if used) with the existing paths in the PATH environment variable.
- b. SET DBDPATH = C:\AP (or other directory name if used).
- c. SET DBFPATH = C:\AP (or other directory name if used).

(18) Reboot the PC. (The monitor displays the C drive programming prompt "C:\>".)

B. UPGRADING A 416/832 DATABASE FOR STAND-ALONE PROGRAMMING

2.10 Previous versions of 416/832 databases can be updated for stand-alone programming of a new standard or expanded version, or for upgrading a standard database to an expanded database. (This procedure is not required if the new software is being loaded directly into the 416/832 System; it is only used for stand-alone programming.)

2.11 If the update procedure is not performed, the Save/Restore feature cannot be used to load a standard database into an expanded system, or an expanded database into a standard system. If you attempt to do so, an error message will appear.

2.12 TO UPDATE AN EXISTING DATABASE FOR STAND-ALONE PROGRAMMING:

- (1) Insert the floppy disk containing the saved database into the stand-alone PC's floppy disk drive.
 - (2) At the C:\> (or C:\AP>) prompt, type "md c:\temp (or some other directory name)" and press RETURN to create a temporary directory on the PC's hard disk drive. (The monitor again displays "C:\".)
 - (3) Type "copy a:*. * c:\temp (or other directory name if used)" and press RETURN to copy the database to the temporary directory. (The monitor displays the names of the files as they are copied and eventually "C:\".)
 - (4) Remove the database disk and insert the Installation Disk (disk 1) for the appropriate size system (standard or expanded) into the floppy drive.
 - (5) Type "a:" and press RETURN. (The monitor displays the A drive programming prompt "A:\>".)
 - (6) At the A:\> prompt, type "update c:\temp db (or other directory name if used)" and press RETURN to update the existing database for use with the new system software. (The update takes several minutes and the monitor eventually displays "A:\>".)
- (7) Remove the Installation Disk, insert a properly formatted floppy disk, and type "copy c:\temp (or other directory name if used)*. * a:" and press RETURN to save the new, updated database. (The monitor displays the names of the files as they are copied and eventually "A:\>".)
 - (8) Remove the floppy disk and label it "416/832 Database" along with the software part number and the current date. This new disk can now be used for stand-alone or system programming on the appropriate size system.
 - (9) *If you no longer wish to keep the new database on the PC's hard disk drive:*
 - a. Type "del c:\temp*. *" and press RETURN to delete all of the files in the temporary directory. (The monitor displays "Are you sure Y/N?")
 - b. Type "Y" (for yes) and press RETURN. (The monitor displays "A:\>".)
 - c. Type "rd c:\temp" and press RETURN to remove the temporary directory. (The monitor displays "A:\>".)

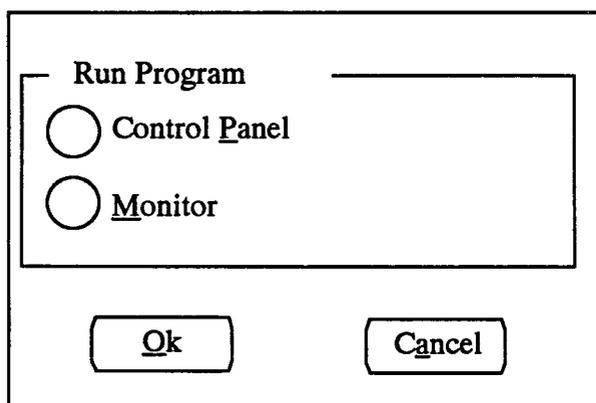
C. BEGINNING AN OFF-SITE STAND-ALONE PROGRAMMING SESSION

2.13 To begin the programming session, type INT416, GMX416, INT832, or GMX832 (depending on your system configuration) and press the RETURN (or ENTER) key. When the logo screen is displayed, press the F3 key. Or, press ALT-D to access the DB Programming pull-down menu and then select Programming Session by highlighting it (use the up or down arrow key, if necessary) and pressing RETURN. The 416/832 Applications Menu appears. All programming can then be completed as described in the following pages.

D. INSTALLING A PRINTER DRIVER FOR STAND-ALONE REPORTS

2.14 To print customized reports or T1 error reports, the stand-alone PC must have the proper printer driver installed. Contact your PC and/or printer manufacturer for the printer driver information for your system. Then follow these steps for installing the driver on the PC:

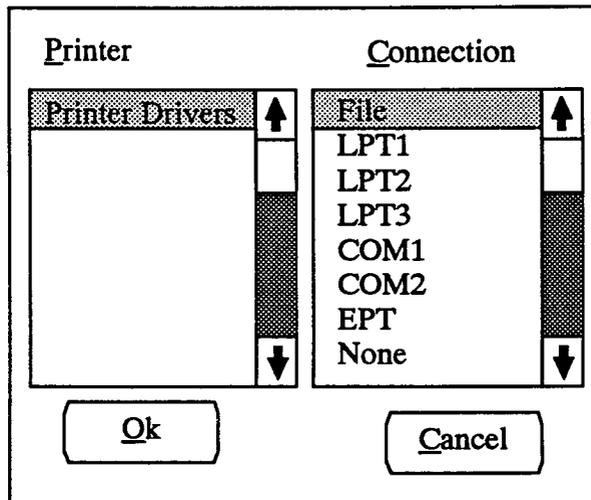
- (1) Press ALT and SPACE BAR to access a pull-down menu that includes the options "Run..." and "About..."
- (2) Press R to select "Run..." The following window appears:



- (3) Press ALT-P and press RETURN to select Control Panel. The top edge of the Control Panel window has three options: Installation, Setup, and Preferences.
- (4) Press ALT-I to select the Installation pull-down menu.
- (5) While viewing the Installation menu, press the RETURN (or ENTER) key to select Add New Printer. A window appears that asks you to identify the drive or directory that contains the printer driver software.
- (6) Insert the Applications Software disk containing the printer driver software in the disk drive. (Insert disk 7 if installing a Standard database or disk 8 if installing an Expanded database.) Or, if you have previously saved the printer drivers on your hard disk, enter the path name for their directory. Then enter the drive or directory name in the text box. Then select the OK command button.
- (7) When the list of printer drivers appears, select the option that most closely matches your printer

type. (Refer to the owner's guide for your printer or contact the manufacturer if unsure.)

- (8) Select the Add Command button.
- (9) When the window asks for a destination directory name, press RETURN to accept the directory name shown. (It should be C:\AP or the applications software directory name you selected in step 8 on page 5-5).
- (10) When copying is completed, press ALT-S to access the Setup pull-down menu. (Or, if you will be assigning printer drivers to more than one port/file destination, repeat steps 4 through 8, as needed.)
- (11) While viewing the Setup menu, press RETURN to select Connections. The following window appears:



- (12) Place the highlight bar on the printer driver to be programmed in the Printer list box.
- (13) Press TAB to move to the Connections list box. Then move the highlight bar to the file or port assignment for the selected printer driver.
- (14) If you have another printer driver to be programmed, press TAB again to return to the Printer list box and repeat steps 12 and 13.
- (15) When the printer driver programming is as desired, select the OK command button.
- (16) When the Control Panel window returns, press ALT-I to access the Installation pull-down menu. Then press X (or press the down arrow key to scroll to the Exit option and press RETURN). The Inter-Tel logo screen returns.

Outgoing Remote Session Information

Hardware Information

COM1 COM2

Baud Rate

300	↑
1200	
2400	
4800	↓

Communications Method

Modem Connection Direct Connection

Modem Information

Location:

Phone:

E. CONNECTING THE REMOTE PROGRAMMING SESSION

2.15 The screen shown above can be accessed in one of the three following ways:

- Enter INT416, GMX416, INT832, or GMX832 (depending on the system configuration) at the C:\ prompt. Then press F5 when the Inter-Tel logo screen appears.
- If the Inter-Tel logo screen is displayed, press F5.
- If the Inter-Tel logo screen is displayed, press ALT-D and then select "Connect Remote" from the pull-down menu.

2.16 You can then set the correct session information as described in the following paragraphs.

2.17 **HARDWARE INFORMATION:** This section is used for indicating the communications parameters used by your PC.

- **COM 1 or COM 2:** Indicate which COM port your PC is using for the RS-232-C connection. Press the TAB key until one of the COM options is highlighted, then use the left or right arrow key to move the dot to the correct circle. Or, press ALT-1 for COM 1 or ALT-2 for COM 2.
- **BAUD RATE:** Indicate the baud rate at which your PC will be operating. Press the TAB key to select the Baud Rate list box or press ALT-B. Then use the up

or down arrow key to move the highlight bar to the desired baud rate.

2.18 **COMMUNICATIONS METHOD:** Indicate that this is a modem connection (the direct connection option is not available in the 416/832 System). Press TAB until the communications method option is highlighted, then use the left or right arrow key to move the dot to the correct circle. Or, press ALT-M.

2.19 **MODEM INFORMATION:** If the communications method is "modem connection," enter the following information:

- **LOCATION:** Press the TAB key until the cursor appears in the Location text box or press ALT-L. Then type the name of the 416/832 System site.
- **PHONE:** Press the TAB key until the cursor appears in the Phone text box or press ALT-P. Then type the desired telephone number (you can use a comma for a pause in the number, if necessary).

2.20 **SAVE:** When the information appears as desired, select the Save command button. Press TAB until Save is highlighted and then press the SPACE BAR. Or, press ALT-S. This replaces the default values with the new information so that you do not have to repeat this procedure each time you log in.

2.21 **CANCEL:** To exit this screen without connecting a programming session, press TAB until Cancel is highlighted and then press the SPACE BAR. Or, press ALT-A. The Inter-Tel logo screen appears.

2.22 CONNECT: When the session information is correct, begin the programming session by selecting the Connect command button. Press TAB until Connect is highlighted and then press the SPACE BAR. Or, press ALT-C. The following window appears.

Outgoing Session	
Comm Port:	
Baud Rate:	<input type="button" value="Redial"/>
Connect Type:	
Location:	<input type="button" value="Cancel"/>
Number:	
Status:	

2.23 The window shows the information as it was programmed in the window on the previous page, including the COM port, baud rate, modem/direct connection type, 416/832 site location, and telephone number. The "Status" line indicates when the PC is configuring the modem, dialing, and waiting for a connection.

2.24 Two command buttons allow you the options of cancelling the connection or redialing the number if problems arise. If the software is unable to communicate with the modem, select the Cancel command button and check the connection between the modem and

the PC. Also verify that the modem is connected to the proper port. To select Cancel, press TAB until it is highlighted and then press the SPACE BAR. Or, press ALT-C. To select Redial, press TAB until it is highlighted and then press the SPACE BAR. Or, press ALT-R.

2.25 When the connection is completed, the Inter-Tel logo screen appears. To begin the programming session, press the F3 key. Or, press ALT-D to access the DB Programming pull-down menu and then select Programming Session by highlighting it (use the up or down arrow key, if necessary) and pressing RETURN. The 416/832 Applications Menu appears.

2.26 The 416/832 System will prompt you for a password. Enter the password if one is required, or press RETURN if a password is not required. A copy of the 416/832 software begins loading onto the PC. This process takes 3-5 minutes at 1200 baud. When finished, the 416/832 main menu displays on the PC monitor screen. All programming can then be completed as described in the following pages.

NOTE: If used, Save/Restore will take longer to perform via modem than with a direct connection due to the slower (300 or 1200) baud rate. If the Restore function is used, the associated system reset will disconnect all calls including the modem connection.

2.27 If modem connection is lost during the programming session, allow a minute for the 416/832 modem to reset, then re-establish the call using the procedure given above. All changes that were saved by a system update before the connection was lost will be retained in 416/832 memory.

3. SESSION TIMER AND SCREEN SAVER

3.1 Two timers have been built into the system that go into effect when the programming terminal remains idle for lengthy periods. They are the Session Timeout and Screen Saver timers.

3.2 Whenever the programming session remains idle (no input) for more than five minutes, a screen saver feature will cause the monitor display to go blank. When this occurs, the programmer can press any key or move the mouse to restore the video display. The display itself will not change unless the session has also timed out, then the Inter-Tel logo is displayed.

NOTE: If your PC has an independent screen saver feature (in addition to the 416/832 screen saver), you may need to clear both screen savers to return to programming.

3.3 If the programming session remains idle for more than 20 minutes while a programming window is displayed, the session is automatically terminated.

4. MICROSOFT WINDOWS

NOTE: The following information is provided by Microsoft, regarding their licensing policies.

4.1 The 416/832 Database Programming operates in a graphics environment called *Microsoft Windows*, created by Microsoft Corporation. An extension of the MS-DOS operating system, *Microsoft Windows* gives a

standard look and feel to 416/832 Database Programming and all other *Windows* applications.

4.2 The 416/832 Database Programming package contains all the software necessary to run 416/832 Database Programming. You can also run 416/832 Database Programming under *Microsoft Windows* version 2.1 or higher.

4.3 With *Microsoft Windows*, you can take advantage of these additional features of the *Windows* environment:

- **Running multiple applications:** You can run several applications under *Windows* at one time and easily switch between them, creating an integrated work environment.
- **Data exchange between applications:** You can transfer data between 416/832 Database Programming and other standard DOS applications as well as other *Windows* applications.
- ***Windows* control of the DOS environment:** From the *Windows* environment you can easily access all *Windows* and non-*Windows* applications, files, directories, and disks, and control all DOS-related tasks such as directory or file management and formatting disks.

4.4 The *Microsoft Windows* applications associated with 416/832 programming cannot be used to run other *Windows* related functions. To run 416/832 Database Programming with other applications under *Microsoft Windows*, you need to license and install *Microsoft Windows* version 2.1 or higher.

5. HOW TO USE THE PROGRAMMING WINDOWS

5.1 The database is divided up into “windows” that permit the programmer to view and change the system programming one section at a time. Each of the programming windows contains boxes and/or buttons for selecting and entering specific information. These include: Text Boxes, List Boxes, Command Buttons, Option Buttons, and Check Boxes. Samples of each are shown in the following paragraphs.

5.2 To move among items in a window, you may use the TAB or ALT key, as follows:

- **Using the TAB key:** Press the TAB key repeatedly until the desired area is highlighted by a gray box and a dark outline or filler. To move in reverse, press the SHIFT and TAB keys at the same time.
- **Using the ALT key:** Pressing a combination of the ALT key and the underlined letter allows you to move directly to the desired area. (For example, in the following sample Text Box, you would use ALT-D because the “D” in Description is underlined).

5.3 When using a stand-alone PC, a mouse can be used for selecting items. To select an item, simply point the mouse cursor at the desired item and click the left button.

A. TEXT BOX

EXAMPLE:

Description: |

5.4 A text box is used when the requested information requires typing. The vertical line is the cursor that indicates where text will be inserted. As you type, the line moves to the right, pushing any existing text to the right. The line can be moved right or left using the arrow keys on the keyboard or by pointing the mouse cursor at the desired place and clicking the left button once.

5.5 To move the cursor to a text box, follow the instructions in paragraph 5.2. When the cursor appears in the box, you can begin typing.

5.6 The system recognizes both upper- and lower-case characters. When typing, you may use either case or a combination.

5.7 To correct mistakes made while entering information or to erase existing information, back up using the backspace or delete key and retype the entry.

5.8 To delete the entire contents of a text box, highlight the box, then press the backspace or delete key.

B. LIST BOX

EXAMPLE:

5.9 The list box is used for several purposes, as follows:

- **Main Menu selections:** In the main menu list box shown above, selecting a listed item that is followed by an ellipsis (...) causes other selections to appear below it. For example, selecting Station Programming will expand the list to show additional items; however, Least-Cost Routing does not have an ellipsis and selecting it will lead directly to a programming window.
 - **Typed information:** When programming items such as Do-Not-Disturb and reminder messages, the list box shows the current values. Selecting one line of the list box causes a smaller window with a text box (like the one shown above paragraph 5.4) to appear. After the information is entered in the text box and you exit from the small window, the list box shows the new information.
 - **Enable/Disable and Yes/No lists:** Items such as system features have only two states: enabled or disabled. When these appear in a list box, selecting the item changes the state of that item. For example, if the station feature “CO Reseize” is enabled and you wish to disable it, you would select the line containing “CO Reseize” to change the status to “DISABLED” by pressing the SPACE BAR (see page 5-30 for an illustration).
 - **Include/Exclude lists:** Some programs require you to list the stations or trunks that are on “include” or “exclude” lists. To move an item from one list to the other, select the desired item. It is automatically moved to the other list.
- 5.10 There are several methods for selecting a line in a list box. They are as follows:
- **Arrow keys:** Use the up or down arrow key to move the highlight bar. Press the SPACE BAR to select an item while it is highlighted.

- **HOME, END, PAGE UP and PAGE DOWN keys:** You can use the HOME key to move directly to the top of the list, or the END key to move directly to the bottom. The PAGE UP and PAGE DOWN keys move up or down the list one screen at a time.
- **First letter or digit of desired item:** When a list is presented in alphabetical or numerical order, you can quickly move to the first item beginning with a specific letter or number by entering that character. For example, when in a list of stations by name, you can move to names that begin with "C" by pressing the C key.
- **Scroll bar:** Along the right edge of the list box is a band with an arrow at each end and a white box (as shown in the List Box sample on the previous page). This is a scroll bar and it is used, with the mouse cursor, to move through the list. Point the cursor at either of the arrows and click the left button to move one line at a time, or point the cursor at the white box and hold down the left button. Moving the mouse "drags" the box up or down and scrolls through the list. When the desired item is highlighted, press the SPACE BAR or click the left mouse button to select it.

C. COMMAND BUTTON

EXAMPLE:



5.11 Selecting a command button executes a single command. To select a command button, do one of the following:

- **TAB key:** Use the TAB key to advance to the command button and to *highlight* it. Then press the SPACE BAR to *select* it.
- **ALT key:** Press the ALT key plus the underlined character. (In the sample above, you would use ALT-X to execute the Exit command).

5.12 Frequently, a command button is highlighted by a dark border while you are programming in a window. If so, pressing the RETURN key will execute that command automatically. You do not need to TAB to the button first.

D. OPTION BUTTON

EXAMPLE:



5.13 Option buttons are used when there are two or more options for a feature and you must choose only one. The options are listed in a box and the buttons are located along the left. Selecting the desired button places a dot in it to show which option was chosen.

5.14 Option buttons can be selected using one of the following methods:

- **TAB key:** Use the TAB key to advance to the box surrounding the buttons, and the up or down arrow key to move the dot to the desired button.
- **ALT key:** Press the ALT key plus the underlined character (in the sample above, you would use ALT-1 or ALT-2).

E. CHECK BOX

EXAMPLE:



5.15 Check boxes are used when a single option is available that has only two states (on/off, enabled/disabled, or yes/no). When the box is selected, an X is placed inside it to indicate an affirmative state (on, enabled, or yes). Selecting a box that already contains an X, removes the X (off, disabled, or no).

5.16 Check boxes can be selected using one of the following methods:

- **TAB key:** Use the TAB key to advance to the check box to *highlight* it. Then press the SPACE BAR to *select* it.
- **ALT key:** Press the ALT key plus the underlined character. (In the sample above, you would use ALT-A).

F. ITEMS THAT CANNOT BE SELECTED — GRAY ITEMS

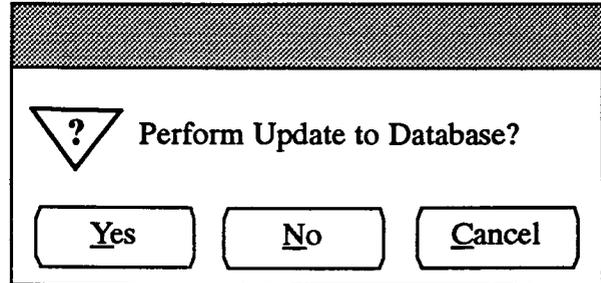
5.17 If an item in a window appears in a light gray color, it cannot be selected unless an associated item is highlighted. For example, in the System Configuration window, the command button for Configuration cannot be selected unless a line in the list box with "Keyset Interface," "T1 Trunk Interface," or "DID Trunk Interface" is highlighted, because only these cards require special configuration programming. But, when the proper line is highlighted, the command button appears in black and selecting it displays the configuration window.

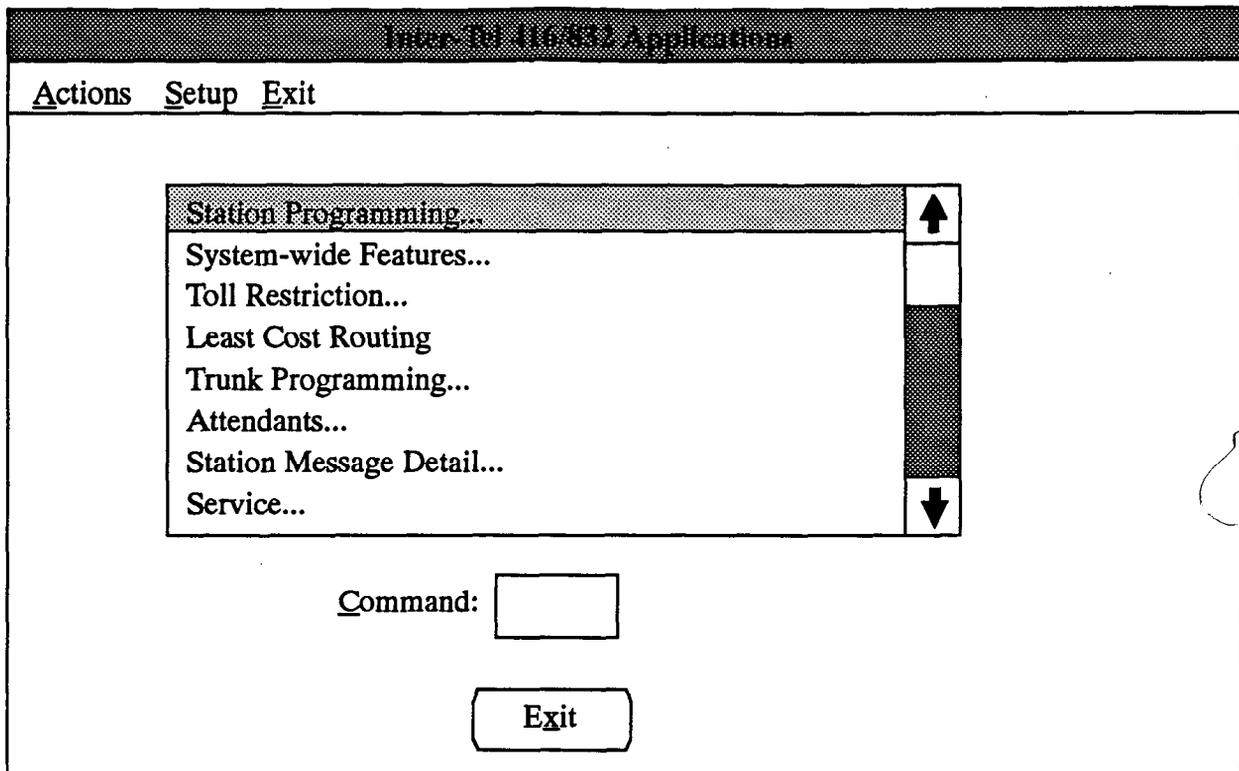
G. HOURGLASS SYMBOL CURSOR

5.18 Occasionally, the system will change the cursor to an "hourglass" shape. This indicates that the system is performing an internal operation and cannot respond to input. Wait for the cursor to return to normal before entering more information.

H. UPDATE TO DATABASE — EXIT SCREEN

5.19 The following screen appears when an Exit command button is selected. It offers the options of saving the changes that were made in the associated window and exiting to the Applications Menu (select Yes), exiting to the Applications Menu without saving the changes (select No), or returning to the programming window to continue making changes (select Cancel).





6. APPLICATIONS MENU

6.1 The first window that is shown after sign-on contains a list box with the Applications menu that introduces the eight major programming sections: Station Programming, System-Wide Features, Toll Restriction, Least Cost Routing, Trunk Programming, Attendants, Station Message Detail, and Service. The window appears as shown above.

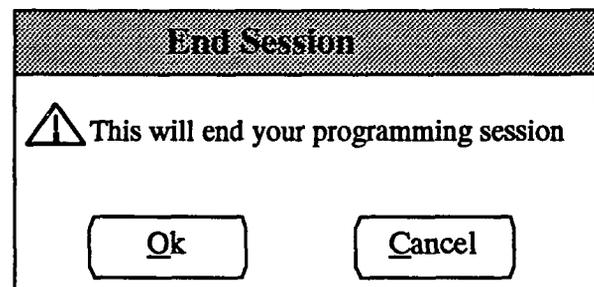
NOTE: When programming a KF-rated system, LCR will still appear in the Applications Menu, but when selected, an error message is presented to remind the programmer that it is not available.

6.2 LIST BOX: Each item in the list box, except Least-Cost Routing, is followed by an ellipsis (...) to indicate that it contains submenus. These submenus appear when the main menu line is selected. Selecting a submenu line leads to a programming window.

6.3 COMMAND: Each of the options listed on the following pages can be accessed directly by entering a

three- or four-letter command in the Command text box. Select the text box using the mouse, the TAB key, or ALT-C. Then type the desired command and press RETURN. Refer to the appropriate page in this section for instructions on using the selected window.

6.4 EXIT: When programming is completed, select the Exit command button. The following window appears. Select the OK command button to end the programming session, or select the Cancel command button to return to the Applications menu.



6.5 The full list of available menus, with the abbreviated access commands and a list of submenus and programming options accessed by each are included in the following tables:

MAIN MENU ITEM	SUBMENU	PROGRAMMING OPTIONS
Station Programming... <i>(Continued on next page)</i>	Individual Station Information (STN) <i>(Continued on next page)</i>	Copy to Another Station Station Review Window: Full Name And Username Secondary Stations Miscellaneous Flags Window: Allow Private Intercom Override Auto Att/VM/DISA Do-Not-Disturb Breakthrough Automatic Answer CO or IC Barge Initiate or Receive Camp-On Tones CO Reseize Dial Pulse DID Camp-On Tones Do-Not-Disturb Allowed Do-Not-Disturb Override DTMF Feedback Enabled E&M Camp-On Tones Handsfree Headset LCR Facility Group Camp-On Message Lamp Music Channel One/Two Off-Premises Extension OHVA Receive/Transmit Page Remove/Replace Redial Mode Ring Cadence Ring Intercom Always Ring Type for Off-Premises Extension Transparent LCR Miscellaneous Information Window: Attendant Message Center Alternate Message Source (single-line station only) Tenant Group And Department Account Code Type/Index/Validate Account Code Class-Of-Service Account Code Ring Zones (single-line station only) Receive/Transmit Gain (OPX only) Day/Night Outgoing Access Programmable Key Programming Window: Key Map Station Programmable Keys Secondary Call Key Window: Secondary Call Keys Primary Station Enable Ring Cadence Special Purpose Station Window: Attendant/Stations Served Automated Attendant/Recall Dest. & Digit Translation FAX Station/FAX Message Center House Phone/Day & Night Numbers Message Center/Stations Served Voice Mail Station

MAIN MENU ITEM	SUBMENU	PROGRAMMING OPTIONS
Station Programming... (Continued)	Individual Station Information (Continued)	System Forwarding Window: Forwarding Paths Forward Call Types Station Conditions System Conditions Ring Principal Once Toll Restriction Information Window: Day/Night Station Class Of Service (SCOS) Day/Night Mode Toll Restriction User Group Day/Night Mode LCR Advance Limit
	Key Assignments (KEY)	Keypad Key Assignments: Keypad Map View Types Keypad Map Groups Station List User Programmable Keys Default Sets DSS/BLF Unit Key Assignments: DSS Map Descriptions DSS Map Groups DSS Station List Digital DSS Map View Single-Line Set Key Maps Key Type Programming
	Ring Zone Programming (ZONE)	Station Lists
	Station Features (SFEA)	Allow Private Intercom Override Auto Attendant/VM/DISA Do-Not-Disturb Breakthrough Automatic Answer On CO Calls (keysets) Automatic Answer On IC Calls (keysets) Barge Receive Enabled Barge Transmit Enabled (keysets) Camp-On Tones Disabled CO Reseize Enabled (keysets) Dial Pulse Enabled (single-line stations) DID Camp-On Tones Disabled Do-Not-Disturb Allowed Do-Not-Disturb Override Allowed (keysets) DTMF Feedback Enabled (single-line stations) E & M Camp-On Tones Disabled Handsfree Enabled (keysets) Headset Enabled (keysets) LCR Facility Group Camp-On Allowed Message Lamp Enabled (single-line stations) Music Channel One Enabled Off-Hook Voice Announce Receive Enabled (keysets) Off-Hook Voice Announce Transmit Enabled Off-Premises Extension (single-line stations) Page Remove Enabled (keysets) Redial Mode — Last Number Dialed (keysets) Ring Cadence Extended (single-line stations) Ring Intercom Always Enabled Ring Type For OPX -- DC (single-line stations) Transparent LCR Enabled

MAIN MENU ITEM	SUBMENU	PROGRAMMING OPTIONS
System-Wide Features <i>(Continued on next page)</i>	Account Code Information (ACCT)	Account Code Length Standard, Forced, LCR Toll, & None Station Lists Batch Station Lists (Forced, Standard, LCR Toll, Validated) Class-Of-Service Account Codes
	DND and Reminder Messages (MMSG)	
	Extensions, Usernames, and Feature Codes (EXT)	Stations Hunt Groups Trunk Groups Feature Codes Set Extensions/Clear Extensions (Batch Load)
	Hunt Groups (HUNT)	Station Lists Voice Mail Hunt Group Voice Computer Group Automated Attendant Hunt Group Dial Rules Recall Destination Hunt Group Extended Data Window: Hunt Group Name Description Supervisor Hunt Group Search Type Timer Programming Window: No Answer Advance Timer Announcement Timer Overflow Timer Default Timers Announcement Station Data Window: Announcement Stations Announcement Types Overflow Station Data Window: Overflow Device Overflow Station Overflow Type Overflow Count

MAIN MENU ITEM	SUBMENU	PROGRAMMING OPTIONS
System Wide Features... (Continued)	Miscellaneous System-Wide Information (MISC)	Primary Attendant Station Call Termination Digits System Flags: Allow Cross-Tenant IC Traffic Allow Cross-Tenant Voice Mail/Computer Traffic Account Code Class-Of-Service Audible Message Indication for SL Sets Auto Attendant — Dial During Recording Auto Attendant — Enable Ringback Tone Barge Barge Confirmation Tone Broadcast Alarms to All Attendants Broadcast Station Off-Hook Alarms Drop Incomplete Outgoing Call Extended DTMF Feedback Digits External Paging Music Channel Handsfree Announce System Forward Transfer Hot Dial Pad Keys Hunt Group Transferred Call Type Keypad Identification Display Music-On-Hold for IC Calls OHVA DSS Immediate Transmit OHVA System-Wide Privacy Release Reverse Transfer Immediate Connection Standard Tones (CO Trunks, Keysets, and Single-Lines) Station DTMF Digit Mute Station Monitoring Tone Suppress All Displayed Digits After End Of Dialing System "Skate" Type System Speed-Dial Override SCOS Validate Voice Mailbox Numbers
	Page Zones (PAGE)	Page Zones Relays And External Ports Keysets Convert Ports
	Relay Programming (RLAY)	
	System Forwarding (SFWD)	Forwarding Paths Path Description Forwarding Point(s)
	System Speed Dial (SSPD)	Name Tenant Number Number Of Displayed Speed-Dial Numbers Speed Dial Number Programming Station Number Of Digits in Bin Number
	System Timers (TIMR)	Value Default Range

MAIN MENU ITEM	SUBMENU	PROGRAMMING OPTIONS
System Wide Features... (Continued)	Tenants and Departments (TNT)	Tenant Groups Description Departments Trunk Group For Auto Feature Stations Trunk Groups DID Groups
Toll Restriction...	Alternate Carriers/Allowed Long Distance (ALT)	Alternate Carrier Numbers Allowed Long Distance Numbers
	Area/Office Codes Allowed/Restricted (AREA)	Area And Office Codes Overlap User Groups Day/Night Station Lists Area Codes (Allowed, Restricted, or Extended) Office Codes (Allowed or Restricted)
	SCOS Information (SCOS)	Station Class-Of-Service Programming Day/Night Lists Day/Night LCR Advances
	Toll Security	7/10 Digit Enabled Operator/International Enabled Weekly Toll Limit Clear Accumulated Total Remaining Days
Least-Cost Routing (LCR)		Dial Rules Route Groups: Description Area Code Table Office Code Table Day, Evening, & Night Time Blocks (Facility Groups) Facility Groups: Description Dial Rules Trunk Groups

MAIN MENU ITEM	SUBMENU	PROGRAMMING OPTIONS
Trunk Programming... <i>(Continued on next page)</i>	Individual Trunk (INDT)	Group Number Receive Gain Transmit Gain Hybrid Balance E&M Interface Start Type Current DT Detect Relaxed Ring Detect DTMF Signaling Ignore Answer Supervision
	Trunk Groups, DID Groups, And Ring-In/Answer Patterns (TRNK)	Trunk Group Programming Window: Trunk Group Description & Name Tenant Group E & M Trunk Group: Call Routing (Auto Ring-In/Dial Repeating) Reorder Tone (Continuous or Burst) Handshaking (Immediate, Delayed, Or Wink) Return Dial Tone DID Digit Translation Enable Hookflash One-Way Incoming Only Music-On-Hold Day/Night Outgoing Access Station List Day/Night Ring-In (Single, Hunt, Multiple, or DISA — DISA can have toll restriction) Trunk List Toll Restriction: Subject To Toll Restrict Exempt From LCR Only Call Cost (Free, Local, 10-Digit, Operator) Equal Access Absorbed Digits Absorbed Digits Applications (PBX or Local) Absorbed Digits Repeatable Absorbed Strings DID Group Programming Window: Description Tenant Group Base Number Trunk List Music On Hold Start Type (Immediate, Wink, Delay) Add/Delete Entry Day/Night Ring-In (Single, Hunt, Multiple, or DISA) DISA Codes Set Ring-in (Batch Load) Ring-In/Answer Patterns Window: Pattern Title Ring-In Station List Answer Station List Relay Lists

MAIN MENU ITEM	SUBMENU	PROGRAMMING OPTIONS
Trunk Programming... (Continued)	T1 Programming (T1)	Error Threshold Programming Dialing Feedback Configuration: DTMF Dialing Feedback Gain Dial Pulse Feedback Gain Dial Pulse Tone Selection Backup Clock T1 Card Programming Window: PCM Encoding Law Relay Activation Card Type (D4 or ESF) Zero Code Suppression Scheme (AMI, B8ZS, or None) Channel Service Unit (On-Board or DSX-1) Line Build-out (LBO) if On-Board CSU DSX-1 Line Length if DSX-1 Test Tone Reference Clock Programming Clock Programming Window: T1 From Public Network Provides Reference Clock For System Master/Slave Loop Operation Source Of Reference Clock Error Diagnostics Window: Output Type (Table or Graph/Hour or Day) Update Current Errors Port/File & Print Location
Attendants...	Attendant's Console (CONS)	Designate/Format Destination Create Database
	Alias Programming (ALSS)	Add Alias List Current Aliases
	DSS/BLF Assignment (DSS)	Description DSS/BLF Associated Keyset DSS/BLF Keymap
Station Message Detail... (Continued on next page)	Call Cost (COST)	Daytime Rates In Dollars Per Minute Evening/Night/Weekend Multiplicative Factors
	SMDA (SMDA)	Output Port Reporting Interval (Attendant, Daily, Weekly, Monthly) Clear SMDA Data Print Report Review Format Window: Account Code Reports Clear Account Code Data Following Report Summary Reports Select Device Reports Detailed Reports Clear Station/Trunk/Hunt Data Following Report Selected Device Reports: Stations Trunks Hunt Groups

MAIN MENU ITEM	SUBMENU	PROGRAMMING OPTIONS
Station Message Detail... (Continued)	SMDR (SMDR)	SMDR Output Port SMDR Output Active SMDR Report Format Station List
Service...	Error Message Programming (ERR)	Error Output Port Error Output Active Report Contents
	Hybrid Balance (HYBR)	Circuits Hybrid Balance Test Line Break Dial-Tone Digit
	Maintenance Programming (MAIN)	Devices CO Trunks In Maintenance/Available
	Passwords (PASS)	Applications Restricted/Unrestricted On-Line Monitor Restricted/Unrestricted
	Report Programming (REP)	Select Output Port Station Report Area/Office Code Report Least Cost Routing Data Report
	Customized Report Programming (CREP)	Reports: Area/Office Codes Detailed Station DID General Station Hunt Group Key Maps LCR Phone List Special Purpose Flags System Speed Dial Timers Trunk Group Port/File
	Save/Restore (SAVE)	Format Disk Save Database Restore Database Save CVH Database (not currently supported) Copy Error File File Destination/Source
	Serial Port Configuration (PORT)	Enable DSR Handshaking Enable CTS Handshaking Baud Rate Reset Ports
	System Configuration (CONF)	Time & Date Home Area Code/Local Area Codes System Board Types +30VDC Modules Required Non-Blocking For Voice Channels Configuration For KSC, T1C, & DID Clock Adjustment (on-line only) Move Board (stand-alone PC only)

7. DEFAULT VALUES

7.1 The default values of the features are specified throughout this section of the manual. A summary of the default system values is as follows:

A. CONFIGURATION

- There are three default configurations:
 - If configuration A is used, slots 1–20 are KSCs and slots 21–26 are LGCs.
 - If configuration B is used, slots 1–10 are KSCs, slots 11–19 are SLCs, and slots 20–26 are LGCs.
 - If configuration C is used (IMX only), slot 1 is a KSC, 2–10 are DKSCs, 11–19 are SLCs, and 20–26 are LGCs.
- The Matrix Card is assigned to slot 27 and the Expansion Card to slot 54; these cannot be changed.
- No other slots in the expansion cabinet are given default configurations.

B. ATTENDANT

- There is one attendant for all stations (circuit 1.1). It is the primary attendant, alarm station, and message center for all stations. It is also the system speed-dial programming station and it can be used to place the system in night mode. The circuit is equipped and configured for a keyset.
- Circuit 1.1 receives ring-in and can answer all trunks during day mode and night mode.

C. STATIONS

- Stations are not toll restricted.
- All stations have ring-in assignment and can answer all trunks when the system is in night mode. Users have outgoing access on all trunks.
- Intercom numbers are assigned in order beginning with circuit 1.1 (intercom number 1000).
- All stations are in tenant group 1, department 1.
- All keysets are in paging zone 1. External paging ports are not enabled.
- Camp-on tones are heard at all stations.
- No headsets are equipped.
- No user names are assigned.
- There are no DSS/BLF stations, automated attendants, message centers (other than the primary attendant), or house phones.
- Off-Hook Voice Announce is enabled. Barge is not enabled.

- Keyset LCD identification is enabled full-time.
- All stations have Do-Not-Disturb capability, but none have DND Override enabled.
- All single-line sets are in the *immediate* ring zone.
- All stations have CO Reseize disabled.

D. TRUNKS

- All trunks are programmed for DTMF signaling.
- System-wide Call Privacy is enabled.
- All trunks are subject to toll restriction. All trunks accept equal access dialing. None absorb digits.
- No trunks are associated with hunt groups.
- All trunks are assigned to trunk group 1, which is named "All Lines."

E. TOLL RESTRICTION

- Area and office codes do not overlap. All area codes and office codes are unrestricted.
- The allowed long distance numbers are 800-XXX-XXXX and 911. There are no alternate carrier numbers.

F. MISCELLANEOUS

- The system is in day mode.
- No system or station speed-dial numbers are programmed.
- Speed-dial numbers are subject to toll restriction.
- Least-Cost Routing (LCR) is programmed as "transparent" to the users.
- None of the system speed-dial locations are identified as non-display numbers. All are assigned for use by all tenant groups.
- Speed-dial DTMF tones are not muted.
- No hunt groups, hunt group supervisors, or announcement or overflow stations are assigned.
- No account codes are assigned. Account code default length is four digits. Class-of-service account codes are not enabled.
- The system is programmed to disconnect calls (not place them on hold) when a user presses another trunk key during a call.
- Cross-tenant intercom traffic is allowed.
- System alarms are sent to all attendants.
- Reverse transfers to keyset stations are connected immediately, the user does not need to press the flashing trunk or IC key.
- Passwords are not required to gain access to the database programs or the on-line monitor.

Individual Station		
<u>A</u> ctions	<u>S</u> etup	<u>E</u> xit
Station to be Reviewed: <input style="width: 100px; height: 20px;" type="text"/> <div style="display: flex; justify-content: space-around; margin: 10px 0;"> C<u>o</u>py R<u>e</u>view </div> <p style="text-align: center;">Press F2 for List of Stations</p> <div style="text-align: center; margin-top: 10px;"> E<u>x</u>it </div>		

8. STATION PROGRAMMING — INDIVIDUAL STATION INFORMATION (STN)

8.1 When Station Programming is selected from the Applications Menu window, the menu expands to show the following options:

- Station Programming...
- Individual Station Information
- Key Assignments
- Ring Zone Programming
- Station Features

8.2 The Individual Station Information option and the windows it accesses are described in the following pages. The remaining options apply to batch programming and are described beginning on page 5-44.

A. STATION TO BE REVIEWED

8.3 The first window in the Individual Station programming area is shown above. It can be accessed by selecting Individual Station from the Station Programming menu or entering the STN command. There are two methods for selecting the station to be programmed as described in the following paragraphs.

8.4 **STATION TO BE REVIEWED:** Select the Station to be Reviewed text box and enter a circuit or extension number to program the station features for an individual station. (If programming an 8-line IMX AIM keyset that is installed on a dual circuit, add A or B to the

end of the circuit number to designate which station is being programmed.) Then press RETURN to select the Review command button and display the window shown page 5-28.

NOTE: Programmers should use *extension numbers* and not station circuit numbers when programming stations. Because the Station Exchange feature can be used to change the extension programming of the station circuit numbers, circuit numbers are not reliable references to the extension numbers.

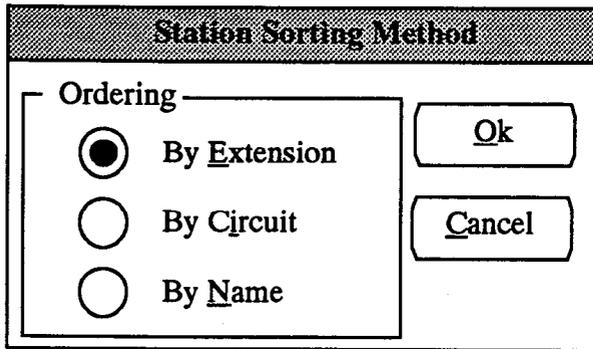
8.5 **F2 FOR LIST OF STATIONS:** To view a list of the stations, press the F2 key. The following window appears. To select a station, scroll through the list box until the desired station is highlighted.

Select Station to Program		
Ext	Ckt	Name
1000	01.01	↑
1001	01.02	□
1002	01.03	█
1003	01.04	↓
1004	01.05	↓

Ok
Cancel
Sort

- **OK or CANCEL:** Select the OK command button or press RETURN. To exit from the window without selecting a station, select the Cancel command button.

- **SORT:** To sort the stations and list them numerically by extension number or circuit number, or to list them alphabetically by name, select the Sort command button. The window appears as shown below. Choose the desired sorting method by selecting the corresponding option button. Then select the OK command button. When the list of stations returns, the list box will show the stations in the selected order. To exit without changing the sorting method, select the Cancel command button.

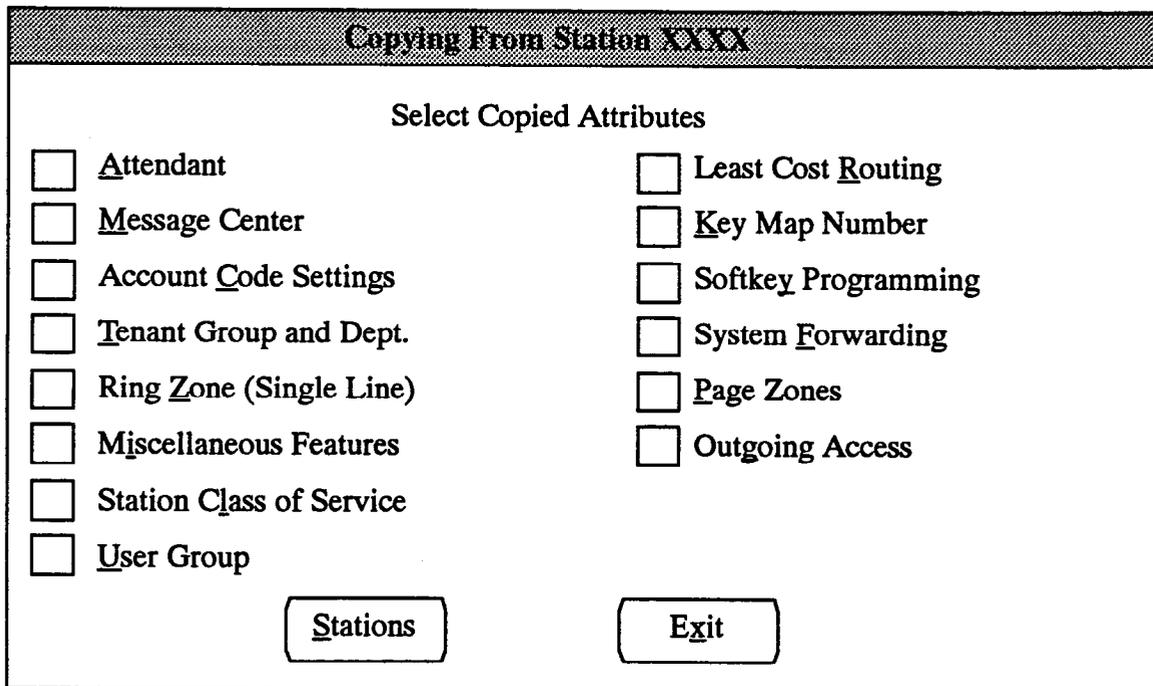


The dialog box is titled "Station Sorting Method". It features a section labeled "Ordering" with three radio button options: "By Extension" (selected), "By Circuit", and "By Name". To the right of these options are two buttons: "Ok" and "Cancel".

- 8.6 **COPY:** To copy attributes from the station shown in the Station To Be Reviewed text box to other stations,

enter the source station's extension or circuit number in the text box and then select the Copy command button. The window shown at the bottom of this page appears.

- **SELECT COPIED ATTRIBUTES:** To determine which attributes will be copied, place an X in the box for each desired attribute. To place an X in a box, highlight it and then press SPACE BAR. To remove the X, highlight it and press SPACE BAR again.
- **STATIONS:** To determine which stations will receive the copied information, select the Stations command button. The window shown on the next page appears.
- **EXIT:** When all of the attributes have been selected (or if you wish to exit without copying information), select the Exit command button. A small window appears that asks if you wish to update the database. If you select the Yes command button, the information will be copied as specified. If you select the No command button, the Individual Station window (shown on the previous page) will return. If you select the Cancel command button, the Copy window (shown below) will return.



The dialog box is titled "Copying From Station XXXX". It contains a section titled "Select Copied Attributes" with two columns of checkboxes. The first column includes: Attendant, Message Center, Account Code Settings, Tenant Group and Dept., Ring Zone (Single Line), Miscellaneous Features, Station Class of Service, and User Group. The second column includes: Least Cost Routing, Key Map Number, Softkey Programming, System Forwarding, Page Zones, and Outgoing Access. At the bottom of the dialog are two buttons: "Stations" and "Exit".

Select Station To Copy To

Include

1003 01.01 Smith, John	↑
1001 01.02 Station Undefined	
1002 01.03 Station Undefined	
1003 01.04 Station Undefined	
1004 01.05 Station Undefined	↓

Exclude

1008 02.01 Station Undefined	↑
1009 02.02 Station Undefined	
1010 02.03 Station Undefined	
1011 02.04 Station Undefined	
1012 02.05 Station Undefined	↓

None

All

Sort

Cancel

Ok

- **INCLUDE or EXCLUDE:** To include a station, locate it on the Exclude list and select it by pressing the SPACE BAR; it will automatically move to the Include list. To remove a station, select it in the Include list to move it to the Exclude list.
- **ALL or NONE:** To include all stations, select the All command button. To delete all stations, select the None command button.
- **OK or CANCEL:** When the station lists appear as desired, select the OK command button to exit

and record your changes or select the Cancel command button to exit without saving changes.

- **SORT:** To sort the stations and list them numerically by extension number or circuit number, or to list them alphabetically by name, select the Sort command button. The window appears as follows. Choose the desired sorting method by selecting the corresponding option button. Then select the OK command button. When the list of stations returns, the list box will show the stations in the selected order. To exit without changing the sorting method, select the Cancel command button.

Station Sorting Method

Ordering

By Extension

By Circuit

By Name

Ok

Cancel

- 8.7 **EXIT:** (Shown on page 5-25.) When finished programming station information, select the Exit command button to return to the Applications menu.

Circuit: XX.XX Extension XXXX

Full Name: Username:

Station Exchange Password:

Area to be Reviewed

Miscellaneous Flags	↑
Miscellaneous Information	|
Outgoing Access — Day	|
Outgoing Access — Night	█
Programmable Keys	|
Secondary Call Key Assignments	|
Special Purpose Station	|
System Forwarding	↓

Secondary Stations

	↑
	█
	↓

B. USER NAME AND AREA TO BE REVIEWED

8.8 The windows that are accessed through this window are used to enter specific information about the selected individual station. The program planning sheet in Figure 5-4, on page 5-175, may be helpful.

8.9 FULL NAME and USERNAME: The full name of the station user can be up to 20 characters, and the abbreviated user name, that will appear on display keysets in the "idle" display (if the option is enabled) and in several call processing displays, can have up to seven characters. To program the names, select the desired text box and type the entry.

8.10 STATION EXCHANGE PASSWORD: (*This is not available unless the Station Exchange flag in Miscellaneous Flags is enabled. See page 5-31.*) Enter the desired password, up to four digits, to be used for this extension number (not circuit number) for the Station Exchange feature. See page 4-99 in FEATURES for more information on the Station Exchange feature.

8.11 AREA TO BE REVIEWED: This list box includes options for gaining access to the following programming areas:

- **MISC. FLAGS:** The window that appears when this line is selected appears on page 5-30. It is used for programming several station specific features such

as Do-Not-Disturb Allowed, Off-Hook Voice Announce, etc. A complete list of the flags is given on page 5-30.

- **MISC. INFORMATION:** Selecting this line in the Area to be Reviewed list box, causes another programming window to appear (as shown on page 5-33). This window is used for programming the station's attendant, message center, account code type and index, class-of-service account code, tenant group, and department. It is also used for programming ring zones for single-line sets.
- **OUTGOING ACCESS DAY/NIGHT:** Select an Outgoing Access trunk to determine the trunk group(s) to which the station will have access for placing outgoing calls during day or night mode. The window appears as shown on page 5-34.
- **PROGRAMMABLE KEYS:** *This option does not appear for single-line stations.* Select this line to choose the key map that will be used by the station and, for keysets, assign the values for the station programmable keys. The window appears as shown on page 5-35.
- **SECONDARY CALL KEY ASSIGNMENTS:** *This option does not appear for single-line stations.* If the station will have secondary call keys, select this line. The programming window is shown on page 5-37.

- **SPECIAL PURPOSE STATION:** This option is selected to program the station as an attendant, automated attendant, FAX station, house phone, message center, or voice mail station. The window for this option is shown on page 5-38.
- **SYSTEM FORWARDING:** Select this line to assign the system forwarding path(s) and forwarding conditions for the station. The window for this option is shown on page 5-41.
- **TOLL RESTRICTION:** This line is selected to program the station's toll restriction user group, LCR advance limit, and SCOS restrictions. A window appears as shown on page 5-43.

8.12 SECONDARY STATIONS: *This list box appears gray for single-line stations.* If the station being programmed is a primary station and one or more secondary stations have secondary call keys associated with its call keys, the secondary stations are listed in this box for reference.

8.13 EXIT: When finished programming through this window, select the Exit command button. A window appears that asks "Perform Update to Database?" To update the database and exit, select the Yes button. Or select the No command button to exit without saving any changes. To return to this programming window, select the Cancel button.

Miscellaneous Flags		
Allow Private Intercom Override	Disabled	↑
Auto Att/VM/DISA DND Breakthru	Enabled	
Automatic Answer CO	Enabled	
Automatic Answer IC	Enabled	
Camp-on Tones	Enabled	
CO Reseize	Enabled	
DID Camp-on Tones	Enabled	
Do-Not-Disturb Allowed	Enabled	
Do-Not-Disturb Override	Disabled	
E&M Camp-on Tones	Enabled	
Handsfree	Enabled	
Headset	Enabled	↓

Ok

C. MISCELLANEOUS FLAGS WINDOW

8.14 Determine the desired status for each of the following features. Refer to FEATURES for more information on each of these features. The program planning sheet for this window is located in Figure 5-4 on page 5-175.

8.15 LIST BOX: Each of the items in the list box has only two states (enabled/disabled, on/off, etc.). Scroll through the list to verify that they are programmed as desired. To change the status of a flag, select it.

- **Allow Private Intercom Override:** (*Keyset only*) This option, when enabled, allows the caller to press the pound (#) key to break through handsfree when calling a keyset station that is programmed to receive only private calls. In the default state, this is *disabled*.
- **Automated Attendant/VM/DISA Do-Not-Disturb Breakthrough:** This option determines whether calls received through the automated attendant, voice mail, or DISA will break through Do-Not-Disturb mode. If the option is enabled, the station receives DISA, voice mail, or automated attendant calls even when in Do-Not-Disturb. If disabled, the call is sent to the station's attendant. In the default state, it is *enabled*.
- **Automatic Answer CO or IC:** (*Keyset only*) The Automatic Answer feature can be enabled so that ringing outside and/or intercom calls are answered by simply lifting the handset. If Automatic Answer is disabled, the user must press a key to answer the call. (This can also be programmed by the station user.) In the default state, Automatic Answer for both IC and CO are *enabled*.
- **Barge Initiate or Receive:** (*This prompt appears only if the system-wide flag for Barge is enabled. Barge Initiate appears for keysets only.*) A keyset station can be given Barge permission and/or any station can be programmed to receive or block barges. In the default state, Barge is *disabled*.
- **Camp-On Tones:** The tone that signals a user when a call has camped on can be enabled or disabled. (This flag does not apply to DID or E&M calls. Those are programmed separately as described below.) In the default state, the tones are *enabled*.
- **CO Reseize:** (*Keyset only*) The ability to immediately reseize a trunk after disconnecting from a call can be enabled. In the default state, it is *disabled*.
- **Dial Pulse:** (*Single-line station only*) Single-line sets can be permitted to use pulse-dialing signals. This feature enables or disables that option. In the default state, this feature is set to *no*.
- **DID Camp-On Tones:** The tone that signals the user that a DID call has camped on can be enabled or disabled. In the default state it is *enabled*.
- **Do-Not-Disturb Allowed:** This option designates whether the station can be placed in Do-Not-Disturb. In the default state, it is *enabled*.
- **Do-Not-Disturb Override:** (*Keyset only*) The station can be given Do-Not-Disturb Override privilege that allows the user to place an intercom call to a station in Do-Not-Disturb. In the default state, it is *disabled*.

- **DTMF Feedback:** The progress tones that are normally sent to a voice computer can be replaced with DTMF "feedback" tones. These tones determine call status such as whether the call is ringing, has been answered, has been disconnected, or if the called station is in do-not-disturb, busy, or forwarded to an outside telephone number. If the voice computer cannot interpret the DTMF feedback tones, progress tones should be kept enabled. If feedback tones are enabled, the "extended" set of feedback tones can also be enabled in system-wide programming (see page 5-68). These extended tones include codes for indicating when a station is forwarded to another station and when the calling party hangs up. In the default state, feedback tones are set to *disabled*.
 - **E&M Camp-On Tones:** The tone that signals the user that an E&M call has camped on can be enabled or disabled. In the default state it is *enabled*.
 - **Handsfree:** (*Keyset only*) The station can be programmed to receive intercom calls handsfree, or handsfree answering can be disabled. (This can also be programmed at the keyset.) In the default state, Handsfree Answering is *enabled*.
 - **Headset:** (*Keyset only*) If a headset will be used on the keyset, it can be enabled through programming or by the keyset user. In the default state, it is *disabled*.
 - **LCR Facility Group Camp-On:** Determine whether the station will be allowed to camp-on to busy facility groups when the Least-Cost Routing feature is used. In the default state, it is *enabled*.
 - **Message Lamp:** (*Single-line station only*) Single-line sets can be equipped with a message waiting lamp. This feature enables or disables that option. In the default state, this option is set on *no*.
 - **Music Channel One/Two:** This option selects the music-on-hold channel that will be used by this station. The chosen music channel is used for background music to the station, and for music-on-hold when the user is placed on hold by another station or camps on to a resource. This can also be programmed by the station user. In the default state, channel *one* is selected.
 - **OHVA Receive/Transmit:** (*OHVA Receive appears for keysets only*) The station can be programmed to place off-hook voice announcements. Keysets can also be programmed to receive Off-Hook Voice Announce calls. In the default state, receive and transmit are *enabled*, but the system-wide flag must also be enabled to allow the feature to be used.
 - **Off-Premises Extension:** (*Single-line IDC circuits only*) This option appears for single-line IDC circuits that have been designated as OPX stations in the System Configuration window. It defaults to *yes* to increase gain by +3dB to compensate for the normal loss in OPX cabling between the 416/832 System and the off-premises site. If the station will actually be used on premises (e.g., connected to a voice mail unit), this option should be set to "no" to prevent DTMF digit recognition errors.
 - **Page Remove/Replace:** (*Keyset only*) If desired, the station can be removed from its page zone(s), or placed in again through programming or by the keyset user. In the default state, the stations are in *replace* mode.
 - **Redial Mode:** (*Keyset only*) Keyset users can use *last number dialed* or *last number saved* redial modes. This option can be programmed using this window, or at the keyset. In the default state, the stations are set for *dialed* mode.
 - **Ring Cadence:** (*Single-line station only*) Ring cadence can be set for normal or extended. The extended setting lengthens the duration of the ring signal to meet the requirements of OPX and/or repeater applications. The default setting is *normal*.
 - **Ring Intercom Always:** When this feature is enabled, all calls placed to keysets from this station are received as private calls. The feature can be enabled or disabled through programming or by the keyset user. In the default state, this feature is *disabled*.
 - **Ring Type for Off-Premises Extension:** (*Single-line IDC circuits only*) This option appears for single-line IDC circuits that have been designated as OPX stations in the System Configuration window. Determine whether the OPX uses AC or DC ringing, then select the appropriate option. (Refer to the card strapping information on page 3-50 in INSTALLATION.) The default setting is *AC*.
 - **Station Exchange:** This option, if enabled, allows a station user to enter a feature code and a password (see page 5-28) to exchange the extension numbers and station programming of two station circuits. See page 4-99 in FEATURES for details. In the default state this is *disabled*.
 - **Transparent LCR:** If this option is enabled, the user will hear dial tone while the LCR feature is selecting the trunk. If disabled, the user hears a progress tone, then digits being dialed. In the default state, this feature is *enabled*.
- 8.16 OK:** When finished, select the OK command button to return to the Station Programming window.

Miscellaneous Information																	
<p><u>A</u>ttendant: <input style="width: 80px;" type="text"/></p> <p><u>M</u>essage Center: <input style="width: 80px;" type="text"/></p> <p><u>A</u>lt. Message Source: <input style="width: 80px;" type="text"/></p> <p><u>T</u>enant <u>G</u>roup: <input style="width: 30px; text-align: center;" type="text" value="1"/></p> <p><u>D</u>epartment: <input style="width: 30px; text-align: center;" type="text" value="1"/></p> <p><u>R</u>eceive Gain: <input style="width: 60px;" type="text"/> dB</p> <p><u>T</u>ransmit Gain: <input style="width: 60px;" type="text"/> dB</p>	<p style="text-align: center;">Account Code Type</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td style="background-color: #cccccc;">Standard</td><td style="text-align: center;">↑</td></tr> <tr><td>Forced</td><td style="background-color: #cccccc;"></td></tr> <tr><td>LCR Toll</td><td style="background-color: #cccccc;"></td></tr> <tr><td>None</td><td style="text-align: center;">↓</td></tr> </table> <p><input type="checkbox"/> <u>V</u>alidate Account Code</p> <p>Account Code <u>I</u>ndex: <input style="width: 80px;" type="text"/></p> <p><u>C</u>lass-of-Service Account Code: <input style="width: 80px;" type="text"/></p> <p style="text-align: center;">Ring Zone</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td style="background-color: #cccccc;">Immediate</td><td style="text-align: center;">↑</td></tr> <tr><td>1</td><td style="background-color: #cccccc;"></td></tr> <tr><td>2</td><td style="background-color: #cccccc;"></td></tr> <tr><td>3</td><td style="text-align: center;">↓</td></tr> </table>	Standard	↑	Forced		LCR Toll		None	↓	Immediate	↑	1		2		3	↓
Standard	↑																
Forced																	
LCR Toll																	
None	↓																
Immediate	↑																
1																	
2																	
3	↓																
<input style="width: 80px; height: 25px;" type="button" value="Ok"/>																	

D. MISCELLANEOUS INFORMATION WINDOW

8.17 Determine the following information for each station. Refer to FEATURES for more information on each of these features. The program planning sheet for this window is located in Figure 5-4 on page 5-175.

- **Attendant station:** Determine which station (if any) will serve as the attendant for each station.
- **Message center:** Determine which station or hunt group (if any) will be assigned as message center for each station. The message center will receive messages after the Message timer expires.
- **Alternate Message Source:** (*Single-line station only*) Determine which station (if any) will be assigned as the alternate message source for each single-line station. The alternate message source was developed primarily for voice mail use. It allows voice mail ports to leave message waiting indications at stations, but when the station user retrieves the message the call is sent to the alternate message source hunt group rather than the specific voice mail port.
- **Tenant group and department:** Every station must be assigned to a tenant group and department.
- **Account code type/index:** The station can be assigned a standard, forced, or LCR toll account

code, or none. If it is a standard code, indicate which code by noting its code index (00-63 in standard systems, 000-119 in expanded systems). (The actual code is assigned in the Account Code window on page 5-54.)

- **Validate account code:** Forced account codes can be validated or non-validated. If they are validated and the entered code matches one of the pre-programmed forced account codes in the database, the call is allowed. If the code does not match, the call is blocked. If forced account codes are not validated, the code is not checked against any lists and the call is allowed as soon as the code is entered.
- **Class-of-service account code:** Assign the account code that this station user will enter (if using another station) to use his or her station's usual SCOS. It must match the programmed account code length (4-8 digits) and must be a unique account code that does not match any existing standard, forced, or class-of-service code.
- **Ring zones:** (*Single-line station only*) The system power supply's ring generator can provide ring voltage to ring up to 20 AC-ringing single-line stations simultaneously without any noticeable change in the ring tone. To preserve the ring tone quality, single-line stations should be divided into ring zones 1-3. All single-line sets are in the "immediate" ring zone in the default state.

- **Receive/Transmit gain:** (*OPX stations only*) Receive and transmit gain can be adjusted on an OPX-by-OPX basis if voice transmit or voice receive volume problems occur. You can adjust the receive gain and/or the transmit gain for individual circuits. Receive and transmit are measured from the perspective of the central office. That is, *receive gain* adjusts the signal that is *sent to the CO from the 416/832 System*. The signal that is *transmitted from the CO* is affected by adjusting the *transmit gain* on the 416/832 System.

8.18 ATTENDANT: Select the Attendant text box and type the circuit or extension number of the station that will serve as this station's attendant.

8.19 MESSAGE CENTER: To program a message center for the station, select the Message Center text box and type the desired station circuit, extension number, or hunt group number.

8.20 ALTERNATE MESSAGE SOURCE: To program an alternate message source for a single-line station, select the Alternate Message Source text box and enter the desired alternate message source's extension number.

8.21 TENANT/DEPARTMENT: The station must be assigned to a tenant group and a department. Select the Tenant Group text box and type the desired tenant group number. Then select the Department text box and enter the desired department number.

8.22 ACCOUNT CODE TYPE: Highlight and select the desired account code type in the list box. If a standard code type was assigned, the account code index text box changes from gray to black.

8.23 ACCOUNT CODE INDEX: Standard account codes require an index. To enter one, select the Account Code Index text box and type the index number (00-63 in standard systems, 000-119 in expanded systems).

8.24 VALIDATE ACCOUNT CODE: To program the system to validate forced account codes, place an X in the Validate Account Code check box by pressing the SPACE BAR or simultaneously pressing the ALT and V keys. (Repeat this process to remove the X.)

8.25 CLASS OF SERVICE ACCOUNT CODE: To enter the class of service account code, select the text box and enter the desired code. It must match the programmed account code length (4-8 digits) and must be a unique account code that does not match any existing standard, forced, or class-of-service code.

8.26 RING ZONE: When programming a single-line set, a ring zone list box will appear in the lower right corner, as shown below. Scroll the highlight bar to the desired ring zone. The single-line set is assigned to the zone that is highlighted.

Ring Zone

Immediate	↑
1	
2	
3	↓

8.27 RECEIVE GAIN: When programming an OPX, the receive gain may need to be adjusted. To set the receive gain, enter the gain amount in the Receive Gain text box (-9dB to +3dB for non-T1 trunks; -15dB to +15dB for T1 trunks).

8.28 TRANSMIT GAIN: When programming an OPX, the transmit gain may need to be adjusted. To set the transmit gain, enter the gain amount in the Transmit Gain text box (-3dB to +6dB for non-T1 trunks; -15dB to +15dB for T1 trunks).

8.29 OK: When finished with this window, select the OK command button to return to the Station Programming window.

Day/Night Mode Outgoing Access Programming

Include

001 All Lines	↑
002	
003	
004	
005	↓

Exclude

	↑
	↓

E. OUTGOING ACCESS — DAY OR NIGHT

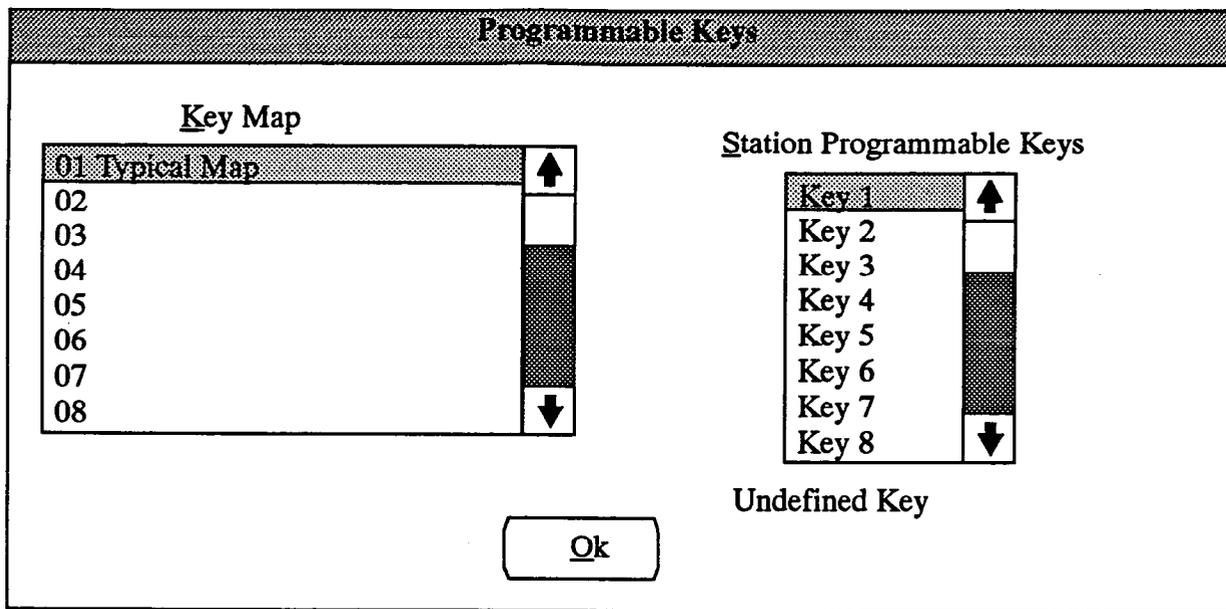
8.30 Outgoing-access assignments can be made on a station-by-station basis for day and night modes. The program planning sheet for this window is located in Figure 5-4 on page 5-175.

8.31 INCLUDE or EXCLUDE: To determine the trunk groups to which the station will have outgoing access, place the desired trunk groups in the Include list box. To include a trunk group, locate it on the Exclude list and select it by pressing the SPACE BAR; it will

automatically move to the Include list. To remove a trunk group from the list, locate it on the Include list and select it by pressing the SPACE BAR; it will automatically move to the Exclude list.

8.32 ALL or NONE: To allow outgoing access to all trunk groups or none, select the All or None command button.

8.33 OK: When the outgoing access list appears as desired, select the OK command button to return to the Station Programming window.



F. PROGRAMMABLE KEY PROGRAMMING WINDOW

8.34 The database can contain up to 20 maps (30 in expanded systems) of default values for the database-programmable feature keys. Determine the preferred key map for each station, and the default values of the keyset station programmable keys. The program planning sheet for this window is located in Figure 5-4 on page 5-175.

8.35 KEY MAP: To program the key map that will be used by this station, select the Key Map list box, and

scroll to the desired map number. The highlighted line indicates the selected map.

8.36 STATION PROGRAMMABLE KEYS: (*Keysets only*) Determine the function of each of the station programmable keys for this station. Then, scroll through the list, selecting (by pressing the SPACE BAR) and assigning each key (1-8) using the window shown on the next page.

8.37 OK: When finished with station programmable key programming, select the OK command button to return to the Station Programming window.

8.38 Each station programmable key can be assigned one of the following Key Types. When the Key Type is highlighted, the bottom half of the screen changes as follows:

- **Call Key:** A list box appears (as shown above) which allows you to indicate the call key (1-10) that will be assigned (according to the chosen key map).
- **DSS/BLF Key:** A text box like the one below appears which allows you to enter the circuit or extension number of station that will be accessed by this key.

Station:

- **Feature Key:** A list box (similar to the one shown above) appears which permits you to select the feature code that will be accessed by this key.
- **Forward Key:** If this key will be used for the Call Forwarding feature (FWD key), highlight this line. Nothing appears in the lower half of the window.
- **Hunt Group Key:** A list box (similar to the one shown above) appears which permits you to select the hunt group that will be accessed by this key.
- **IC/CO Speed Dial Key:** A list box (similar to the one shown above) appears which allows you to indicate the IC/CO speed-dial key (1-10) that will be assigned.

- **Individual Trunk Key:** A list box (similar to the one shown above) appears which permits you to select the individual trunk that will be accessed by this key.
- **Intercom (IC) Key:** If this key will be used as the IC key, highlight this line. Nothing appears in the lower half of the window.
- **Secondary Call Key:** To create a secondary call key, highlight this line. A list box appears (similar to the one shown above) which allows you to indicate the secondary call key that this will be (1-16). The station associated with the key is assigned as described on page 5-37.
- **SPCL Key:** If this key will be used as the SPCL key, highlight this line. Nothing appears in the lower half of the window.
- **Trunk Group Key:** A list box (similar to the one shown above) appears which permits you to select the trunk group that will be accessed by this key.
- **Undefined Key:** Use this selection if the key will not be used. Nothing appears in the lower half of the window.
- **User Programmable Key:** A list box (similar to the one shown above) appears which allows you to indicate the user-programmable key (1-9) that will be assigned.

8.39 OK or CANCEL: When finished with station programmable key programming, select the OK command button to return to the Station Programmable Key window. Or select the Cancel command button to exit without changing the key assignments.

Secondary Call Key Station Assignments																							
<p>Warning: Stations may be assigned to secondary call keys even though no secondary call keys exist in the keymap or as station programmable keys.</p>																							
<p style="text-align: center;">Secondary Call Keys</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 80%; border: 1px solid black; padding: 5px;"> <table style="width: 100%; border-collapse: collapse;"> <tr style="background-color: #cccccc;"> <td style="width: 10px; padding: 2px;">01—</td> <td style="border-right: 1px solid black; text-align: center;">↑</td> </tr> <tr> <td style="padding: 2px;">02—</td> <td style="border-right: 1px solid black;"></td> </tr> <tr> <td style="padding: 2px;">03—</td> <td style="border-right: 1px solid black;"></td> </tr> <tr> <td style="padding: 2px;">04—</td> <td style="border-right: 1px solid black; background-color: #cccccc;"></td> </tr> <tr> <td style="padding: 2px;">05—</td> <td style="border-right: 1px solid black;"></td> </tr> <tr> <td style="padding: 2px;">06—</td> <td style="border-right: 1px solid black;"></td> </tr> <tr> <td style="padding: 2px;">07—</td> <td style="border-right: 1px solid black;"></td> </tr> <tr> <td style="padding: 2px;">08—</td> <td style="border-right: 1px solid black;"></td> </tr> <tr> <td style="padding: 2px;">09—</td> <td style="border-right: 1px solid black;"></td> </tr> <tr> <td style="padding: 2px;">10—</td> <td style="border-right: 1px solid black; text-align: center;">↓</td> </tr> </table> </td> <td style="width: 20%; padding: 10px; vertical-align: top;"> <p>Station: <input style="width: 100%;" type="text"/></p> <p><input type="checkbox"/> Enable Ring Cadence</p> <p style="text-align: center;"><input type="button" value="Ok"/></p> </td> </tr> </table>		<table style="width: 100%; border-collapse: collapse;"> <tr style="background-color: #cccccc;"> <td style="width: 10px; padding: 2px;">01—</td> <td style="border-right: 1px solid black; text-align: center;">↑</td> </tr> <tr> <td style="padding: 2px;">02—</td> <td style="border-right: 1px solid black;"></td> </tr> <tr> <td style="padding: 2px;">03—</td> <td style="border-right: 1px solid black;"></td> </tr> <tr> <td style="padding: 2px;">04—</td> <td style="border-right: 1px solid black; background-color: #cccccc;"></td> </tr> <tr> <td style="padding: 2px;">05—</td> <td style="border-right: 1px solid black;"></td> </tr> <tr> <td style="padding: 2px;">06—</td> <td style="border-right: 1px solid black;"></td> </tr> <tr> <td style="padding: 2px;">07—</td> <td style="border-right: 1px solid black;"></td> </tr> <tr> <td style="padding: 2px;">08—</td> <td style="border-right: 1px solid black;"></td> </tr> <tr> <td style="padding: 2px;">09—</td> <td style="border-right: 1px solid black;"></td> </tr> <tr> <td style="padding: 2px;">10—</td> <td style="border-right: 1px solid black; text-align: center;">↓</td> </tr> </table>	01—	↑	02—		03—		04—		05—		06—		07—		08—		09—		10—	↓	<p>Station: <input style="width: 100%;" type="text"/></p> <p><input type="checkbox"/> Enable Ring Cadence</p> <p style="text-align: center;"><input type="button" value="Ok"/></p>
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G. SECONDARY CALL KEYS

8.40 Secondary call keys are first created in a key map in the Key Assignments window of Station Programming (page 5-44) and the secondary station is assigned to that key map. Or, if the key map for the secondary station contains station programmable keys, those keys can be designated as secondary call keys using the Programmable Key window on page 5-35. The window shown above is used to determine which primary station is associated with each secondary call key and whether the secondary station will ring when receiving a call on that secondary call key. A program planning sheet for this window is located in Figure 5-4 on page 5-175. For a full explanation of secondary call keys, refer to FEATURES, page 4-44.

8.41 SECONDARY CALL KEY: To select a secondary call key for programming, highlight the desired secondary call key number in the list box. You can then assign the associated primary station and/or enable ring cadence. To delete a secondary call key entry, highlight the entry to be deleted and press the SPACE BAR.

8.42 STATION: While the desired secondary call key is highlighted, press TAB to select the Station text box.

Type the extension number of the primary station that will be associated with this key. (If this is the first secondary call key associated with that station, it corresponds to call key #1 at the primary station; if this is the second key associated with that same station, it corresponds to call key #2 at the primary station; and so on.) Press RETURN. The primary station's extension number, circuit number, and description are shown next to the secondary call key number in the list box.

8.43 ENABLE RING CADENCE: To determine whether the secondary station will ring when receiving a call on the secondary key, highlight the desired secondary call key in the list box and then press TAB until the Enable Ring Cadence check box is highlighted. If the station should not ring, leave the box blank (or remove a previous X by pressing the SPACE BAR). To program the station to ring when receiving a call on the secondary key, place an X in the box by pressing the SPACE BAR or simultaneously pressing the ALT and E keys.

8.44 OK: When all secondary keys have been programmed for this station, select the OK command button to return to the Station Programming window.

Special Purpose Station

Station Type

Attendant	Yes	↑
Automated Attendant	No	
House Phone	No	
Message Center	No	
		↓

Stations Served

Ok

H. SPECIAL PURPOSE STATION WINDOW

8.45 The window shown above is an example of one that would appear for a keyset station. If a single-line station was being programmed, the options would be: Automated Attendant, FAX Station, House Phone, Message Center, and Voice Mail Station. Stations can be programmed to serve the following functions. Refer to FEATURES for more details on these special purpose stations. The program planning sheet for this window is located in Figure 5-4 on page 5-175.

- **Attendant:** (*Keysets only*) A keyset station can be designated as an attendant and assigned a list of stations that it will serve.
- **Automated Attendant:** If using *Extended* software, the station can be designated as an automated attendant. The recall destination and digit translation table for the automated attendant can also be programmed.
- **FAX Station:** (*Single-line station only*) A single-line station can be designated as a FAX station if the station circuit will be connected to a facsimile machine. The FAX message station can also be assigned.
- **House Phone:** The station can be designated as a house phone that automatically dials a predetermined number when the handset is lifted. The assigned day number is dialed when the system is in day mode and the assigned night number is dialed when the system is in night mode. The day/night house phone numbers can also be programmed using the house phone station speed-dial locations.
- **Message Center:** A station can be designated as a message center and assigned a list of stations that it will serve.
- **Voice Mail Station:** (*Single-line station only*) A single-line station can be designated as a voice mail station if the circuit is connected to a voice mail unit.

8.46 STATION TYPE: Select the Station Type list box, then select the desired option to change the Yes/No status.

- **Attendant:** When Attendant status is "Yes," a Stations Served command button appears to the right of the list box as shown on the previous page. Select this command button to assign the stations that will be served by this attendant. The following window appears.

— **INCLUDE or EXCLUDE:** To include a station, locate it on the Exclude list and select it by pressing the SPACE BAR; it will automatically move to the Include list. To remove a station, select it in the Include list to move it to the Exclude list.

NOTE: A station can only be served by one attendant. Including a station in an attendant's lists removes it from its previous attendant's list.

- **ALL or NONE:** To include all stations, select the All command button. To delete all stations, select the None command button.
- **OK or CANCEL:** When the station lists appear as desired, select the OK command button to exit and record your changes or select the Cancel command button to exit without saving changes.
- **SORT:** To sort the stations and list them numerically by extension number or circuit number, or

to list them alphabetically by name, select the Sort command button. The window appears as follows. Choose the desired sorting method by selecting the corresponding option button. Then select the OK command button. When the list of stations returns, the list box will show the stations in the selected order. To exit without changing the sorting method, select the Cancel command button.

- **Automated Attendant: (Extended software only)** When the Automated Attendant status is "Yes," a text box labeled "Recall Destination" appears as shown below. Select this text box and enter the extension or circuit number of the station that will receive this automated attendant station's recalls. Also, text boxes for the Digit Translation feature are given. Select the text box for the desired digit and type the extension number that will be dialed when a caller enters that digit.

Recall Destination:

<u>D</u> igit T <u>r</u> anslation	1:	<input type="text"/>	6:	<input type="text"/>
	2:	<input type="text"/>	7:	<input type="text"/>
	3:	<input type="text"/>	8:	<input type="text"/>
	4:	<input type="text"/>	9:	<input type="text"/>
	5:	<input type="text"/>	0:	<input type="text"/>

- **FAX Station :** (*Single-line station only*) When the FAX Station status is changed to "Yes," a text box appears, as shown below, that is used for designating the station that will receive a message indication whenever a FAX is received. Select the Message Center box and type the circuit or extension number of the desired FAX message station.

Message Center:

- **House Phone:** When the House Phone status is "Yes," two text boxes appear as shown below. Select the "Day Number" box to enter the extension or outside number (up to 16 digits) that will be dialed when the house phone is used during the day. Select the "Night Number" text box to enter the number (up to 16 digits) that will be accessed when the system is placed in night mode. (These numbers can also be programmed at the house phone station by entering the day number in the outside number location of station speed-dial location 1 and the night number in the outside number location of station speed-dial location 2.) When entering an outside number, enter a trunk group access code or the LCR code before the telephone number. In numbers that are routed through a trunk group, you can enter a short pause by entering an S, a long pause by entering an L, or a hookflash by entering an F.

Day Number:

Night Number:

NOTE: If a station is programmed as both a house phone and an automated attendant, the numbers programmed in speed-dial locations 1 and 2 will also appear as digit translations 1 and 2. The house phone programming overrides the automated attendant programming for the first two speed-dial locations.

- **Message Center:** When Message Center status is "Yes," a Stations Served command button appears to the right of the list box as shown on page 5-38. Select this command button to assign the stations that will be served by this station. A station list window appears as shown for attendant programming. To assign the stations to the message center, use the methods as described for attendant stations on the preceding page.
- **Voice Mail Station:** (*Single-line station only*) If the single-line station circuit will be connected to a voice mail unit, change the status to "Yes." No additional information is requested in this window.

NOTE: When a voice mail unit is connected to an IDC circuit, the off-premises extension option described on page 5-31 must be set to "no" to prevent DTMF digit recognition errors.

8.47 OK: When finished with special purpose station programming, select the OK command button to return to the Station Programming window.

System Forwarding		
Forwarding Paths	<div style="border: 1px solid black; padding: 2px;">1. Sample: Secretary/VMail 110 209</div> <div style="border: 1px solid black; padding: 2px;">2.</div>	<input type="button" value="↑"/> <input type="button" value="↓"/>
<input type="button" value="Ok"/>		
Forwarding Path 1	Forwarding Path 2	Forwarding Path 3
Forward Call Types <input type="checkbox"/> Ring-In <input type="checkbox"/> Transfer <input type="checkbox"/> IC Calls <input type="checkbox"/> Recall <input type="checkbox"/> DISA/AA <input checked="" type="checkbox"/> DID <input checked="" type="checkbox"/> E&M	Forward Call Types <input type="checkbox"/> Ring-In <input type="checkbox"/> Transfer <input type="checkbox"/> IC Calls <input type="checkbox"/> Recall <input type="checkbox"/> DISA/AA <input type="checkbox"/> DID <input type="checkbox"/> E&M	Forward Call Types <input type="checkbox"/> Ring-In <input type="checkbox"/> Transfer <input type="checkbox"/> IC Calls <input type="checkbox"/> Recall <input type="checkbox"/> DISA/AA <input type="checkbox"/> DID <input type="checkbox"/> E&M
Station Conditions <input type="checkbox"/> Busy <input type="checkbox"/> No Answer <input type="checkbox"/> DND <input checked="" type="checkbox"/> Immediate	Station Conditions <input type="checkbox"/> Busy <input type="checkbox"/> No Answer <input type="checkbox"/> DND <input type="checkbox"/> Immediate	Station Conditions <input type="checkbox"/> Busy <input type="checkbox"/> No Answer <input type="checkbox"/> DND <input type="checkbox"/> Immediate
System Conditions <input checked="" type="checkbox"/> Day Mode <input checked="" type="checkbox"/> Night Mode	System Conditions <input type="checkbox"/> Day Mode <input type="checkbox"/> Night Mode	System Conditions <input type="checkbox"/> Day Mode <input type="checkbox"/> Night Mode
<input checked="" type="checkbox"/> Ring Principal Once	<input type="checkbox"/> Ring Principal Once	<input type="checkbox"/> Ring Principal Once

I. SYSTEM FORWARDING

8.48 The forwarding path assignment is made on a station-by-station basis. Refer to FEATURES, page 4-79 for more details on system forwarding. The program planning sheet for this window is located in Figure 5-4 on page 5-175.

8.49 FORWARDING PATHS: To select the forwarding path to be programmed for the station, move the highlight bar in the list box to the desired path number. You now have two programming options for that Forwarding Path number:

- To assign, delete, or change a forwarding path for this path number, highlight the path number in the list box and press the SPACE BAR. A list box will appear that shows "000 No Forwarding Path" and a list of forwarding path numbers. To delete the path, highlight the "000" line and press the SPACE BAR to select it. To change the path, highlight the desired path and press the SPACE BAR.
- If a forwarding path has not been assigned to that number, the Forwarding Path column (1, 2, or 3) in the lower half of the window is grey; assign a path as described above to change the column to black. When the column is black, programming can be performed as described in the following paragraphs.

8.50 FORWARD CALL TYPES: Determine the types of calls that will follow the forwarding path by highlighting each desired call type and pressing the SPACE BAR to place an X in the check box. In the sam-

ple shown in Forwarding Path 1 above, only calls through DID or E&M will be sent to the forwarding path. In the default state, all but Recalls and IC calls are selected.

8.51 STATION CONDITIONS: Determine which station conditions will cause the calls to follow the forwarding path by highlighting the desired station condition(s) and pressing the SPACE BAR to place an X in the desired check box(es). In the sample shown in Forwarding Path 1 above, calls will be sent to the forwarding path immediately. In the default state, all but Immediate are selected. Note that if any condition other than Immediate is selected, Immediate cannot be selected.

8.52 SYSTEM CONDITIONS: Indicate whether calls will follow the forwarding path in day and/or night mode by highlighting the desired system condition(s) and pressing the SPACE BAR to place an X in the desired check box(es). In the sample shown in Forwarding Path 1 above, calls are forwarded during both day and night modes. In the default state, both day and night mode are selected.

8.53 RING PRINCIPAL ONCE: If the principal station is a keyset and the user wishes to hear a single ring signal each time a call enters the forwarding path, select the Ring Principal Once check box to place an X in it. In the default state, this is not selected.

8.54 OK: When all forwarding paths are programmed, select the OK command button to exit to the System Forwarding window.

Toll Restriction Information			
<u>SCOS Restrictions</u>	Day	Night	
(1) Operator Access	No	No	↑
(2) Toll Access	No	No	↓
(3) International Access	No	No	↓
(4) Eight Digit Access	No	No	↓
(5) Area/Office Code	No	No	↓
(6) LCR Only	No	No	↓
(7) Alternate Carriers	No	No	↓
(8) Allowed Long Distance	No	No	↓
<div style="border: 1px solid black; padding: 5px; display: inline-block; margin-bottom: 10px;">Toggle <u>D</u>ay Mode</div> <div style="border: 1px solid black; padding: 5px; display: inline-block; margin-bottom: 10px;">Toggle <u>N</u>ight Mode</div> <input type="checkbox"/> Night <u>F</u> ollow Day <div style="border: 1px solid black; padding: 5px; display: inline-block; margin-bottom: 10px;">Ok</div>			
<u>User Group</u>	<u>LCR Advance Limit</u>		
01	Unlimited		↑
02	No Advances		↓
03	01 Advances		↓
Day Mode			
01	Unlimited		↑
02	No Advances		↓
03	01 Advances		↓
Night Mode			

J. TOLL RESTRICTION INFORMATION WINDOW

8.55 Determine the following toll restriction information for each station. Refer to FEATURES, page 4-27, for a full explanation of toll restrictions. The program planning sheet for this window is located in Figure 5-4 on page 5-175.

- **Station class of service (SCOS):** Determine which SCOS designations the station will have during day and night modes.
- **Day/night mode toll restriction user group:** Determine which user group the station is assigned to in day and night modes.
- **Day/night mode LCR advance limit:** When a call is placed using LCR, the most economical facility groups are accessed first. The LCR advance limit (0-22 or unlimited) sets the number of facility group levels the station will access. Determine the number of advances the station will be allowed during day and night modes.

CAUTION

REGARDING EMERGENCY NUMBERS

In areas where the emergency number is 1911, be sure that toll-restricted stations have SCOS 8 (Enable ALD) and that 911 is in the allowed long distance number list. Otherwise, toll-restricted users may not be able to find a station that is permitted to dial "1+" numbers. Note that 911 is allowed at every station regardless of toll restriction, but 1911 requires this special programming.

8.56 SCOS RESTRICTIONS: This list box contains all of the possible SCOS restrictions. Determine the SCOS restrictions that should be assigned to the station for day and night modes. To program the day and/or night mode SCOS, use a combination of the Toggle command buttons, the Night Follow Day check box, and the list box as described below:

- *To change only the day mode SCOS:* Highlight the desired line in the list box and press the SPACE BAR. OR, highlight the desired line in the list box and then select the Toggle Day Mode command but-

ton. The day mode will toggle between Yes and No each time the SPACE BAR is pressed or the command button is selected.

- *To change only the night mode SCOS:* Highlight the desired line in the list box and then select the Toggle Night Mode command button. The night mode will toggle between Yes and No each time the command button is selected.
- *To match the day and night mode SCOS settings and change them simultaneously:* Place an X in the Night Follow Day check box by highlighting it and pressing the SPACE BAR (pressing SPACE BAR again will remove the X). Then highlight the desired line in the SCOS Restrictions list box and press the SPACE BAR. If the day and night modes were not the same, only the day mode status will change. If day and night modes match, each time you press the SPACE bar the status of both will toggle between

Yes and No. (The Toggle Night Mode command button will not function, and selecting the Toggle Day Mode command button will change both day and night modes, when this option is enabled.)

8.57 USER GROUP DAY/NIGHT: Determine the toll restriction user group for the station being programmed. Then select the User Group list box and highlight the desired user group number. The black line indicates the selected user group.

8.58 LCR ADVANCE LIMIT DAY/NIGHT: To program how many levels of facility groups the station will be permitted to access when LCR is used, select the LCR Advance Limit list box and scroll to the desired number (Unlimited, No Advance, or 1-30 Advances). The black line indicates the selected advance limit.

8.59 OK: When finished, select the OK command button to return to the Station Programming window.

9. STATION PROGRAMMING — BATCH PROGRAMMING OPTIONS

9.1 When Station Programming is selected from the Applications Menu window, the menu expands to show the following options:

Station Programming...
 Individual Station Information
 Key Assignments
 Ring Zone Programming
 Station Features

9.2 The Individual Station Information option is described beginning on page 5-25. The remaining options apply to batch programming of key assignments, ring zones, and station features. They are described in the following pages.

A. KEY ASSIGNMENTS (KEY)

9.3 The window shown below is a sample from the IMX System. The Key Assignments window can be

reached by selecting Key Assignments from the Station Programming menu or entering the KEY command. The program planning sheets are in Figure 5-5 on page 5-178. The window is used for performing the following programming tasks for keysets, DSS/BLF Units, and single-line sets.

- Name the key maps.
- Determine the layout of the keys for the station instrument(s) that will use each key map. Note that when a key is designated on one type of keyset or single-line set, it will appear on the corresponding key in all stations in that key map.
- Assign the station that will use each map.
- Determines the default values for the user-programmable keys and, if desired, updates selected stations.

9.4 There can be up to 20 keyset map groups and 8 DSS/BLF map groups in a standard system. In an expanded system there can be 30 keyset map groups and 12 DSS/BLF groups.

Key Assignments

Actions
Setup
Exit

Keyset Map Groups

01 Typical map	↑
02	↓
03	↓
04	↓
05	↓

Keyset Map View Type

IMX 8-Line Keyset	↑
IMX 12-Line AIM	↓
IMX 12-Line Keyset	↓
IMX 24-Line AIM	↓
IMX 24-Line Keyset	↓

Station List

Keyset Descr.

User Prg Keys

DSS Map Groups

01 Default DSS Map 1	↑
02 Default DSS Map 2	↓
03	↓
04	↓
05	↓

Digital DSS Map View

Single Line Map Programming

ESLS	↑
SLI	↓

DSS 1&2 List

DSS 3&4 List

Default Sets

DSS Descr.

Exit

9.5 Refer to the proper page for the type of station instrument you wish to program:

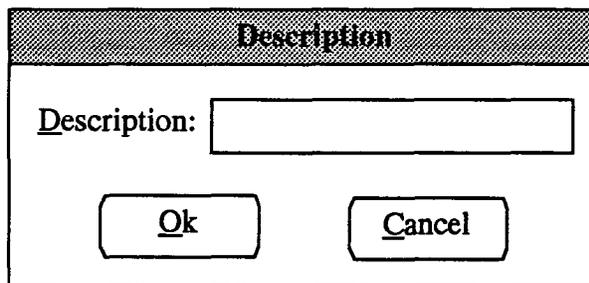
- Keypad programming begins on the next page.
- DSS/BLF programming begins on page 5-47.
- Single-line set programming begins on page 5-48.

NOTE: For more information on the GX and GMX station instruments, see appendixes A and B in the back of this manual.

To Program Keypad Key Assignments

9.6 The keypad programming procedures are described in the following paragraphs.

9.7 **KEYSET DESCR:** To enter a keypad map group name (or change a previously programmed name), highlight the desired line in the Keypad Map Groups list box and then select the Keypad Descr command button. The following window appears. Type the name in the text box and select the OK command button to accept the change. Select the Cancel command button to exit without saving any changes.



9.8 **KEYSET MAP GROUPS and KEYSET MAP VIEW TYPE:** To assign the common keys for the instruments in the map group perform the following steps. The default values of the keysets are represented in the illustrations at the end of SPECIFICATIONS and in the program planning sheets that begin on page 5-178.

- (1) Select the Keypad Map View Type box and scroll the highlight bar to the desired keypad type.
- (2) Select the Keypad Map Group box and choose the map group by highlighting it and pressing the SPACE BAR. A map of the selected keypad type appears.
- (3) Locate the key(s) to be programmed. The keys are grouped together according to location on the keypad.

To move from group to group, use the TAB key.

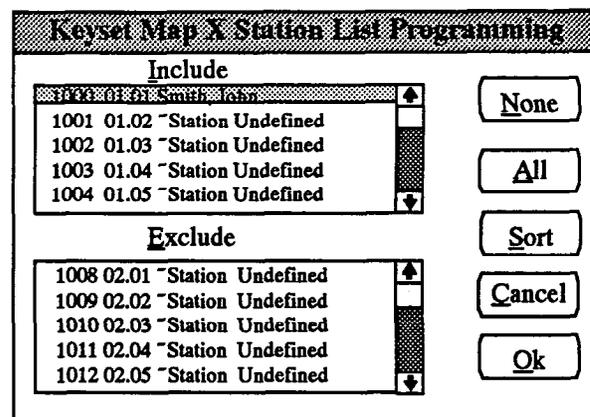
To move within the group, use the arrow keys.

To view a key, highlight it. Its current value appears in the box at the bottom of the map.

To program a key, select it. The Key Programming window shown on page 5-49 appears.

NOTE: Key assignments within a keypad map are common to all keypad types in that map. Modifying a key changes that key assignment for ALL keysets assigned to that map, regardless of keypad type. For example, if the top left key is changed to a user-programmable key for IMX 24-line keysets in Keypad Map Group 1, the top left key will also be user-programmable on IMX 12-line and 8-line keysets in Keypad Map Group 1.

9.9 **STATION LIST:** To assign the stations to a keypad map, highlight the desired map in the Keypad Map Groups list box and then select the Station List command button. A window with Include and Exclude station list boxes appears (as shown below) to allow you to select the stations that will use the keypad map that you have programmed.



- **INCLUDE or EXCLUDE:** To include a station in the keypad map group, locate that station on the Exclude list and select it by pressing the SPACE BAR; it will automatically move to the Include list. To remove a station from the keypad map group, you must exit and select another keypad map group and include the station there. This procedure ensures that a keypad is always assigned to a map group.
- **ALL:** To include all stations in the keypad map group, select the All command button. (The None button cannot be used in this window.)
- **OK or CANCEL:** When the station lists appear as desired, select the OK command button to accept the change. To exit from the window without saving changes, select the Cancel command button.

- **SORT:** To sort the stations and list them numerically by extension number or circuit number, or to list them alphabetically by name, select the Sort command button. The following window appears. Choose the desired sorting method by selecting the corresponding option button. Then select the OK command button. When the list of stations returns, the list box will show the stations in the selected order. To exit without changing the sorting method, select the Cancel command button.

The dialog box titled "Station Sorting Method" contains a section labeled "Ordering" with three radio button options: "By Extension" (selected), "By Circuit", and "By Name". To the right of these options are two buttons: "Ok" and "Cancel".

- 9.10 USER PRG KEYS:** Select this command button to assign the default value of the user-programmable keys in each keyset map; the following window appears. When the desired key is selected, the procedure for assigning the key value is the same as described for keyset map keys on page 5-49, except that the options include only: Feature Key, Trunk Group key, or Undefined key. The new values will be assigned to the keys when the user enters the Feature Key Default feature code (325) or the programmer selects the Default Set command button shown on page 5-44 and described in the next paragraph.

The dialog box titled "User Programmable Key Default Programming" contains a section labeled "User Programmable Default Keys" with a list of nine items: "User Programmable Key Number-- 1" through "User Programmable Key Number-- 9". Each item has a vertical bar to its right with an upward arrow at the top and a downward arrow at the bottom. To the right of the list is an "Ok" button.

- 9.11 DEFAULT SETS:** (Command button shown in the window on page 5-44.) When user-programmable key values have been changed, you can allow the users to update their own stations by entering the Feature Key Default feature code (325), or you can use the Default Sets command button to update stations in selected key maps. When the Default Sets command button is selected, the following window appears. Select the desired map groups as described below. The stations in the selected maps will be updated with the new default values when you exit from the Key Assignments window and perform the database update.

The dialog box titled "Force Keys/ESLS/SLI User Prog Keys Update" contains two list boxes: "Map Group Pick List" and "Map Group Update List". The "Map Group Pick List" contains a header "ESLS/SLI Devices:" followed by "Keyset Map Group 01" through "Keyset Map Group 07". The "Map Group Update List" is currently empty. Below the lists are three buttons: "Ok", "All", and "None".

- **MAP GROUPS PICK LIST and MAP GROUP UPDATE LIST:** Select the map groups to be updated in the pick list. They automatically move to the update list. The pick list includes all 20 keyset maps and the single-line map.
- **ALL or NONE:** To include all key map groups in the update list, select the All command button. To exclude all key map groups, select the None command button.
- **OK:** When all of the desired map groups are in the update list, select the OK command button. This list will remain as programmed until an update to the database is performed. The Key Assignments window returns.

To Program DSS/BLF Unit Key Assignments

9.12 The DSS/BLF programming portion of the Key Assignments window (from page 5-44) is shown above. The programming procedures are as follows.

9.13 **DSS MAP GROUPS:** While the DSS map group is *highlighted*, all other programming pertains to that map group. When a map is *selected* from the DSS Map Groups list, an illustration of the DSS key layout appears. Select the key for which you wish to assign a new value, and refer to the Key Programming window on page 5-49.

9.14 **DIGITAL DSS MAP VIEW:** Placing an X in this box changes the DSS Map display to the Digital DSS layout (6 rows, 10 columns) instead of the Analog DSS layout (10 rows, 6 columns). To place an X in the check box, highlight it and press the SPACE BAR (pressing SPACE BAR again will remove the X).

9.15 **DSS DESCR:** Select the DSS Descr button to enter a name for the DSS map group. The following window appears. Type the name in the text box and select the OK button. To exit without saving any changes, select the Cancel button.

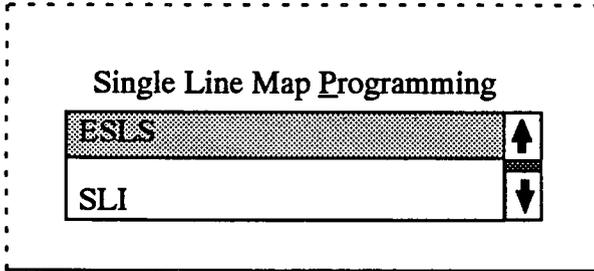
9.16 **DSS LISTS:** When the DSS 1&2 List or DSS 3&4 List command button is selected, the following list boxes appear which allow you to select the DSS station(s) that will use the map. The list box contains only

those circuits that have been designated as DSS/BLF stations in Attendant Programming (see page 5-136).

- **INCLUDE or EXCLUDE:** To include a DSS station in the DSS map group, locate the circuit number on the Exclude list and select it by pressing the SPACE BAR; it will automatically move to the Include list. To remove a station from the DSS map group, you must exit and select another map group and include it there. This procedure ensures that a DSS is always assigned to a map group.
- **ALL:** To include all DSS circuits in the DSS map group, select the All command button. (The None command button cannot be used in this window.)
- **OK or CANCEL:** When the DSS lists appear as desired, select the OK command button. To exit without saving changes, select the Cancel button.
- **SORT:** To sort the stations and list them numerically by extension number or circuit number, or to list them alphabetically by name, select the Sort command button. The following window appears. Choose the desired sorting method by selecting the corresponding option button. Then select the OK command button. When the list of stations returns, the list box will show the stations in the selected order. To exit without changing the sorting method, select the Cancel button.

To Program Single-Line Set Key Assignments

9.17 The single-line set programming portion of the Key Assignments window (from page 5-44) is shown below.



9.18 SINGLE-LINE MAP PROGRAMMING: Select the ESLS or SLI key map from the Single-Line Programming list box. A map of the station type you have selected appears. When you select the key you wish to program from the map, the key programming window shown on the next page appears. The new values will be assigned to the keys when the user enters the Feature Key Default feature code (325) or the programmer selects the Default Set command button shown on page 5-44 and described in paragraph 9.11.

Key Programming Screen

9.19 KEY TYPE: Key type options are described below. Different options are available for keysets, single-line sets, and DSS/BLF Units.

- **Keysets:** The available options for keyset keys are as follows. All keysets *must* have a SPCL key, an IC key, and a SPKR key.
 - Call key for call access
 - DSS/BLF key for one-key dialing of an extension or pilot number and, if the key has a lamp, provides a busy lamp field status of the station or hunt group
 - Feature key for one-key dialing of feature codes (cannot be programmed by the user and is the same for all stations in the key map)
 - Forward key that can be programmed by the user to access any of the Call Forward feature codes
 - Hunt Group key for one-key dialing of a hunt group pilot number and, if the key has a lamp, shows the status of the hunt group
 - IC/CO Speed-Dial (SD) key for one-key dialing of one extension number and one outside number and, if the key has a lamp, shows the status of the extension programmed in the intercom portion of the key
 - Individual Trunk key for direct access to a single trunk
 - Intercom (IC) key for intercom channel access
 - Secondary Call key that is associated with a primary station (see page 5-37)
 - SPCL key for signaling the system before a feature code is entered
 - Station Programmable key for feature code dialing (individually programmed in the database for each keyset, but cannot be changed by user)
 - Trunk Group key for one-key dialing of a trunk group access code. If the key has a lamp, it will light if all trunks in the group are busy.
 - Undefined key for unused key
 - User Programmable key for feature code access (individually programmed for each keyset *and* can be changed by user)
- **Single-Line Sets:** The available options for single-line sets are as follows. All keys are programmed the same for all single-line sets in the map *and* can be changed by the users.
 - Feature key for feature code access
 - Trunk Group key for one-key dialing of a trunk group access code
 - Undefined key for unused key

- **DSS:** For DSS/BLF keys, the choices are:
 - DSS/BLF key for one-key dialing of an extension or pilot number and provides a busy lamp field status of the station or hunt group
 - Feature key for one-key dialing of feature codes (cannot be programmed by the user and is the same for all DSS/BLF Units in the key map)
 - System Speed Dial key for one-key dialing of system speed-dial numbers.
 - Hunt Group key for one-key dialing of a hunt group pilot number and shows the status of the hunt group
 - Undefined key

9.20 To determine the key assignment:

- If Call key is selected, the next available call key number (1-10) is assigned to that key.
- If DSS/BLF key is selected, the following text box and message appear. Enter the circuit or extension number of the station that will appear under the selected DSS/BLF key or press F2 to select the station from a list.

Extension:

Press F2 for a list
of available extensions.

- If a Feature, Individual Trunk, or Trunk Group key is selected, a list box appears (as shown on the previous page) that gives the options for that key. Select the feature, trunk, or trunk group as desired.
- If a Hunt Group key is selected, the following text box and message appear. Enter the pilot number of the desired hunt group or press F2 to select the desired hunt group from a list.

Extension:

Press F2 for a list
of available extensions.

- If Forward, IC, or SPCL key is selected, the function is assigned to the key.
- If IC/CO Speed-Dial key is selected, the list box shows the available keys. Select the desired IC/CO speed-dial key number (0-9) to assign to that key.
- If Secondary Call key is selected, the next available secondary call key (1-16) is assigned to that key.
- If Station Programmable key is selected, the list box shows the available keys. Select the desired station programmable key number (1-8) to assign to that key.
- If System Speed Dial key is selected, the list box shows the available keys. Select the desired system speed dial location number (000-499) to assign to that key.
- If User Programmable key is selected, the list box shows the available keys. Select the desired user programmable key number (1-9) to assign to that key.
- If the key will not be used, highlight the Undefined key line in the list box.

NOTE: Be careful not to assign the same key in two different locations, such as the SPKR, IC, or feature key, unless the users have a specific application that requires it.

9.21 OK or CANCEL: When the key has been programmed as desired, select the OK command button. Or, to leave the key unchanged, select the Cancel command button.

9.22 EXIT: (Shown in the window on page 5-44.) When finished with all key map programming, select the Exit command button. A window appears that asks "Perform Update to Database?" To update the database and exit to the Applications Menu window, select the Yes button. Or select the No command button to exit without saving any changes. To return to the window on page 5-44, select the Cancel button.

B. RING ZONE PROGRAMMING (ZONE)

9.23 The power supply's ring generator can provide power to ring up to 20 AC-ringer equipped single-line stations simultaneously without any noticeable change in the ring tone. If there are more than 20 AC-ringer equipped single-line sets that would ring at the same time, they should be removed from the immediate zone and divided up among zones 1-3 so that no more than 20 sets ring at once. This window can be reached by selecting Ring Zone programming in the Station Programming menu or entering the ZONE command. The program planning sheet is in Figure 5-6 on page 5-189. For more information regarding the feature, refer to page 4-25 in FEATURES.

9.24 RING ZONES: Select the ring zone you wish to program. A list box appears as shown below that contains only single-line stations.

- **INCLUDE or EXCLUDE:** To include a station in the ring zone group, locate that station on the Exclude list and select it by pressing the SPACE BAR; it will automatically move to the Include list. To re-

move a station from the ring zone group, you must exit and select another ring zone group and include the station there. This procedure ensures that a station is always assigned to a ring zone group.

- **ALL:** To include all stations in the ring zone group, select the All command button. (The None command button cannot be used in this window.)
- **OK or CANCEL:** When the station lists appear as desired, select the OK command button. To exit from the window without saving changes, select the Cancel command button.
- **SORT:** To sort the stations and list them numerically by extension or circuit number, or to list them alphabetically by name, select the Sort command button. The window appears as shown on the next page. Choose the desired sorting method by selecting the corresponding option button. Then select the OK command button. When the list of stations returns, the list box shows the stations in the selected order. To exit without changing the order, select the Cancel command button.

9.25 EXIT: When finished programming, select the Exit command button shown in the window on the previous page. A window appears that asks "Perform Update to Database?" To update the database and exit to the Applications Menu window, select Yes. Or, select No to exit without saving any changes. To return to the Ring Zones programming window, select the Cancel button.

Station Features	
<u>A</u> ctions	<u>S</u> etup <u>E</u> xit
<ul style="list-style-type: none"> Allow Private Intercom Override Auto Att/VM/DISA DND Breakthrough Automatic Answer On CO Calls Automatic Answer On IC Calls Barge Receive Enabled Barge Transmit Enabled Camp-On Tones Disabled CO Reseize Enabled Dial Pulse Enabled DID Camp-on Tones Disabled Do-Not-Disturb Allowed Do-Not-Disturb Override Allowed DTMF Feedback Enabled E&M Camp-on Tones Disabled 	 
<div style="border: 1px solid black; padding: 5px; display: inline-block;">Exit</div>	

C. STATION FEATURES (SFEA)

9.26 The window shown above is used to assign a station feature to a group of stations. It is accessed by selecting Station Features from the Station Programming menu or entering the SFEA command. Station features included in this program are the same as most of those in the Miscellaneous Flags window of Individual Station programming as described on page 5-30. Determine which station will use each of the following features. Note that some are keyset only or single-line set only features. The program planning sheet is in Figure 5-7 on page 5-190.

- Allow Private Intercom Override
- Auto Attendant/VM/DISA Do-Not-Disturb Breakthrough
- Automatic Answer On CO Calls (keysets only)
- Automatic Answer On IC Calls (keysets only)
- Barge Receive Enabled
- Barge Transmit Enabled (keysets only)
- Camp-On Tones Disabled
- CO Reseize Enabled (keysets only)
- Dial Pulse Enabled (single-line stations only)
- DID Camp-on Tones Disabled
- Do-Not-Disturb Allowed
- Do-Not-Disturb Override Allowed (keysets only)

- DTMF Feedback Enabled
- E&M Camp-on Tones Disabled
- Handsfree Enabled (keysets only)
- Headset Enabled (keysets only)
- LCR Facility Group Camp-on Allowed
- Message Lamp Enabled (single-line stations only)
- Music Channel One Enabled
- Off-Hook Voice Announce Receive Enabled (keysets only)
- Off-Hook Voice Announce Transmit Enabled
- Off-Premises Extension — No (single-line stations only)
- Page Remove Enabled (keysets only)
- Redial Mode — Last Number Dialed (keysets only)
- Ring Cadence Extended
- Ring Intercom Always Enabled
- Ring Type for OPX — DC
- Station Exchange Enabled
- Transparent LCR Enabled

9.27 STATION FEATURES: Highlight and select the station feature you wish to assign to a group of stations. A station list box appears as shown on the next page.

Feature Name	
Include	
1000 01.01 Smith, John	↑
1001 01.02 ~Station Undefined	
1002 01.03 ~Station Undefined	
1003 01.04 ~Station Undefined	
1004 01.05 ~Station Undefined	↓
Exclude	
1008 02.01 ~Station Undefined	↑
1009 02.02 ~Station Undefined	
1010 02.03 ~Station Undefined	
1011 02.04 ~Station Undefined	
1012 02.05 ~Station Undefined	↓

None

All

Sort

Cancel

Ok

- **INCLUDE or EXCLUDE:** To add to the list of stations with that feature, locate the desired station on the Exclude list and select it by pressing the SPACE BAR; the station will automatically move to the Include list. To remove a station from the list, select the station in the Include list to move it to the Exclude list.
- **ALL or NONE:** To include all stations in the list of stations with that feature, select the All command button. To exclude all stations, select the None command button.
- **OK or CANCEL:** When the station lists appear as desired, select the OK command button. To exit from the window without saving changes, select the Cancel command button. The station features win-

dow (see previous page) reappears after either of these command buttons is selected.

- **SORT:** To sort the stations and list them numerically by extension number or circuit number, or to list them alphabetically by name, select the Sort command button. The following window appears. Choose the desired sorting method by selecting the corresponding option button. Then select the OK command button. When the list of stations returns, the list box will show the stations in the selected order. To exit without changing the sorting method, select the Cancel command button.

Station Sorting Method	
Ordering	
<input checked="" type="radio"/> By <u>E</u> xtension	<div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;">Ok</div> <div style="border: 1px solid black; padding: 5px;">Cancel</div>
<input type="radio"/> By <u>C</u> ircuit	
<input type="radio"/> By <u>N</u> ame	

9.28 EXIT: When finished programming, select the Exit command button (shown on the preceding page). A window appears that asks "Perform Update to Database?" To update the database and exit to the Applications Menu window, select Yes. Or, select No to exit without saving any changes. To return to the Station Features programming window, select the Cancel button.

Account Code Information																										
<p><u>A</u>ctions <u>S</u>etup <u>E</u>xit</p>																										
<p>WARNING: Changing the Account Code Length Erases All Previously Defined Account Codes.</p>																										
<p>Current Account Code Length: 4</p>																										
<u>F</u> orced	<u>S</u> tandard																									
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td style="background-color: #cccccc;">000</td><td style="text-align: center;">↑</td></tr> <tr><td>001</td><td></td></tr> <tr><td>002</td><td style="background-color: #cccccc;"></td></tr> <tr><td>003</td><td></td></tr> <tr><td>004</td><td></td></tr> <tr><td>005</td><td style="text-align: center;">↓</td></tr> </table>	000	↑	001		002		003		004		005	↓	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td style="background-color: #cccccc;">000</td><td style="text-align: center;">↑</td></tr> <tr><td>001</td><td></td></tr> <tr><td>002</td><td></td></tr> <tr><td>003</td><td></td></tr> <tr><td>004</td><td></td></tr> <tr><td>005</td><td style="text-align: center;">↓</td></tr> </table>	000	↑	001		002		003		004		005	↓	<p style="text-align: center;">Program Length</p> <p style="text-align: center;">Station Lists</p> <p style="text-align: center;">Forced</p> <p style="text-align: center;">Standard</p> <p style="text-align: center;">LCR Toll</p> <p style="text-align: center;">Validated</p> <p style="text-align: center;">None</p>
000	↑																									
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001																										
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003																										
004																										
005	↓																									
<u>E</u> xit	<u>C</u> lass-of-Service																									

10. SYSTEM-WIDE FEATURES

10.1 When System-Wide Features is selected from the Applications Menu window, the menu expands to show the following options:

System-Wide Features...

- Account Code Information
- DND and Reminder Messages
- Extensions, Usernames, and Feature Codes
- Hunt Groups
- Miscellaneous System-Wide Information
- Page Zones
- Relay Programming
- System Forwarding
- System Speed Dial
- System Timers
- Tenants and Departments

10.2 Each of these programs is explained in detail on the following pages.

A. ACCOUNT CODE INFORMATION (ACCT)

10.3 In a standard system, there can be up to 64 standard account codes (numbered 00-63), up to 416 forced account codes (numbered 000-415), and up to 416 stations can be assigned class-of-service account codes. In an expanded system, there can be up to 128 standard ac-

count codes (numbered 000-127), up to 832 forced account codes (numbered 000-831), and up to 832 stations can be assigned class-of-service account codes. Account code length can be 4 to 8 digits; all codes have the same length. The program planning sheet is in Figure 5-8 on page 5-191.

10.4 To program account codes, select Account Code Information from the System-Wide Features menu or enter the ACCT command. The programming window appears as shown above.

10.5 PROGRAM LENGTH: To change the length of all account codes, select the Program Length command button. The following window appears. Enter the desired account code length (4-8) and select the OK command button. Note the warning that states that changing the account code length will erase all existing account codes.

Account Code Length	
Account Code Length:	<input style="width: 40px; height: 20px;" type="text"/>
<input style="width: 80px; height: 25px;" type="button" value="Ok"/>	

10.6 STANDARD and FORCED LIST BOXES: The list boxes are used for assigning the account codes. When the desired account code is selected, the following window appears. Enter the account code in the text box and select the OK command button.

10.7 If you attempt to add an account code that has already been assigned, the following error message appears. The system has selected a unique number. If you wish to use that number, select the Yes command button. If you wish to enter a different number, select the No command button to return to the Account Code window shown above.

10.8 If the account code is not the programmed length, an error message will display that reminds you to program the correct number of digits in the account code. If this message appears, press the RETURN key and then re-enter the correct account code.

10.9 STATION LISTS: To determine which stations will use forced, standard, or neither type of account codes, select the desired command button as follows:

- **FORCED COMMAND BUTTON:** To assign forced account codes to multiple stations, select the Forced *command button*. A list of stations appears as shown on this page. Select the desired stations as described in paragraph 10.10.
- **STANDARD COMMAND BUTTON:** To assign a standard account code to multiple stations, highlight the desired account code in the Standard *list box*. Then select the Standard *command button*. The stations that are selected for the station list will be as-

signed only to the highlighted account code. To program other account codes, repeat this procedure.

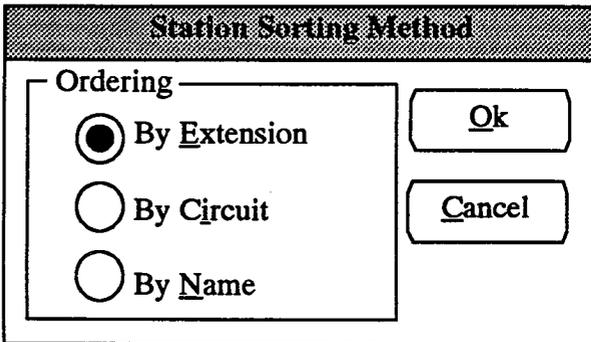
- **LCR TOLL COMMAND BUTTON:** To assign LCR toll account codes to multiple stations, select the LCR Toll *command button*. A list of stations appears as shown on this page. Select the desired stations as described in paragraph 10.10.
- **VALIDATED COMMAND BUTTON:** To program the system to validate the account codes of multiple stations, select the Validated *command button*. A list of stations appears as shown on this page. Select the desired stations as described in paragraph 10.10.
- **NONE COMMAND BUTTON:** To determine the stations that will not have account codes, select the None *command button* and use the list of stations as described in paragraph 10.10.

NOTE: Each station can be assigned *one of account code type* (forced, standard, or LCR toll account code) in addition to being enabled for class-of-service account codes. If you select a station for standard, forced, or LCR toll account code that had a previously programmed account code, the previous account code is replaced by the new code (the previous code is deleted if the station is selected for "None").

10.10 Assign stations to the account code batch lists using the list box as follows.

- **INCLUDE or EXCLUDE:** To include a station in the selected list, locate that station on the Exclude list and select it by pressing the SPACE BAR; it will automatically move to the Include list. To remove a station from the list, select the station in the Include list to move it to the Exclude list.

- **ALL or NONE:** To include all stations in the list, select the All command button. To exclude all stations, select the None command button.
- **OK or CANCEL:** When the station lists appear as desired, select the OK command button. To exit from the window without saving changes, select the Cancel command button.
- **SORT:** To sort the stations and list them numerically by extension number or circuit number, or to list them alphabetically by name, select the Sort command button. The following window appears. Choose the desired sorting method by selecting the corresponding option button. Then select the OK command button. When the list of stations returns, the list box will show the stations in the selected order. To exit without changing the sorting method, select the Cancel command button.

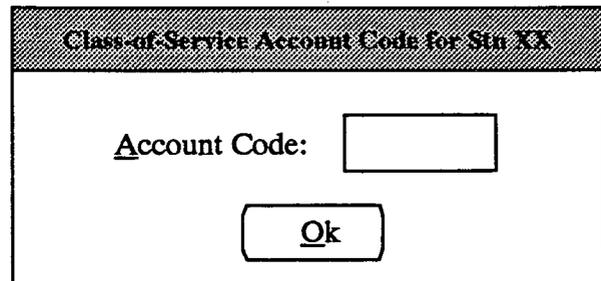


The dialog box is titled "Station Sorting Method". It contains a section labeled "Ordering" with three radio button options: "By Extension" (selected), "By Circuit", and "By Name". To the right of these options are two buttons: "Ok" and "Cancel".

10.11 CLASS-OF-SERVICE: This option can be used only if the class-of-service account codes option is enabled in System Information. To determine the sta-

tions that will have class-of-service account codes, select the Class-of-Service command button. A window containing a list box appears.

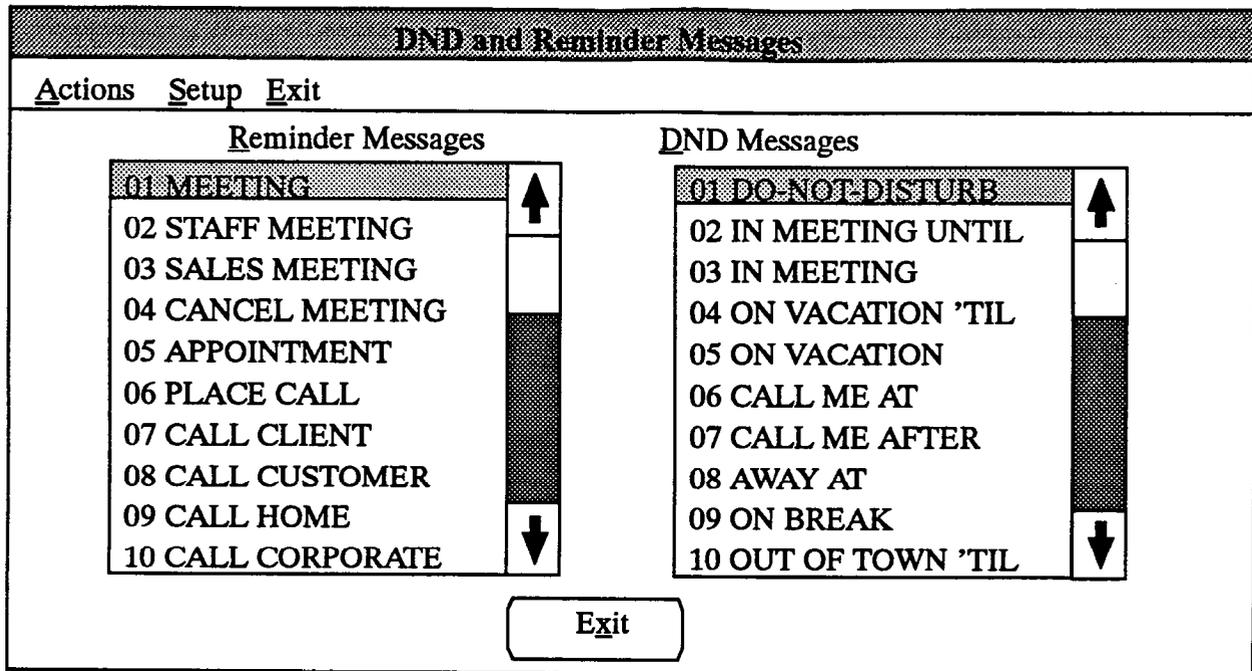
- **CLASS-OF-SERVICE ACCOUNT CODE:** The list box contains a list of all stations. To assign a class-of-service account code to a station, locate that station in the list and press the SPACE BAR. The following window appears. Enter the account code (000-831) in the text box and select the OK command button. (If the account code is entered incorrectly, the error messages described on the previous page in paragraphs 10.7 and 10.8 may appear.)



The dialog box is titled "Class-of-Service Account Code for Stn XX". It features a text input field labeled "Account Code:" and a button labeled "Ok" below it.

- **OK:** When class-of-service account codes have been assigned as desired, select the OK command button to return to the Account Code Information Programming window.

10.12 EXIT: When finished programming, select the Exit command button. A window appears that asks "Perform Update to Database?" To update the database and exit to the Applications Menu window, select Yes. Or, select No to exit without saving any changes. To return to the Account Code Information programming window, select the Cancel button.



B. DND AND REMINDER MESSAGES (MESG)

10.13 You can reprogram any or all of the 20 reminder message displays and Do-Not-Disturb messages 02-20 with a new message of up to 16 characters. (Do-not-disturb 01 message cannot be changed). The program planning sheet is in Figure 5-9 on page 5-205. The default messages are as follows:

REMINDER MESSAGES:

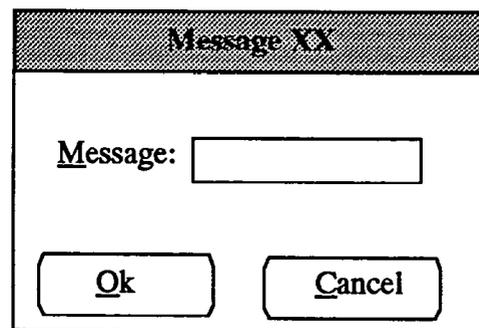
- | | |
|-------------------|---------------------|
| 01 Meeting | 11 Call Engineering |
| 02 Staff Meeting | 12 Call Marketing |
| 03 Sales Meeting | 13 Call Accounting |
| 04 Cancel Meeting | 14 Cancel DND |
| 05 Appointment | 15 Cancel Call FWD |
| 06 Place Call | 16 Take Medication |
| 07 Call Client | 17 Make Reservation |
| 08 Call Customer | 18 Review Schedule |
| 09 Call Home | 19 Lunch |
| 10 Call Corporate | 20 Reminder |

DO-NOT-DISTURB MESSAGES:

- | | |
|---------------------|-------------------|
| 01 Do-Not-Disturb | 11 Out of Office |
| 02 In Meeting Until | 12 Out Until |
| 03 In Meeting | 13 With a Client |
| 04 On Vacation 'Til | 14 With a Guest |
| 05 On Vacation | 15 With a Patient |
| 06 Call Me At | 16 Unavailable |
| 07 Call Me After | 17 In Conference |
| 08 Away At | 18 Away From Desk |
| 09 On Break | 19 Gone Home |
| 10 Out Of Town 'Til | 20 Out To Lunch |

10.14 When you select DND and Reminder Messages from the System-Wide Features menu or enter the MESG command, the programming window appears as shown above.

10.15 REMINDER MESSAGES or DND MESSAGES: Scroll through the desired list box until the message to be re-programmed is *highlighted*. When the message is *selected*, a smaller window appears in the middle of the screen as shown below. Type any 16-character message in the text box and select the OK command button. Or select the Cancel command button to leave the message unchanged.



10.16 EXIT: When finished programming, select the Exit command button. A window appears that asks "Perform Update to Database?" To update the database and exit to the Applications Menu window, select Yes. Or, select No to exit without saving any changes. To return to the DND and Reminder Messages programming window, select the Cancel button.

C. EXTENSIONS, USERNAMES, AND FEATURE CODES (EXT)

10.17 To reprogram station extension numbers, hunt group pilot numbers, trunk group access codes, or feature codes, select Extensions, Usernames, and Feature Codes from the System-Wide Features menu or enter the EXT command. The programming window appears as shown above.

10.18 Make a list of feature codes, extension numbers, hunt group pilot numbers, and trunk group access codes, as well as names and descriptions for the users, hunt groups, and trunks. The program planning sheet in Figure 5-10 on page 5-207 lists the default values of all the extensions, hunt group numbers, trunk group access codes, and feature codes.

10.19 To make a station or trunk group inaccessible to users, remove the extension number/access code using the Extensions, Usernames, and Feature Codes window. Without an access code, the trunk group or station cannot be accessed by the station users by entering a feature code. However, the trunk group can still be assigned to an individual trunk group key.

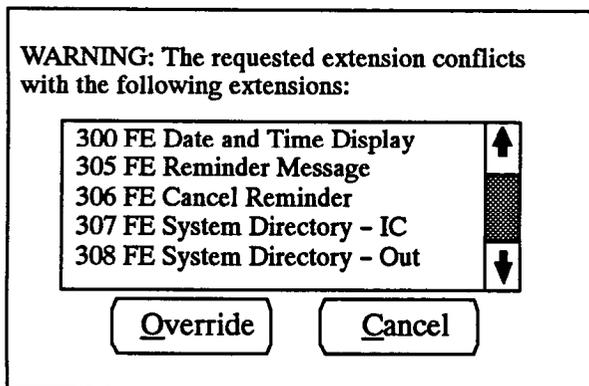
10.20 EXTENSION PROGRAMMING TYPE: This list box allows you to choose one of the following programming areas. When you select the desired option, the bottom list box shows the available stations, hunt groups, trunk groups, or feature codes. *Highlighting* one of the items in the lower list box, causes the current value of that item to appear below the list box. (For

example, if the first station is highlighted, the circuit number, description, and extension number appear.) When the item is *selected*, the following window appears.

- **Stations:** Enter the extension number, user's full name (description), and abbreviated user name for the station. If you wish to see a list of available extension numbers, press F2. When finished, select the OK command button. Note that "dual" keyset circuits will not have a default extension number assigned to the "B" station. (For example, 1.1A would be extension 100, but 1.1B would not have a default extension number.) Dual keysets circuits are programmed in the System Configuration window shown on page 5-171. If an Attendant Computer Console will be used on the system, enter the user name with the last name first, followed by a comma and the first name (e.g., Smith, John). This will allow the Attendant Computer Console directory to sort the names alphabetically by last name.

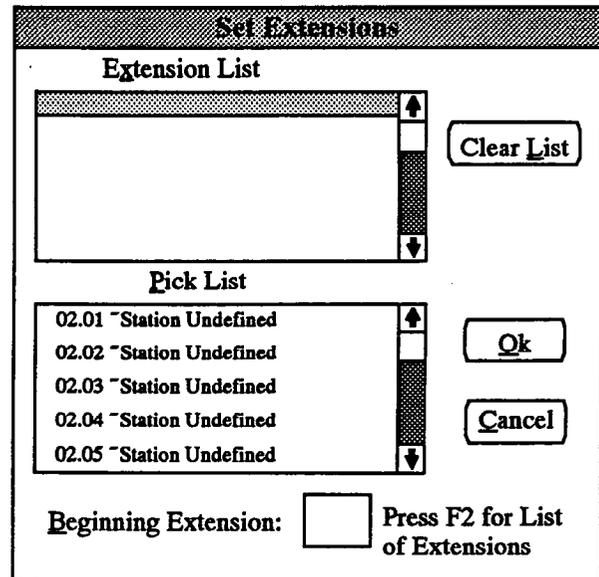
- **Hunt Groups:** Enter the pilot number (extension), the hunt group name (description), and abbreviated user name. If you wish to see a list of available extension numbers, press F2. When finished, select the OK command button.
- **Trunk Groups:** Enter the access code (extension), the description of the trunk, and an abbreviated trunk name (user name). If you wish to see a list of available extension numbers, press F2. When finished, select the OK command button.
- **Features:** Enter the feature code (extension). If you wish to see a list of available extension numbers, press F2. When finished, select the OK command button.

10.21 The feature codes and extension numbers are preset to carefully selected default values. Changing the codes or numbers can cause existing assignments to be erased. For example, if 300, 305, and 306 are assigned as feature codes and you attempt to assign 30 as another feature code, 30 would not be accepted, because 3 and 0 make up part of existing codes. Instead, a warning will appear, as shown below. You can then choose to make the change and erase the conflicting codes (override), or cancel the change and select another code.



10.22 The abbreviation FE in the example above indicates that the number is a feature code. Additional abbreviations that may appear include ST for stations, HG for hunt groups, and TG for trunk groups.

10.23 SET EXTENSIONS: To batch load extension numbers, hunt group pilot numbers, or trunk group numbers, highlight the desired line in the Extension Programming Type list box and then select the Set Ext command button. The following window appears.



- **BEGINNING EXTENSION:** Begin programming by entering the Beginning Extension number in the text box at the bottom of the window. This will be the extension number assigned to the first station, hunt group, or trunk group in the Extension list. (If you wish to select from a list of available extension numbers, press F2. When the list box appears, scroll to the desired number and select the OK command button. Or, select the Cancel command button to return to the Set Extensions window.)
- **EXTENSION LIST/PICK LIST:** The Pick List box contains a list of stations, hunt groups, or trunk groups that do not have assigned numbers. Scroll through the Pick List box to find the entries for which you wish to assign numbers. Locate and select the entries (by pressing the SPACE BAR) *in the desired order* to move them to the Extension List box. The first entry will be assigned the Beginning Extension number shown in the text box. All others will be assigned numbers in consecutive order as they appear in the Extension list box. For example, if the beginning extension is 100, and three stations are selected, the first station will be extension 100, the second will be 101, and the third will be 102.
- **CLEAR LIST:** To clear the Extension List, select the Clear List command button.
- **OK/CANCEL:** To leave the window without saving any changes, select the Cancel command button. When all programming appears as desired, select the OK command button.

10.24 CLEAR EXTENSION: To erase several extension numbers, hunt group pilot numbers, or trunk group numbers, highlight the desired line in the Extension Programming Type list box and then select the Clear Ext command button. The following window appears.

Clear Extensions

Extension List

- 02.01 ~ Station Undefined
- 02.02 ~ Station Undefined
- 02.03 ~ Station Undefined
- 02.04 ~ Station Undefined
- 02.05 ~ Station Undefined

Pick List

All
None
Sort

Ok
Cancel

- **EXTENSION LIST/PICK LIST:** The Pick List box contains a list of stations, hunt groups, or trunk groups that have assigned numbers. Scroll through the Pick List box to find the entries for which you wish to erase numbers. Scroll to the entries and select them (by pressing the SPACE BAR) to move them to the Extension List box.
- **ALL or NONE:** To include all entries in the Extension List box, select the All command button. To clear the Extension List, select the None command button.

- **SORT:** To sort the entries and list them numerically by extension number or circuit number, or to list them alphabetically by name, select the Sort command button. The following window appears. Choose the desired sorting method by selecting the corresponding option button. Then select the OK command button. When the list returns, the list box will show the entries in the selected order. To exit without changing the sorting method, select the Cancel command button.

Station Sorting Method

Ordering

- By Extension
- By Circuit
- By Name

Ok
Cancel

- **OK/CANCEL:** To leave the window without saving any changes, select the Cancel command button. When all programming appears as desired, select the OK command button.

10.25 EXIT: When finished programming, select the Exit command button. A window appears that asks "Perform Update to Database?" To update the database and exit to the Applications Menu window, select Yes. Or, select No to exit without saving any changes. To return to the Extensions, Usernames, and Feature Codes programming window, select the Cancel button.

D. HUNT GROUPS (HUNT)

10.26 Several items must be determined before programming hunt groups, as follows. Refer to Figure 5-11, page 5-212, for a program planning sheet that lists hunt groups. Refer to page 4-16 in FEATURES for more details.

- **Stations:** Prepare a list of up to 30 hunt groups (40 in expanded systems) and the stations to be included in them. Each hunt group can have as many stations as desired, providing the system-wide total does not exceed 680 stations (800 in expanded systems) assigned to hunt groups. If desired, a station can appear more than once in a hunt group list. A station can also be in more than one hunt group.
 - **Hunt group descriptions and names:** Descriptions can contain up to 20 characters and hunt group names can contain up to seven characters.
 - **Ring order:** Determine whether the calls are sent to the stations in all-ring, linear, or distributed order. All-ring order means that the call rings at all stations in the hunt group simultaneously. Linear order means that the call is sent to the first station on the list and moves down the list until it reaches an available station. With distributed order, the call is sent to the station that appears on the list after the last station to receive a call (even if the call was not answered).
 - **Voice mail hunt group:** Indicate if the hunt group contains all single-line circuits that have been designated as voice mail ports.
 - **Voice computer group/Automated attendant hunt group:** Indicate if the hunt group contains only single-line circuits connected to a voice mail computer. Voice computer groups can also be programmed as automated attendant hunt groups.
- *Voice Computer Hunt Group:* The single-line station circuits in this group are connected to voice mail computers.
 - *Voice Computer Automated Attendant Hunt Group:* The single-line circuits in this group are connected to a voice computer that uses them as automated attendants.
- **Overflow and announcement stations:** A hunt group can have an overflow station and/or up to three announcement stations. If a call rings in directly to the hunt group and is not answered before the hunt group Announcement timer expires, the call automatically transfers to the announcement station(s). If a call is transferred to the hunt group and is not answered before the hunt group Overflow timer expires, the call automatically transfers to the overflow station. Do not include these stations in the hunt group distribution list.
 - Overflow and announcement stations can be user-operated stations or hunt groups, or they can be playback devices that answer calls and automatically return the calls to the hunt group.
 - If an overflow station is a playback device, you can determine the number of times calls will be permitted to return to the overflow station (overflow count). The overflow count can be 1-127, unlimited (-1), or 0 (to bypass the overflow station).
 - **Hunt group supervisor:** Each group can have one display keyset assigned as a hunt group supervisor. The assigned supervisor has the option of using the Station Monitor feature code to monitor an active outside call of any station in the hunt group.

10.27 Select Hunt Groups in the System-Wide Features menu or enter the HUNT command to program the hunt groups. The window appears as shown on the next page.

Hunt Groups																																																	
<u>A</u>ctions <u>S</u>etup <u>E</u>xit																																																	
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr style="background-color: #cccccc;"> <th colspan="2" style="text-align: center;">Hunt Groups</th> </tr> </thead> <tbody> <tr><td>H1 2000</td><td style="text-align: center;">↑</td></tr> <tr><td>H2 2001</td><td></td></tr> <tr><td>H3 2002</td><td></td></tr> <tr><td>H4 2003</td><td></td></tr> <tr><td>H5 2004</td><td></td></tr> <tr><td>H6 2005</td><td></td></tr> <tr><td>H7 2006</td><td></td></tr> <tr><td>H8 2007</td><td></td></tr> <tr><td>H9 2008</td><td></td></tr> <tr><td>H10 2009</td><td style="text-align: center;">↓</td></tr> </tbody> </table> <input type="checkbox"/> Voice Mail Hunt Group <input type="checkbox"/> Voice Computer Group <input type="checkbox"/> Automated Attendant Hunt Group <div style="display: flex; justify-content: space-around;"> Dial Rules Recall Dest. </div> <div style="display: flex; justify-content: space-around;"> Announce Overflow Timers </div> <div style="text-align: center; margin-top: 10px;"> Exit </div>	Hunt Groups		H1 2000	↑	H2 2001		H3 2002		H4 2003		H5 2004		H6 2005		H7 2006		H8 2007		H9 2008		H10 2009	↓	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr style="background-color: #cccccc;"> <th colspan="2" style="text-align: center;">Hunt Group Station List</th> </tr> </thead> <tbody> <tr><td>[End of List]</td><td style="text-align: center;">↑</td></tr> <tr><td> </td><td></td></tr> <tr><td> </td><td></td></tr> <tr><td> </td><td style="text-align: center;">↓</td></tr> </tbody> </table> <div style="text-align: center; margin-top: 10px;"> Clear </div> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr style="background-color: #cccccc;"> <th colspan="2" style="text-align: center;">Pick List</th> </tr> </thead> <tbody> <tr><td>1000 01.01 ~ Station Undefined</td><td style="text-align: center;">↑</td></tr> <tr><td>1001 01.02 ~ Station Undefined</td><td></td></tr> <tr><td>1002 01.03 ~ Station Undefined</td><td></td></tr> <tr><td>1003 01.04 ~ Station Undefined</td><td></td></tr> <tr><td>1004 01.05 ~ Station Undefined</td><td></td></tr> <tr><td>1005 01.06 ~ Station Undefined</td><td></td></tr> <tr><td>1006 01.07 ~ Station Undefined</td><td style="text-align: center;">↓</td></tr> </tbody> </table>	Hunt Group Station List		[End of List]	↑						↓	Pick List		1000 01.01 ~ Station Undefined	↑	1001 01.02 ~ Station Undefined		1002 01.03 ~ Station Undefined		1003 01.04 ~ Station Undefined		1004 01.05 ~ Station Undefined		1005 01.06 ~ Station Undefined		1006 01.07 ~ Station Undefined	↓
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10.28 HUNT GROUPS: Begin programming by *highlighting* the desired hunt group number in the Hunt Groups list box. If you *select* the highlighted line, a smaller window appears as shown on the next page to allow you enter extended data. If you do not select it, but leave it *highlighted*, the other boxes in this window can be used to program other aspects of that hunt group as described below.

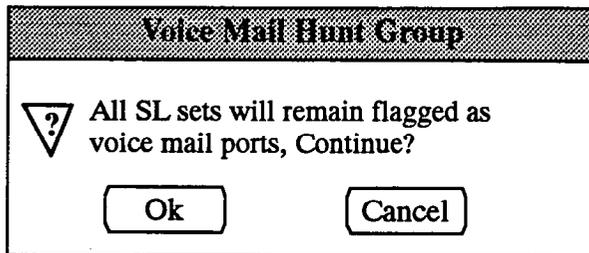
10.29 HUNT GROUP STATION LIST/PICK LIST: These list boxes are used for placing stations in the hunt group list or removing stations from the list. The stations should be programmed in the order in which calls will circulate through the hunt group. To place a station in the list, scroll to the desired position in the Hunt Group Station List (the location of the highlight bar indicates where the station will be included in the list). Then scroll through the Pick List box to locate the station to be added and select it. It moves to the Hunt Group Station List box above the station that is highlighted in the station list box. Continue locating and selecting stations in the desired order until the list is complete. To remove a station from the list, highlight and select it in the Station List.

10.30 CLEAR: If you wish to clear the Hunt Group Station List, select the Clear command button.

10.31 VOICE MAIL HUNT GROUP/VOICE COMPUTER GROUP: To designate the hunt group as a voice mail hunt group or voice computer hunt group, highlight the desired check box and press SPACE BAR to place an X in the box. The following warning appears. If you do not want to change the hunt group, select the Cancel command button. To make the hunt group a voice mail or computer hunt group, select the OK command button. You can also assign dial rules and a recall destination as described on the next page.

Voice Mail (or Computer) Hunt Group	
?	All keysets in the station list will be deleted, and all SL sets will be flagged as voice mail ports, Continue?
Ok	Cancel

10.32 If you later remove the voice mail designation from the hunt group, the following window appears:

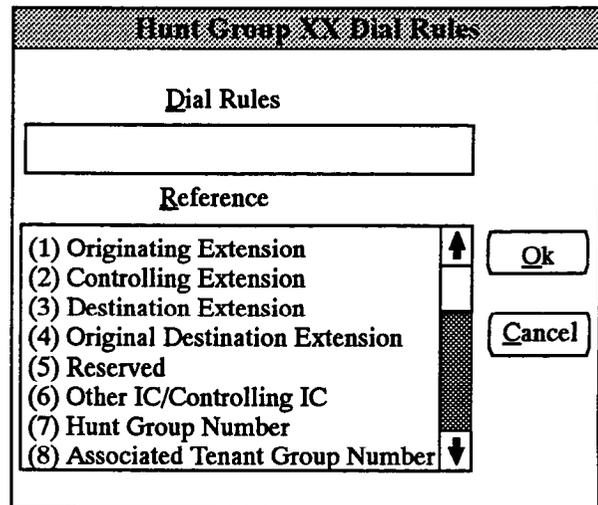


10.33 AUTOMATED ATTENDANT HUNT GROUP: If the hunt group is flagged as a voice computer group, the Automated Attendant Hunt Group check box is available. Check this box if the stations in the voice computer hunt group will serve as automated attendants.

10.34 DIAL RULES: When you select this command button, the following window appears. Enter any combination of specific digits and/or preset dial rules, as described below. Separate the numbers with commas (for example: 1,3,12). The Reference list box contains a list of all available dial rules. (For complete definitions of the dial rules, refer to page 4-21 in FEATURES.) When finished, select the OK command button. Or, select the

Cancel command button to exit without changing the dial rules.

- *Specific digits:* If the system must dial specific digits, such as a control or command code, enter those digits surrounded by quotes (for example: "*1").
- *Preset dial rules:* Enter one or more of the preset dial rule numbers, shown in the chart below, without using quotes (for example: 1,2,3).



DIAL RULE	IC-TO-VOICE COMPUTER CALL	CO-TO-VOICE COMPUTER CALL
1	Originating station's intercom number	No code sent
2	Originating station's intercom number	No code sent
3	Intercom number of last non-voice mail station to forward the call if a chain of stations is forwarded to voice mail or voice mail transfer mailbox number	Intercom number of last non-voice mail station to forward the call if a chain of stations is forwarded to voice mail or voice mail transfer mailbox number
4	Intercom number of the first non-voice mail station in a chain of stations that is forwarded to voice mail	Intercom number of the first non-voice mail station in a chain of stations that is forwarded to voice mail
5	Intercom number of the originating station or its secretarial intercept station	No code sent
6	Originating station's intercom number	No code sent
7	Receiving hunt groups or voice mail group number	Receiving hunt group or voice mail group number
8	Originating station's tenant group number	No code sent
9	Originating station's department number	No code sent
10	If system is in day mode = 1; If in night mode = 0	If system is in day mode = 1; If in night mode = 0
11	No code sent	Account code, if entered
12	Intercom call: code = 1	Outside call: code = 2
13	No code sent	Number of calls waiting ahead of this call
14	No code sent	The number of times this call has been sent through the hunt group
15	Intercom number of the station that received a recalling transferred (even if the station is forwarded)	No code sent

10.35 RECALL DESTINATION: When you select this command button, the following window appears. Enter the extension or circuit number of the station that will serve as the recall destination for this voice computer hunt group. When finished, select the OK command button. Or, select the Cancel command button to exit without changing the recall destination.

HG 01 Recall Destination

Recall Destination:

10.36 ANNOUNCE: To assign announcement stations to the hunt group, select the Announce command button and refer to the window shown on page 5-65.

10.37 OVERFLOW: To assign an overflow station to the hunt group, select the Overflow command button and refer to the window on page 5-66.

10.38 TIMERS: To program the timer for the hunt group, select the Timer command button and refer to the window on page 5-65.

10.39 EXIT: When finished programming, select the Exit command button. A window appears that asks "Perform Update to Database?" To update the database and exit to the Applications Menu window, select Yes. Or, select No to exit without saving any changes. To return to the Hunt Groups programming window, select the Cancel button.

Hunt Group Extended Data Window

10.40 When you select a hunt group from the Hunt Group list box shown on the previous page, the following window appears.

10.41 HUNT NAME: Select the Hunt Name text box and enter the name for the hunt group (up to seven characters) that will appear on keyset displays for calls associated with the hunt group.

10.42 DESCRIPTION: To enter a descriptive name for the hunt group (such as Field Service, or Order Processing), select the Description text box and type the desired name with up to 20 characters.

10.43 SUPERVISOR: A station can be assigned as the hunt group supervisor for monitoring purposes. To assign a supervisor to the hunt group, select the Supervisor text box and type the supervisor's station circuit or extension number.

10.44 HUNT GROUP SEARCH TYPE: To determine whether the hunt group will receive calls in linear, distributed, or all-ring order, select the desired option button. The selected button will have a dark circle in the center. (Voice mail/computer hunt groups are always linear and cannot be changed.)

10.45 OK: When finished, select the OK command button to return to the Hunt Groups programming window. If you have changed the search type to or from "all ring" and there is currently a call ringing or camped on at the hunt group, a warning window will appear. If you select the OK button, those calls will be disconnected. If you select Cancel, the Extended Data screen reappears to allow you to change the type back or try again.

Hunt Group XX Extended Data

Hunt Name: Description:

Supervisor:

Hunt Group Search Type

Linear Search All Ring

Distributed Search

Hunt Group XX Timers	
No Answer Advance:	<input style="width: 40px; text-align: center;" type="text" value="18"/> sec. Default 18: Range 3-255
Announcement:	<input style="width: 40px; text-align: center;" type="text" value="18"/> sec. Default 18: Range 10-255
Overflow:	<input style="width: 40px; text-align: center;" type="text" value="72"/> sec. Default 72: Range 10-255
<input style="width: 100px; height: 25px; border: 1px solid black;" type="button" value="Default"/> <input style="width: 100px; height: 25px; border: 1px solid black;" type="button" value="Ok"/>	

Timer Programming Window

10.46 TIMERS: When you select the Timer command button shown on page 5-62, the window above is displayed. To change the timer values, select the desired text boxes and type the new value. The timer functions are as follows:

- **No Answer Advance Timer:** This is the length of time a call can remain unanswered at a hunt group station before moving to the next station in the hunt group.
- **Announcement Timer:** This determines how long a direct ring-in call will remain unanswered before being automatically transferred to the hunt group's announcement station(s).
- **Overflow Timer:** This determines how long a transferred CO call will circulate through the hunt group (unanswered) before being automatically transferred to the hunt group's overflow station.

10.47 DEFAULT: To set all three timers to default values, select the Default command button.

10.48 OK: When the timers have been programmed as desired, select the OK command button.

Announcement Station Data Window

10.49 ANNOUNCEMENT STATIONS: When you select the Announce command button shown on page 5-62, the window below is displayed. To assign up to three announcement stations for the hunt group, select the text box(es) and enter the desired intercom number or pilot number. (If a hunt group is assigned as the announcement station, there can be only one announcement station. If individual stations circuits are assigned, there can be up to three announcement stations.) Announcement stations receive calls in numerical order. Therefore, enter the extension numbers in the order you wish to have the announcement stations accessed.

10.50 ANNOUNCEMENT TYPES: To determine whether the announcement stations are user stations (stations or a hunt group) or playback devices, select the desired option button.

10.51 OK: When programming is complete, select the OK command button to return to the Hunt Group programming window.

Hunt Group XX Announcement Locations	
Announce <u>1</u> :	<input style="width: 80px; height: 25px;" type="text"/>
Announce <u>2</u> :	<input style="width: 80px; height: 25px;" type="text"/>
Announce <u>3</u> :	<input style="width: 80px; height: 25px;" type="text"/>
<div style="border: 1px solid black; padding: 5px; display: inline-block;"> <p style="margin: 0;">Announcement Types</p> <p style="margin: 5px 0;"><input checked="" type="radio"/> <u>S</u>tation Devices</p> <p style="margin: 5px 0;"><input type="radio"/> <u>P</u>layback Devices</p> </div>	
<input style="width: 100px; height: 25px; border: 1px solid black;" type="button" value="Ok"/>	

Hunt Group XX Overflow Data

Overflow Device

Station/Voice Computer Group
 Hunt Group

Overflow Type

Station Playback

Overflow Station:

Overflow Count:

Overflow Station Data Window

10.52 OVERFLOW DEVICE: Select the appropriate option button to determine whether the overflow station will be a station/voice computer group or a hunt group.

10.53 OVERFLOW STATION: Select the Overflow Station text box and enter the circuit or extension number of the desired overflow station or the pilot number of the desired hunt group.

10.54 OVERFLOW TYPE: If a station will be used as the overflow device, determine whether it will be equipped with a station instrument or a playback device by selecting the appropriate option button.

10.55 OVERFLOW COUNT: If a playback device is used, determine if the call will be sent to the overflow station or immediately recall the primary attendant or

the transferring station. If it will circulate, determine how many times the call will be sent to the overflow station or if the count will be "unlimited." Do one of the following:

- Select the Overflow Count text box and enter the count number.
- If the count is unlimited, select the Unlimited (-1) command button.
- If calls are to recall to the primary attendant or the transferring station immediately when the Overflow timer expires (rather than being sent to an overflow station), select the Immediate (0) button.

10.56 OK: When programming is complete, select the OK command button to return to the Hunt Group programming window.

Miscellaneous System-wide Information		
<u>A</u> ctions <u>S</u> etup <u>E</u> xit		
Primary Attendant Station:	<input type="text" value="1000"/>	
Call Termination Digits:	<input type="text" value="##*****"/>	
<u>S</u> ystem <u>F</u> lags		
Description	Status	
Account code class-of-service	Disabled	▲
Allow cross-tenant IC traffic	Yes	
Allow cross-tenant voice mail/computer traffic	Yes	
Audible message indication for SL sets	Enabled	
Auto attendant — dial during recording	Yes	
Auto attendant — enable ringback tone	Disabled	
Barge	Disabled	▼
<input type="button" value="Exit"/>		

E. MISCELLANEOUS SYSTEM-WIDE INFORMATION (MISC)

10.57 Select Miscellaneous System-Wide Information from the System-Wide Features menu or enter the MISC command to display the window shown above. (If desired, use the program planning sheet in Figure 5-12 on page 5-213.)

10.58 PRIMARY ATTENDANT STATION: Select the Primary Attendant Station text box and enter the circuit or extension number of the primary attendant for the system.

10.59 CALL TERMINATION DIGITS: (*This can be programmed only if Extended DTMF Feedback Digits are enabled.*) Enter the desired call termination digits. This is the code used by a voice computer to indicate that the caller has hung up. You can use any combination of up to eight # and * digits. Default is ##*****.

10.60 SYSTEM FLAGS: To program a feature system-wide, scroll to the desired feature and select it. The status will change each time the SPACE BAR is pressed. The system flags include the following:

- **Account Code Class-Of-Service:** If this option is enabled, account codes can be programmed to be associated with station class of service (SCOS). This permits a user to place an outgoing call *at any station* using the SCOS that is programmed for the user's own station. When the user enters an account code,

the system checks the SCOS programming for the station that is associated with that account code. When the call is completed, the station's normal SCOS goes back into effect. In the default state, this is *disabled*.

- **Allow Cross-Tenant Traffic:** Determine whether stations that are in different tenant groups will be allowed to place intercom calls, forward intercom calls, or transfer intercom or outside calls to one another. If disallowed, intercom calls placed to a hunt group are routed only to the hunt group stations that are in the same tenant group as the caller. Outside calls that are transferred to the hunt group are routed to all stations in the group. Recalls are not blocked, even if the attendant is not in the hunt group's tenant group. In the default state, this is set to *yes* (allowed).
- **Allow Cross-Tenant Voice Mail/Computer Traffic:** Determine whether voice mail units and voice mail computers will be allowed to place intercom calls, forward intercom calls, or transfer intercom or outside calls to stations that are in different tenant groups. If disallowed, intercom calls placed to a hunt group are routed only to the hunt group stations that are in the same tenant group as the voice mail/computer. Outside calls that are transferred to the hunt group are routed to all stations in the group. Recalls are not blocked, even if the attendant is not in the hunt group's tenant group. In the default state, this is set to *yes* (allowed).

- **Audible Message Indication for SL Sets:** If enabled, single-line sets will receive message waiting indications (six tones before dial tone) when a message is waiting. In the default state, this is *enabled*.
- **Auto Attendant — Dial During Recording:** To allow callers to dial extension numbers while the automated attendant message is playing, enable this option by setting it to "yes." In the default state, this is set to *yes*.
- **Auto Attendant — Enabled Ringback Tone:** If ringback tones are enabled, callers will hear ringing instead of music on hold when being transferred to a station through the automated attendant (or an E&M circuit or DISA). In the default state, this is set to *disabled*.
- **Barge:** This system option can be enabled so that stations may be given Barge permission and/or receive or block barges. In the default state, Barge is *disabled*.
- **Barge Confirmation Tone:** If enabled, users will hear a tone when another user enters a call through the Barge or Privacy Release feature. In the default state, this is *enabled*.
- **Broadcast Alarms To All Attendants:** Determine whether system alarms display on all attendant stations (set to "yes"). If not, they will display only at the primary attendant's station (set to "no"). In the default state, this is set to *yes*.
- **Broadcast Station Off-Hook Alarms:** Determine whether station off-hook alarms display on any attendant stations. If not, they will only be sent to the designated serial port. In the default state, this is set to *no*.
- **Drop Incomplete Outgoing Calls:** Occasionally, a station user will seize a trunk at the exact time a call is coming in on that trunk and the user will be connected to the incoming call instead of dial tone. (This is called "glare.") If the Drop Incomplete Outgoing Calls option is enabled (set to *yes*), the resulting call on that trunk will be dropped, just as it would be if the station user did not dial a valid telephone number. If the option is disabled (set to *no*), the call will remain connected regardless of the number of digits dialed, if any. In the default state, this is set to *yes*.
- **DSS Feature Key Lamp Status:** If the system does not have any DSS keys programmed as feature keys, this flag can be set to "disabled" to prevent the system from processing the information that would be required to support the keys and speed up system performance. In the default state, this flag is set to *enabled*.
- **Extended DTMF Feedback Digits:** If DTMF feedback tones are enabled in station programming (see page 5-31), the "extended" set of feedback tones can also be enabled. These extended tones include codes for indicating when a station is forwarded to another station and when the calling party hangs up. In the default state, extended feedback digits are set to *no* (disabled).
- **External Paging Music Channel:** This option selects the music-on-hold channel (one or two) that will be used by external paging speakers for background music. In the default state, this is set to *channel one*.
- **Handsfree Announce System Forward Transfer:** When a station user transfers a call to the principal station of a forwarding path, this option determines what the caller will hear. If enabled (*yes*), the caller will place a handsfree call to the principal station and can announce the transfer. If the option is disabled, the transferring station user will hear ringing and can announce the call only if it is answered by the principal station or one of the forwarding points. This defaults to *no*.
- **Hot Dial Pad Keys:** If this option is enabled, keyset users can dial trunk access codes and feature codes without lifting the handset or pressing the SPKR or SPCL key. This programmable feature is called "hot dial pad" to indicate that the dial pad keys are always activated. In the default state, this is set to *yes* (enabled).
- **Hunt Group Transferred Call Type:** When the database is in the default state, all unanswered *direct ring-in* outside calls to the hunt group go first to the announcement station and then to the overflow station. Unanswered calls that were *transferred to* the hunt group, by default, go only to the overflow station. However, if this system option is set for "Ann/Overflow," the system will send *all* unanswered hunt group calls first to the announcement station and then to the overflow station. This defaults to *overflow*.
- **Keypad Identification Display:** Determine whether the keypad identification display (user name and extension number) should appear on display keysets always (enabled) or only on keypad power up (disabled). This defaults to *enabled*.

- **Music-On-Hold for IC Calls:** This option determines whether a user hears music on hold when placed on hold by another station or camps on to a resource. In the default state, this is *enabled*.
 - **OHVA DSS Immediate Transmit:** Determine if DSS-equipped keysets will have immediate Off-Hook Voice Announce capability enabled. In the default state, this is *disabled*.
 - **OHVA System-Wide:** Determine whether the Off-Hook Voice Announce (OHVA) feature will be enabled system-wide. In the default state, this is *enabled*.
 - **Privacy Release:** Determine whether users will be allowed to join ongoing CO calls (Privacy Release is enabled) or if CO calls will be limited to one station unless the conference feature is used (Privacy Release is disabled). In the default state, Privacy Release is *disabled*.
 - **Reverse Transfer Immediate Connection:** Determine whether reverse-transferred calls are connected to keysets automatically (set to "yes"). If not, the user must press the flashing trunk key or the IC key to be connected (set to "no"). In the default state, this is set to *yes*.
 - **Standard Tones for CO Trunks, Keysets, and Single-Line Sets:** The busy tones and dial tones can be pure system tones (as described in FEATURES, page 4-54) or they can be changed to more closely match the telephone company's standard tones. In the default state, this is set to *no* for trunks (allowing 416/832 system tones) and *yes* for keysets and single-line sets (allowing standard telephone company type tones).
 - **Station DTMF Digit Mute:** Determine whether DTMF tones will be heard (not muted) when numbers are speed dialed (using redial, station speed dial, system speed dial, etc.), or if they will be muted. In the default state, this is set to *no* (not muted).
 - **Station Monitoring Tone:** If enabled, hunt group members will hear a tone whenever the hunt group supervisor uses the Station Monitoring feature to listen to a call. In the default state, this is *enabled*.
 - **Suppress All Displayed Digits After End-Of-Dialing:** When this option is enabled, any digits dialed after the valid number has been dialed will not be displayed. This prevents digits, such as PIN numbers and other codes, from being displayed when they are dialed. If the digits are not displayed, they will also not be included if the number is redialed using the Redial feature. In the default state, this option is *disabled*. (This flag is not affected by the SMDR digit suppression flag described on page 5-143.)
 - **System "Skate" Type:** Determine whether the system will place a call on hold when the user presses another trunk key or the IC key while on a call (skate-to-hold) or will drop the call when another trunk key or the IC key is pressed (skate-to-disconnect). Skate-to-hold does not affect the procedure for reseizing a trunk. In the default state, this is set to *skate-to-disconnect*.
 - **System Speed-Dial Override SCOS:** If this option is enabled, the system speed-dial numbers can be dialed at any station regardless of toll restrictions. If disabled, all system speed-dial numbers are subject to toll restriction. In the default state, this is *disabled*.
 - **Validate Voice Mailbox Numbers:** This feature affects calls transferred to a voice mail unit. If all mailbox numbers match extension numbers, the option should be enabled to allow the system to check that the mailbox number entered by the transferring party is valid. If there are mailbox numbers that do not match an extension number, there is no need to validate and this option should be disabled. In the default state, this is set to *no* (disabled).
- 10.61 EXIT:** When finished programming, select the Exit command button. A window appears that asks "Perform Update to Database?" To update the database and exit to the Applications Menu window, select Yes. Or, select No to exit without saving any changes. To return to the System Flags programming window, select the Cancel button.

Page Zones

Actions
Setup
Exit

Page Zones

0 -	↑
1 - All Page	|
2 -	█
3 -	█
4 -	█
5 -	↓

Relays

External Ports

Keysets

Convert Ports

Assigned Ports/Relays

	↑
	█
	↓

Available Ports/Relays

	↑
	█
	↓

Clear

Exit

F. PAGE ZONES (PAGE)

10.62 To prepare for page zone programming, make a list of the keysets and/or the external paging network(s) that are included in up to 10 paging zones. Keysets and the external paging network(s) can be in more than one page zone. (Refer to the program planning sheet in Figure 5-13, page 5-214, when making the list.) In the default state, all keysets are assigned to page zone 1.

10.63 To define the page zones, select from the System-Wide Features menu or enter the PAGE command to display the window shown above. Programming is described below.

10.64 PAGE ZONES: Begin programming by *highlighting* the desired page zone in the Page Zones list box. When the highlight bar is on a specific page zone, all other programming applies to that zone. When the page zone is *selected*, the following window appears. Enter a description of the page zone in the text box and select the OK command button (or select the Cancel command button to leave the description unchanged).

Page Zone X Description

Description:

Ok

Cancel

10.65 RELAYS and EXTERNAL PORTS: To program relays or external ports for the selected page zone, select the desired option button. The list boxes at the bottom of the window will show the ports/relays that have been assigned to the page zone, and the ports/relays that are available. To move a port/relay from the available list to the assigned list, select the desired port/relay in the available box. It will move automatically. To move a port/relay out of the assigned list, selecting it will move it back to the available list. To erase the Assigned list, select the Clear command button.

NOTE: External ports must be converted in the window shown on page 5-72 before they will appear in the Available list. External page relays must first be equipped in the Relay Programming window (on page 5-73) before they will appear in the Available list.

10.66 KEYSETS: To assign the keysets that will be in the page zone, select the Keysets command button. A station list window appears as shown below.

Page Zone X — Keyset Programming

Include

1000 01.01 Smith, John	↑
1001 01.02 ~Station Undefined	
1002 01.03 ~Station Undefined	
1003 01.04 ~Station Undefined	
1004 01.05 ~Station Undefined	↓

Exclude

1008 02.01 ~Station Undefined	↑
1009 02.02 ~Station Undefined	
1010 02.03 ~Station Undefined	
1011 02.04 ~Station Undefined	
1012 02.05 ~Station Undefined	↓

None
All
Sort
Cancel
Ok

- **INCLUDE or EXCLUDE:** To include a station in that page zone, locate that station on the Exclude list and select it by pressing the SPACE BAR; it will automatically move to the Include list. To remove a station from the list, select the station in the Include list to move it to the Exclude list.
- **ALL or NONE:** To include all stations in the page zone, select the All command button. To exclude all stations, select the None command button.

- **SORT:** To sort the stations and list them numerically by extension number or circuit number, or to list them alphabetically by name, select the Sort command button. The following window appears. Choose the desired sorting method by selecting the corresponding option button. Then select the OK command button. When the list of stations returns, the list box will show the stations in the selected order. To exit without changing the sorting method, select the Cancel command button.

Station Sorting Method

Ordering

By Extension

By Circuit

By Name

Ok
Cancel

- **OK or CANCEL:** When the station lists appear as desired, select the OK command button. To exit from the window without saving changes, select the Cancel command button. The Page Zones window (see previous page) reappears after either of these command buttons is selected.

External Page Port — CO/SLI Conversion			
External Page Ports			
1		↑	
2		□	
3		■	
4		■	
5		■	
6		■	
7		■	
8		■	
9		↓	
Available Devices			
XXXX	XX.XX	Individual CO Trunk	↑
XXXX	XX.XX	Individual CO Trunk	□
XXXX	XX.XX	Individual CO Trunk	■
XXXX	XX.XX	Individual CO Trunk	■
XXXX	XX.XX	Individual CO Trunk	■
XXXX	XX.XX	Individual CO Trunk	■
XXXX	XX.XX	Individual CO Trunk	↓

10.67 CONVERT PORTS: To convert CO trunk or SLI circuits to external paging ports, select the Convert Ports command button (shown in window on page 5-70). The window shown above appears.

- **EXTERNAL PAGE PORTS/AVAILABLE DEVICES:** To convert an available device to an external paging port, locate the desired device on the Available Devices list and select it. It will automatically appear on the External Page Ports list. There can be up to nine external page ports.
- **DELETE:** To delete an external paging port and convert it back to its original use (trunk or single-line circuit), select the desired port in the External Page

Ports list box and then select the Delete command button. It will move back to the available devices list for the appropriate type of device.

- **OK:** When programming is complete, select the OK command button to return to the Page Zones programming window (shown on page 5-70).

10.68 EXIT: When all page zone programming is finished, select the Exit command button. A window appears that asks "Perform Update to Database?" To update the database and exit to the Applications Menu window, select Yes. Or, select No to exit without saving any changes. To return to the Page Zones programming window, select the Cancel button.

Relay Programming																	
<u>A</u>ctions <u>S</u>etup <u>E</u>xit																	
<p style="text-align: center;"><u>R</u>elays</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr style="background-color: #cccccc;"><td style="padding: 2px;">01- Power-Fail Relay</td><td style="text-align: center; padding: 2px;">↑</td></tr> <tr><td style="padding: 2px;">02- Unknown Relay Type</td><td style="text-align: center; padding: 2px;"> </td></tr> <tr style="background-color: #cccccc;"><td style="padding: 2px;">03- Unknown Relay Type</td><td style="text-align: center; padding: 2px;"> </td></tr> <tr><td style="padding: 2px;">04- Unknown Relay Type</td><td style="text-align: center; padding: 2px;">↓</td></tr> </table>	01- Power-Fail Relay	↑	02- Unknown Relay Type		03- Unknown Relay Type		04- Unknown Relay Type	↓	<p style="text-align: center;"><u>A</u>vailable Relay Types</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr style="background-color: #cccccc;"><td style="padding: 2px;">External Page Circuit Relay</td><td style="text-align: center; padding: 2px;">↑</td></tr> <tr><td style="padding: 2px;">Night Switch Relay</td><td style="text-align: center; padding: 2px;"> </td></tr> <tr style="background-color: #cccccc;"><td style="padding: 2px;">Power-Fail Relay</td><td style="text-align: center; padding: 2px;"> </td></tr> <tr><td style="padding: 2px;">Signal Device Relay</td><td style="text-align: center; padding: 2px;">↓</td></tr> </table>	External Page Circuit Relay	↑	Night Switch Relay		Power-Fail Relay		Signal Device Relay	↓
01- Power-Fail Relay	↑																
02- Unknown Relay Type																	
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04- Unknown Relay Type	↓																
External Page Circuit Relay	↑																
Night Switch Relay																	
Power-Fail Relay																	
Signal Device Relay	↓																
<div style="border: 1px solid black; border-radius: 10px; padding: 5px 20px; display: inline-block; margin-bottom: 20px;"> <u>T</u>enant Group </div> <div style="border: 1px solid black; border-radius: 10px; padding: 5px 20px; display: inline-block;"> <u>E</u>xit </div>																	

G. RELAY PROGRAMMING (RLAY)

10.69 Matrix Card and Expansion Card relays can be designated for external paging, night switch (which is activated when the system or associated tenant group is placed in night mode), power-fail, or signal device relays. Relay 1 is preprogrammed as the power-failure signal device and cannot be changed. The program planning sheet is in Figure 5-14 on page 5-215.

10.70 To program relay functions, select Relay Programming from the System-Wide Features menu or enter the RLAY command. The window shown above appears.

10.71 RELAYS and AVAILABLE RELAY TYPES: To program the relay type (for relays 02 through 08), move the highlight bar to the desired relay number in the Relays list box and select it. The highlight bar will automatically move to the Relay Types list box. Scroll to and select the desired type of relay. The selected relay type will automatically appear next to the relay number in the Relays list.

NOTE: Once a relay type has been programmed, it cannot be made into an "Unknown Relay Type." If the relay is assigned a function, but no further programming is done, it is considered "unused" by the system.

10.72 TENANT GROUP: If Night Switch Relay is selected, a tenant group must be assigned to the relay. The following window appears which permits you to make the necessary assignment. Enter the desired tenant group number and select the OK command button to continue programming. If you wish to change the tenant group designation for an existing relay, highlight that relay in the Relays list box and then select the Tenant Group command button to gain access to this window.

Relay X Tenant Group	
<u>T</u> enant Group:	<input style="width: 50px; height: 20px;" type="text"/>
<div style="border: 1px solid black; border-radius: 10px; padding: 5px 20px; display: inline-block;"> <u>O</u>k </div>	

10.73 EXIT: When all relay programming is finished, select the Exit command button. A window appears that asks "Perform Update to Database?" To update the database and exit to the Applications Menu window, select Yes. Or, select No to exit without saving any changes. To return to the Relay programming window, select the Cancel button.

System Forwarding

Forwarding Paths

001	↑
002	
003	
004	
005	
006	
007	
008	
009	
010	↓

H. SYSTEM FORWARDING (SFWD)

10.74 When System Forwarding is selected from the System Wide Features menu (or the SFWD command is entered), the programming window shown above appears. It is used for assigning forwarding points to the system forwarding paths. Stations can then be programmed to use the forwarding paths in the window shown on page 5-41. A program planning sheet for this window is located in Figure 5-15 on page 5-216.

10.75 FORWARDING PATHS: Up to 200 unique forwarding paths can be programmed in a standard system (up to 400 in an expanded system). To program a forwarding path, highlight the desired path number in the list box and press the SPACE BAR. The following window appears.

Forwarding Path XXX

Path Description:

Forwarding Point 1:

Forwarding Point 2:

Forwarding Point 3:

Forwarding Point 4:

10.76 Each forwarding path can have a distinctive description (of up to 20 characters) and four forwarding points. The forwarding points can be stations, voice mail ports, or hunt groups.

- **PATH DESCRIPTION:** Select this text box to enter the name of this forwarding path.
- **FORWARDING POINT(S):** Up to four forwarding points can be programmed. To enter a forwarding point, select the appropriate text box and enter an extension number or hunt group pilot number (or hunt group number HXX). Or, press the F2 key while in one of these three entry boxes to display a list of stations and hunt groups. Select the desired station or hunt group by highlighting it and pressing the SPACE BAR.
- **OK or CANCEL:** When finished programming the forwarding paths, select the OK command button or press RETURN. To exit to the System Forwarding window without selecting a station, select the Cancel command button.

10.77 EXIT: When finished programming station information, select the Exit. A window appears that asks "Perform Update to Database?" To update the database and exit, select the Yes button. Or, select the No command button to exit without saving any changes. To return to the System Forwarding programming window, select the Cancel button.

System Speed Dial			
Actions	Setup	Exit	
Number of <u>D</u> isplayed Speed Dial Numbers:	<input style="width: 80px;" type="text" value="500"/>		
Speed Dial <u>N</u> umber Programming Station:	<input style="width: 110px;" type="text" value="1000"/>		
Number of Digits in <u>B</u> in Number:	<input style="width: 30px;" type="text" value="3"/>		
System Speed Dial Numbers			
#	Name	Number	Tenant
000			0
001			0
002			0
003			0
004			0
005			0
006			0
007			0
008			0

I. SYSTEM SPEED DIAL (SSPD)

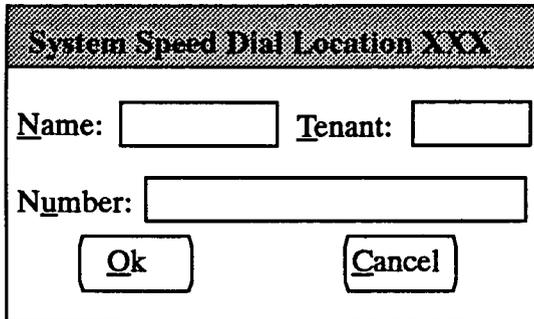
10.78 To program system speed-dial parameters, determine the following information. (It may be helpful to use the program planning sheet in Figure 5-16 on page 5-217.) There are 400 speed-dial numbers (000-399) in a standard system and 500 in an expanded system (000-499).

- **Display Speed-Dial numbers:** Determine how many of the system speed-dial number locations may be viewed on display keysets. Display numbers are assigned consecutively beginning at 000; all remaining numbers will be non-display. For example, if you enter 100, only speed-dial numbers 000-099 will be display numbers; all others are non-display numbers. Non-display numbers do not appear on display keysets when dialed and cannot be redialed. Non-display numbers will appear in the SMDR when dialed.
- **System Speed-Dial programming station:** Determine the circuit or extension number of the keyset station that will be allowed to program all system speed-dial numbers, including all tenant-specific numbers. (Attendants will only be able to program numbers for their associated tenant groups and the system-wide numbers.)

- **Speed-Dial numbers:** List the system speed-dial numbers. Numbers can include up to 32 digits and can include timed pauses or hookflashes. Timed pauses and/or hookflashes are used when entering a series of numbers, such as access codes, security codes, and telephone numbers for specialized common carrier (SCC) dialing. To include a pause in the number, enter the letter S for a short pause or L for a long pause. To include a hookflash, enter F. The pause length represented by the S is determined by the Pause timer and a long pause is double the timer length. Each pause or hookflash is considered one of the 32 digits.
- **Tenant group number:** Determine which system speed-dial numbers may be used by the entire system and those that may be used only by the members of a specific tenant group. If desired, a single tenant group number may be entered for each individual system speed-dial number. Tenant-specific numbers cannot be viewed or dialed by station users who are not in the designated tenant group. If tenant group number 0 is assigned, the system speed-dial number is available to all system users.

10.79 The System Speed Dial programming window is selected from the System-Wide Features menu or the SSPD command is entered. The window appears as shown above.

10.80 SYSTEM SPEED-DIAL NUMBERS: To program a number, select the desired number in the list box shown on the previous page. The following window appears.



- **NAME:** If desired, select the Name text box and type the desired name up to 16 characters.
- **TENANT:** If the number is to be used exclusively by one tenant group, select the Tenant text box and type the tenant group's number. Enter "0" if it is to be used by all tenant groups.
- **NUMBER:** Select the Number text box to enter a number of up to 32 digits as described on the previous page.
- **OK or CANCEL:** When the name, tenant number, and speed-dial number are correct, select the OK command button. To exit without saving the changes, select the Cancel button. The System Speed Dial window returns.

10.81 NUMBER OF DISPLAYED SPEED-DIAL NUMBERS: To designate how many display speed-dial numbers will be used, select the Number of Displayed Speed Dial Numbers text box and enter the desired number (up to 400). The display numbers will be assigned consecutively beginning with number 000.

10.82 SPEED DIAL NUMBER PROGRAMMING STATION: Select the Speed Dial Number Programming Station text box and enter the circuit or extension number of the desired programming station.

10.83 NUMBER OF DIGITS IN BIN NUMBER: The access code (bin number) that users will enter when using speed dialing can be 1-3 digits long. To set the length, select the Number of Digits in Bin Number text box and enter the desired number. If single digit numbers are selected, 10 system speed-dial codes will be available (0-9). If two-digit numbers are selected, there can be up to 100 system speed-dial codes (00-99). Three-digit numbers use all codes (000-399 or 000-499).

NOTE: All of the speed-dial locations can have assigned numbers (and can be used via the Outside System Directory feature), but only those with codes can be dialed using the Speed-Dial feature. For example, with one-digit speed-dial codes, numbers 000-009 can be speed dialed using 0-9, but 010 and higher can only be used through the Outside System Directory feature.

10.84 EXIT: When all system speed dial programming is finished, select the Exit command button. A window appears that asks "Perform Update to Database?" To update the database and exit to the Applications Menu window, select Yes. Or, select No to exit without saving any changes. To return to the System Speed Dial programming window, select the Cancel button.

System Timers			
Actions Setup Exit			
System Timer List			
Description	Value	Units	Range
Abandoned Call	10	Min.	1- 255
Camp-On	3	Sec.	0- 255
Camp-On Tone	15	Sec.	5- 255
CO Hookflash	60	100th	2- 250
CO Re-Seize	3	Sec.	1- 15
CO-CO Disconnect	35	100th	2- 250
Conference-Hold	5	Min.	1- 255
Data Wait	30	Sec.	1- 255
Dial Tone Wait	2	Sec.	1- 50
Dial Initiation — Keyset	15	Sec.	5- 30
Dial Initiation — SL-Set	10	Sec.	5- 30

Exit

J. TIMERS (TIMR)

10.85 There are programmable timers that control various system functions. In the System Timers programming window, the programmer can change any or all of them. The timers and their default values, programmable ranges, and purposes are described on the following pages. The default values have been carefully selected to ensure proper system operation under most circumstances. Occasionally, one or more of the timers may need to be adjusted. (The program planning sheet is located in Figure 5-17 on page 5-218.)

10.86 To reach this window, select System Timers from the System-Wide Features menu or enter the TIMR command.

10.87 SYSTEM TIMER LIST: To change the value of a system timer, scroll through the list box until it is highlighted. When the timer is selected, a window appears that is similar to the one shown below.

Abandoned Call

Value: Units: Min. Range: 1- 255

- **VALUE:** Select the Value text box and enter the new value for the timer.
- **DEFAULT:** To return the selected timer to its default value, select the Default command button. The default value is shown in parentheses () inside the command button.
- **PURPOSE:** To view a window that defines the timer and explains its purpose, select the Purpose command button. When you have finished viewing the information in the Purpose window, select the OK command button to return to the timer programming window.
- **OK or CANCEL:** To save the change and return to the System Timers list box, select the OK command button. To exit without saving any changes, select the Cancel command button.

10.88 EXIT: When all timer programming is finished, select the Exit command button. A window appears that asks "Perform Update to Database?" To update the database and exit to the Applications Menu window, select Yes. Or, select No to exit without saving any changes. To return to the Timers programming window, select the Cancel button.

TIMER	DEFAULT VALUE	RANGE	PURPOSE
Abandoned Call	10	1-255 minutes	After a call has recalled to the last possible station, it will recall until this timer expires. If it remains unanswered, the system will disconnect the call.
Camp-On	3	0-255 seconds	Length of time a caller hears busy tone before camping on.
Camp-On Tone	15	5-255 seconds	Length of time between camp-on tones.
CO Hookflash	60	2-250 hundredths (2/100 - 250/100)	Adjusts the duration of the timed hookflash that is sent over the CO trunk by the system when the Hookflash feature code is used. (Does not affect ESLS or SLI FLASH key.)
CO Re-Seize	3	1-15 seconds	When a user reseizes a trunk, this timer determines the length of time the system will hold the trunk open to allow the central office to drop and reconnect the trunk.
CO-CO Disconnect	35	2-250 hundredths (2/100 - 250/100)	A call is disconnected by the system if it detects loss of loop current (lasting longer than this timer) during CO-to-CO calls.
Conference-Hold	5	1-255 minutes	Limits time a conference call with two or more outside parties remains on hold (in an unsupervised conference) before recalling the station. NOTE: If this timer expires during an unsupervised conference, one of the parties can reset the timer by pressing any DTMF key.
Data Wait	30	1-255 seconds	Length of time the system will wait for the data device to go off hook after the user presses the DATA key when transferring a call to the data port.
Dial Tone Wait	2	1-50 seconds	When processing an LCR call, the system waits for this length of time before dialing to allow the central office time to send dial tone.
Dial-Initiation — Keyset	15	5-30 seconds	Limits time keyset can remain off hook without dialing before the system sends reorder tones.
Dial-Initiation — SL Set	10	5-30 seconds	Limits time single-line set user can remain off hook without receiving reorder tones.
Dialing Disconnect	200	2-250 hundredths (2/100 - 250/100)	The connection is dropped if the system detects loss of loop current (lasting longer than this timer) during dialing.
Dialing Wait After Connect — Ground Start	1500	0-5000 five-hundredths (0/500 - 5000/500)	The length of time the system waits for CO dial tone before dialing or checking the trunk for a disconnect. This timer is not used if the DT Detect option is enabled (see page 5-104).
Dialing Wait After Connect — Loop Start	1500	0-5000 five-hundredths (0/500 - 5000/500)	The length of time the system waits for CO dial tone before dialing or checking the trunk for a disconnect.

TIMER	DEFAULT VALUE	RANGE	PURPOSE
Dialing Wait After Hookflash	30	1-250 tenths (1/10 - 250/10)	Delays dialing after a hookflash to allow the system and central office hardware to recover.
Disconnect Flash Duration	15	1-250 tenths (1/10 - 250/10)	When a single-line station is involved in a call that is dropped by the other party, and the single-line station remains off hook, the system turns off tip and ring battery for the duration of this timer. (The flash is sent after the Single-line Set Wait For Disconnect timer expires.) If there is peripheral equipment on the single-line circuit (such as a voice mail unit, page amplifier, or other phone system) then this loss of battery will signal a call disconnect and will usually cause the equipment to disconnect. This timer applies to both IDC and SLC single-line circuits.
Disconnect Wait After Dialing	20	2-30 seconds	Length of time the system waits after dialing an outside telephone number before checking the trunk for disconnect.
DTMF Digit Duration/Pause	6	5-60 hundredths (5/100 - 60/100)	Adjusts the duration and pause between digits of DTMF tones sent by the system. Both the tone and the pause will use the assigned duration (for example, a 6/100 second tone has a 6/100 second pause between digits).
E&M Answer Recognition	2250	100-10000 five-hundredths (100/500 - 10000/500)	Determines the minimum amount of time the receiving PBX must be off-hook, when a station user places an outgoing call on an E&M trunk, before the 416/832 System recognizes that the call has been answered (unless the Answer Recognition timer is disabled).
E&M Dial Delay	35	1-100 five-hundredths (1/500 - 100/500)	This is the maximum amount of time the EMC will wait before transmitting digits following a handshake. This timer goes in effect after the handshake on a Wink-Start or Dial-Delay circuit or after seizure on an Immediate-Dial circuit.
E&M Dial Delay Hold	70	1-250 five hundredths (1/500 - 250/500)	This is the minimum length for a Dial-Delay handshake. Used only for Dial-Delay circuits.
E&M Dialing Wait After Hookflash	1500	100-10000 five-hundredths (100/500 - 10000/500)	Determines how long the EMC will wait when transmitting a hookflash before dialing additional digits or checking for disconnection.
E&M Disconnect Flash Duration	1000	100-10000 five-hundredths (100/500 - 10000/500)	This is the minimum amount of time the EMC will keep a circuit on hook to cause a disconnection from the remote circuit.
E&M Disconnect Recognition	750	100-5000 five-hundredths (100/500 - 5000/500)	This is the amount of time a circuit must be on hook before the EMC recognizes a disconnection.
E&M Disconnect Wait After Dialing	1500	100-10000 five-hundredths (100/500 - 10000/500)	This is how long the EMC will wait after dialing a digit before checking for disconnection from the remote circuit.

TIMER	DEFAULT VALUE	RANGE	PURPOSE
E&M DTMF Interdigit Pause	20	1-100 five-hundredths (1/500 - 100/500)	This is the minimum amount of time the EMC will pause between DTMF digits when dialing.
E&M DTMF Tone Duration	30	1-100 five-hundredths (1/500 - 100/500)	This is the minimum length of DTMF tones sent by the EMC.
E&M False Signal Debounce	25	1-100 five-hundredths (1/500 - 100/500)	Determines the minimum length of a valid handshake signal that is received from a remote circuit. Used only on Wink-Start and Dial-Delay circuits.
E&M Handshake Timeout	2500	100-10000 five-hundredths (100/500 - 10000/500)	Determines the maximum length of a valid handshake signal. Used only on Wink-Start and Dial-Delay circuits.
E&M Hookflash Duration	300	100-5000 five-hundredths (100/500 - 5000/500)	Determines the length of hookflashes sent to the remote circuits.
E&M Hookflash Recognition	150	100-5000 five-hundredths (100/500 - 5000/500)	Determines the minimum length of recognizable hookflashes from the remote circuit.
E&M Inter-Pulse Pause	20	1-100 five-hundredths (1/500 - 100/500)	This is the length of time the EMC will pause between pulse-dial signals when dialing.
E&M Off-Hook Debounce	5	1-50 five-hundredths (1/500 - 50/500)	This is the minimum amount of time the remote circuit must be off hook before the EMC will recognize another on-hook/off-hook transition.
E&M On-Hook Debounce	5	1-50 five-hundredths (1/500 - 50/500)	This is the minimum amount of time the remote circuit must be on hook before the EMC will recognize another off-hook/on-hook transition.
E&M Post Signal Delay	15	1-250 five-hundredths (1/500 - 250/500)	This is the minimum allowed time between the end of a handshake and the beginning of digit validation. Used only for Wink-Start and Dial-Delay circuits.
E&M Post Seizure Debounce	32	1-100 five-hundredths (1/500 - 100/500)	This is the minimum allowed time between the recognition of a seizure and the beginning of digit validation. Used only for Immediate-Dial circuits.
E&M Pulse Hold	30	1-100 five-hundredths (1/500 - 100/500)	This is the maximum length of a pulse-dial signal that is dialed by the EMC.
E&M Pulse-Dial Interdigit Pause	350	100-5000 five-hundredths (100/500 - 5000/500)	This is the minimum length of time the EMC will pause between pulse-dial signals when dialing.
E&M Pulse-Dial Interdigit Pause Recognition	150	1-500 five-hundredths (1/500 - 500/500)	This is the minimum pause allowed between pulse-dial signals sent from the remote circuit.

TIMER	DEFAULT VALUE	RANGE	PURPOSE
E&M Ready Timeout	2000	100-10000 five-hundredths (100/500 - 10000/500)	<i>On a Wink-Start circuit:</i> This is the maximum time the EMC will wait for a "Digit Register Ready" command before initiating the Wink-Start handshake. <i>On a Dial-Delay circuit:</i> This is the maximum time the EMC will wait for a "Digit Register Ready" command before the Dial-Delay signal is terminated.
E&M Receive Handshake Delay	10	1-250 five-hundredths (1/500 - 250/500)	This is the minimum time required, after seizure, before an incoming handshake signal can be recognized. Used only for Wink-Start and Dial-Delay circuits. If a Wink or Dial Delay signal is detected within this time, the outgoing call is blocked.
E&M Seizure Debounce	1	1-10 five-hundredths (1/500 - 10/500)	Determines the minimum amount of time the remote circuit must remain off hook before the EMC validates the incoming call.
E&M Short Circuit Debounce	500	100-10000 five-hundredths (100/500 - 10000/500)	Determines the minimum length of a recognizable short circuit on an active circuit.
E&M Short Circuit Timeout	2500	100-10000 five-hundredths (100/500 - 10000/500)	This is the maximum amount of time the EMC will allow a short circuit to exist on an active Type-I circuit.
E&M Short Pause Digit	1500	100-10000 five-hundredths (100/500 - 10000/500)	Determines the length of a short speed-dial pause sent over E&M trunks.
E&M Transmit Handshake Delay	50	1-250 five-hundredths (1/500 - 250/500)	This is the minimum delay time between the recognition of a seizure and the beginning of a handshake signal. Used only for Wink-Start and Dial-Delay circuits.
E&M Wait for Dial Tone	500	100-10000 five-hundredths (100/500 - 10000/500)	This is how long the EMC will wait for dial tone before dialing digits on an outgoing call.
E&M Wink Hold	107	1-250 five-hundredths (1/500 - 250/500)	Determines the length of a Wink-Start handshake.
E&M Wink Timeout	175	1-250 five-hundredths (1/500 - 250/500)	Determines the maximum allowed length of wink signals that are received from the remote circuit.
Forward-No-Answer	15	3-255 seconds	Length of time a call waits at an unavailable station before being forwarded. (Applies to manual call forwarding only, not system forwarding.)
Hold	60	10-255 seconds	Limits time a call remains on hold before recalling the station.
IC-CO Disconnect	60	2-250 hundredths (2/100 - 250/100)	A call is disconnected by the system if it detects loss of loop current (lasting longer than this timer) during station-to-CO calls.

TIMER	DEFAULT VALUE	RANGE	PURPOSE
Inactivity Alarm	60	10-255 seconds	Limits the time a station can remain off hook and inactive (after first receiving reorder tones) before registering a system alarm.
Inter-Ring Silence	60	1-250 tenths (1/10 - 250/10)	Indicates the duration of the silence between rings on an incoming CO call to determine if the trunk has stopped ringing prior to being seized. In most areas, CO ring pattern is 2 seconds on/ 4 seconds off. Check with the local telephone company for the ring pattern in your area. NOTE: This timer must always be set higher than the CO ring off time.
Interdigit (Long)	15	2-255 seconds	Determines end of dialing. Short timer is used after a valid number has been dialed. Long timer is used until digits form a valid number.
Interdigit (Short)	4	2-30 seconds	
LCR Advance	8	1-255 seconds	Length of time a station remains camped on to a busy facility group before it is moved to the next group.
Loop Reversal Debounce	25	1-255 five-hundredths (1/500 - 255/500)	The length of time the system will ignore subsequent loop reversals after a reversal occurs on a loop start trunk.
Message Wait	5	1-255 seconds	Length of time a caller waits after pressing the MSG key before being connected to the called party's message center.
Off-Hook Voice Announce Screening	5	0-255 seconds	After the Camp-On timer expires, length of time before an OHVA call can be completed.
Off-Line After Disconnect	10	10-250 tenths (10/10 - 250/10)	The length of time the system waits after disconnect before checking for loop current. Used only after the CO trunk has been disconnected in response to the IC-CO Disconnect timer.
Page	15	0-255 seconds	Limits duration of page.
Pause Digit Length	3	1-5 seconds	Length of "short" timed pauses used in system and station speed-dial telephone numbers and in LCR dial rules. "Long" pauses are double this length of time.
Queue Callback	15	10-255 seconds	Time allowed for a station to respond to a queue callback before the queue is cancelled.
Recall	60	10-255 seconds	Length of time a hold or transfer recall rings at a station before recalling that station's attendant. If the station receiving the recall has no attendant, the call remains at the station until the Abandoned Call timer expires.
Relaxed Ring Detection	62	1-9500 five-hundredths (1/500 - 9500/500)	This is the minimum amount of time the system can detect energy on a trunk before it will recognize that energy as ringing. Note that if this timer is set too low, trunk noise could cause false ring-in detection. This timer is used only on trunks that are programmed to utilize non-standard ringing (such as AT&T Dimension PBX OPX ring signal) with the "relaxed ring detection" option in individual trunk programming.

TIMER	DEFAULT VALUE	RANGE	PURPOSE
Single-Line Hookflash Maximum	7	2-20 tenths (2/10 - 20/10)	The maximum amount of time a single-line set user can press the hookswitch before the system disconnects calls.
Single-Line Hookflash Minimum	2	1-10 tenths (1/10 - 10/10)	The minimum length of time a single-line set user must press the hookswitch for the system to recognize a hookflash.
Single-Line Wait For Disconnect	2	1-60 seconds	When a single-line station is involved in a call that is disconnected by the other party, and the single-line station remains off hook, this timer specifies the length of time between the disconnection and when the disconnect flash (which is set by the Disconnect Flash Duration timer) is transmitted to the single-line circuit. During this time, the station receives no audible signal.
System Forwarding Advance	15	2-255 seconds	Determines how long a call will ring (unanswered) at each forwarding point in a system forwarding path.
System Forwarding Initiate	15	2-255 seconds	Determines how long a call will ring (unanswered) at the principal station before advancing to the first forwarding point in a system forwarding path.
T1 Busy-Out Switch Time Out	60	10-10000 seconds	This is the maximum amount of time the T1 card will remain "busied out" after the busy-out button has been pushed. If the card is not removed or the button is not pressed again, the T1 card will no longer be busy when this timer expires.
Transfer — Available	20	10-255 seconds	Limits time a transferred call rings unanswered before it recalls the transferring station.
Transfer — Busy	24	10-255 seconds	Limits time a transferred call waits at a busy station before recalling the transferring station.
Trunk Key Debounce	3	1-777 seconds	The length of time the system will ignore subsequent attempts to press a trunk key once it has been pressed. This prevents a keyset user from accidentally disconnecting a call by re-accessing the trunk key if the key is pressed twice while answering a call.
			NOTE: The database contains a station option that can be set to prevent users from reseizing a CO trunk. If selected, the station user cannot reseize a trunk until it is disconnected by replacing the handset, pressing the SPKR key, or pressing another trunk key.
Trunk Preselect	5	2-255 seconds	To pre-select a trunk, the keyset user presses a trunk key while on hook. This limits the time the keyset can hold a trunk before dialing.

TIMER	DEFAULT VALUE	RANGE	PURPOSE
Trunk Ring Detection	5	1-250 tenths (1/10 - 250/10)	This is a low-level timer that specifies the duration that continuous ring voltage must be detected on a CO trunk for the system to recognize a new incoming call. If this timer is too low, then false rings could be detected. If the timer is too high, then new incoming calls may not be detected at all. Common ring durations sent by central offices are 1-second and 2-second.
Unsupervised-CO	5	1-255 minutes	Limits duration of CO-to-CO DISA calls or outside calls transferred or forwarded to outside telephone numbers before recalling the primary attendant.
Valid-Call	15	0-60 seconds	Minimum duration of an outgoing call before it is recorded in SMDR or SMDA. Calls placed on hold or transferred are not subject to this timer.
Voice Mail Dialing Delay	5	1-250 tenths (1/10 - 250/10)	When a call is answered by the voice mail unit, this indicates the amount of time the system waits before sending digits to the voice mail unit after it answers the call.

Tenants and Departments	
<u>A</u> ctions	<u>S</u> etup
<u>E</u> xit	
Tenant Groups	
01	↑
02	
03	
04	
05	
06	
07	
08	↓
Exit	

K. TENANTS AND DEPARTMENTS (TNT)

10.89 There can be up to eight tenant groups, with 10 departments per tenant group in a standard system and up to 12 tenant groups with 10 departments each in an expanded system. In the default state, all stations are placed in tenant group 1 and department 1.

10.90 To prepare to use this program, make a list of the stations to be assigned to each of the tenant groups. (All stations must be assigned to a tenant group and a department.) If desired, give each tenant group and department a name of up to 20 characters. The program planning sheet for this program is Figure 5-18 on page 5-221.

10.91 The window shown above can be reached by selecting Tenants and Departments from the System-Wide Features menu or entering the TNT command.

10.92 TENANT GROUPS: To program a tenant group and/or its departments, select it in the list box. The window shown on the next page appears.

10.93 EXIT: When all tenant and department programming is finished, select the Exit command button. A window appears that asks "Perform Update to Database?" To update the database and exit to the Applications Menu window, select Yes. Or, select No to exit without saving any changes. To return to the Tenants and Departments programming window, select the Cancel button.

10.94 DESCRIPTION: To give the tenant group an identifying name, select the Description text box and type a name of up to 20 characters.

10.95 DEPARTMENT: To program the individual departments, move to the Department list box. When the desired department is selected, the following window appears.

- **DESCRIPTION:** To give the department an identifying name, select the Description text box and type a name of up to 20 characters.
- **STATIONS:** To designate the stations that will be in the department, select the Stations command button. A Station List window will appear that contains a list of stations in the tenant group, as described in paragraph 10.97.
- **OK:** When finished programming the department, select the OK command button to return to the department description window.

10.96 TRUNK GROUP FOR AUTO FEATURE: To select the trunk group that will be used by this tenant group as the auto trunk group, move the highlight bar to the desired trunk group or the line that reads "NONE."

10.97 STATIONS: To designate the stations that are in this tenant group, select the Stations command button. The following window appears.

- **INCLUDE or EXCLUDE:** To include a station, locate that station on the Exclude list and select it by pressing the SPACE BAR; it will automatically move to the Include list. To remove a station from the list, exit and select another tenant group, then place the desired station in a new tenant group and department. This procedure must be followed to en-

sure that a station is always part of a tenant group and department.

- **ALL:** To include all stations in the list, select the All command button. (The None command button cannot be used in this window.)
- **OK or CANCEL:** When the station lists appear as desired, select the OK command button. To exit from the window without saving changes, select the Cancel command button.
- **SORT:** To sort the stations and list them numerically by extension number or circuit number, or to list them alphabetically by name, select the Sort command button. The following window appears. Choose the desired sorting method by selecting the corresponding option button. Then select the OK command button. When the list of stations returns, the list box will show the stations in the selected order. To exit without changing the sorting method, select the Cancel command button.

The dialog box titled "Station Sorting Method" contains a section labeled "Ordering" with three radio button options: "By Extension" (selected), "By Circuit", and "By Name". To the right of these options are two buttons: "Ok" and "Cancel".

10.98 TRUNK GROUPS: To determine which trunk groups that the attendant for this tenant group can place in night ring mode, select the Trunk Groups command button. The following window appears. Each trunk group can be assigned to only one tenant group.

The dialog box is split into two sections. The top section, titled "Include", contains a list box with items "02", "03", "04", and "05". Above the list is a button labeled "All". The bottom section, titled "Exclude", contains an empty list box. Below the list is a button labeled "Ok".

- **INCLUDE or EXCLUDE:** To include a trunk group, locate it on the Exclude list and select it by pressing the SPACE BAR; it will automatically move to the Include list. To remove a trunk group from the list, select another tenant group then place the trunk group in that tenant group's list. This procedure must be followed to ensure that a trunk group is always assigned to a tenant group.
- **ALL:** To include all trunk groups in the list, highlight a line in the Include list box and select the All command button.
- **OK:** When the trunk group lists appear as desired, select the OK command button.

10.99 DID GROUPS: To determine which DID groups that the attendant for this tenant group can place in night ring mode, select the DID Groups command button. A window appears, like the one described above for trunk groups; follow the same procedures. Each DID group can be assigned to only one tenant group. Placing a DID group in a tenant group removes it from the group to which it was previously assigned.

10.100 OK: When tenant group programming is complete, select the OK command button in the Tenant Group X window (shown on the previous page). You will return to the Tenant Groups window shown on page 5-85.

11. TOLL RESTRICTION

11.1 When Toll Restriction is selected from the Applications Menu window, the menu expands to show the following options:

Toll Restriction...

- Alternate Carriers and Allowed Long Distance
- Area/Office Codes Allowed/Restricted
- SCOS Information
- Toll Security

11.2 Each of the options and the windows they access are described in detail in the following pages.

A. ALTERNATE CARRIERS AND ALLOWED LONG DISTANCE (ALT)

11.3 **Alternate Carrier Numbers:** Alternate carrier numbers are the telephone numbers that you wish to restrict some stations from dialing. Stations that have been assigned SCOS 7 (Restrict Alternate Carrier List) cannot use these numbers. List up to 20 alternate carrier numbers with up to 10 digits each. You may use X in the number to indicate any digit 0-9. For example, 976XXXX restricts SCOS 7 users from dialing 7-digit numbers that begin with 976. The numbers should not contain the toll field, but can contain equal access digits (e.g., do not enter 1+ or 0+ numbers, except 10XXX and 101XXXX numbers). (Refer to Figure 5-19, page 5-222, for a program planning sheet.)

NOTE: Allowed long distance numbers override alternate carrier number restrictions. Also, numbers are only restricted if they exactly match the number on the alternate carrier list. For this reason, alternate carrier numbers can have a plus (+) added to the end of the number to restrict users from bypassing toll restriction by dialing extra digits after dialing the alternate carrier num-

ber. For example, 976+ restricts all calls that begin with 976, no matter how many digits are dialed.

11.4 **Allowed Long Distance Numbers:** Allowed long distance numbers are the toll-call numbers that stations with SCOS 8 (Allowed Long Distance Access) are permitted to dial. List up to 20 long distance numbers (30 in an expanded system). The numbers can contain up to 10 digits each. You may use X in the number to indicate any digit 0-9. For example entering, XXX5551212 allows SCOS 8 users to dial directory information using any area code. You can also use a "+" at the end of the number to indicate that any digits can be dialed. For example, 800+ allows any number beginning with 800. In the default state, the allowed long distance numbers are 911 and 800XXXXXXXX. (Refer to Figure 5-19, page 5-222, for a program planning sheet.)

NOTE: Even if 0+ numbers are included in the allowed long distance number list, they cannot be dialed by a station with SCOS 1.

CAUTION

REGARDING EMERGENCY NUMBERS

In areas where the emergency number is 1911, be sure that toll-restricted stations have SCOS 8 (Enable ALD) and that 911 is in the allowed long distance number list. Otherwise, toll-restricted users may not be able to find a station that is permitted to dial "1+" numbers. Note that 911 is allowed at every station regardless of toll restriction, but 1911 requires this special programming.

11.5 Select Alternate Carriers and Allowed Long Distance from the Toll Restriction menu or enter the ALT command to access the window shown on the next page.

Alternate Carriers and Allowed Long Distance

Actions Setup Exit

Alternate Carrier	Allowed Long Distance
01	01 911
02	02 800XXXXXXXX
03	03
04	04
05	05
06	06
07	07
08	08
09	09
10	10

Exit

11.6 ALTERNATE CARRIER and ALLOWED LONG DISTANCE: To enter an alternate carrier number or allowed long distance number in the appropriate list, highlight the desired position on the list and select it. The following window appears.

Number:

Ok

- **NUMBER:** Select the text box and type the number.
- **OK:** When finished, select the OK command button and the number will appear in the selected list box.

11.7 EXIT: When programming is finished, select the Exit command button. A window appears that asks "Perform Update to Database?" To update the database and exit to the Applications Menu, select Yes. Or, select No to exit without saving any changes. To return to the Alternate Carrier and Allowed Long Distance window without updating the database, select the Cancel button.

**B. AREA/OFFICE CODES
ALLOWED/RESTRICTED (AREA)**

11.8 The window shown on the next page is used for programming the numbering plan flags for the system and for programming area/office code user groups.

Numbering Plan Flags

11.9 The growth of telecommunications services has created an increasing demand for more telephone numbers. To meet the demand, Bellcore has prepared a long-range North American Numbering Plan (NANP) to provide additional telephone numbers. The plan expands the capacity of the current numbering system by making area and office codes interchangeable. That is, numbering patterns formerly reserved for office codes can be used as new area codes, and office codes within existing area codes can have the same pattern as other area codes.

11.10 With interchangeable area and office codes, switching systems lose the ability to distinguish between 7- and 10-digit numbers by examining the first three digits. To address this, the database contains the following flags:

- **Office Codes Used as Area Codes:** An area code in another location uses an NXX pattern that matches an office code within the system site's area code. (This flag defaults to *no*.)
- **Area Codes Used as Office Codes:** One or more office codes within the system site's area code use an NZX pattern that is the same as an area code in another area. (This flag defaults to *no* unless you are converting a database that has the "Overlap Area/Office Code flag enabled.)
- **Toll Digit Allowed On Toll Local Calls:** This option applies only if the area and office codes overlap. Callers in the site's area code usually dial a 1 when placing a call within the local area code(s). (This flag defaults to *no*.)

- **Toll Digit Required On Toll Long Distance Calls:** This option applies only if the area and office codes overlap. Callers in the site's area code must dial a 1 when placing a call outside of the local area code(s). (This flag defaults to *yes*.)

	AREA CODES CAN BE:	OFFICE CODES CAN BE:
Office Codes as Area Codes	NZX or NXX	NXX
Area Codes as Office Codes	NZX	NXX or NZX

User Groups

11.11 Set up area and office code tables for up to eight user groups to allow different area/office code restriction to be used. This is useful for reducing restrictions for some users while increasing restrictions for others. Each station is assigned to a user group. Within each user group, area codes can be restricted, allowed, or extended. Restricting an area code prevents users from placing calls to that area code and all of its office codes. Allowing an area code also allows all office codes within that area code. Designating an area code as extended allows the programmer to determine which office codes within that area code are allowed or restricted. There can be up to four extended area codes per user group. List the area codes that are allowed, restricted, or extended. Also, list the office codes within the extended area code(s) that are allowed and restricted. (Refer to Figure 5-20, page 5-223, for a program planning sheet.)

NOTE: Area/office code programming also affects call cost designation for the SMDR feature. When a seven-digit number is dialed from a station without area/office code restriction, the system still checks the office code against the area/office code tables for the station's user group. If the office code is allowed, the call is recorded as a local call (LOC). If it is restricted, the call is recorded as a seven-digit toll call (T7).

Area/Office Codes Allowed/Restricted

Actions
Setup
Exit

User Groups

01	↑
02	
03	
04	
05	
06	
07	↓

Area Codes

Office Codes

Day Station List

Night Station List

Exit

Office Codes Used As Area Codes
 Area Codes Used As Office Codes
 Toll Digit Allowed On Toll Local Calls
 Toll Digit Required On Toll Long Distance Calls

11.12 The window shown above is used for programming the various aspects of area and office code restriction used for SCOS 5 (Area/Office Code Restriction). To reach it, select Area/Office Codes Allowed/Restricted from the Toll Restriction menu or enter the AREA command.

11.13 FLAGS: If any of the numbering plan flags apply to the system location (see explanation on previous page), select the flag to place a check mark in the check box. To remove a check mark, select the check box again. Depending on the combination of flags that are selected, some flags may be dimmed and cannot be selected.

11.14 USER GROUPS: The list box shows the user groups and their descriptions (if programmed). To program a description for a user group, *highlight* the desired line and then *select* it by pressing the SPACE BAR. The following window appears.

Description Programming

Description:

Ok

Cancel

- **NAME:** A name, up to 20 characters, can be assigned to each user group. Select the Name text box and type the desired name.

- **OK or CANCEL:** When the name appear as desired, select the OK command button. To exit from the window without saving changes, select the Cancel command button.

11.15 DAY/NIGHT STATION LISTS: To program the list of stations that are included in a specific user group in day or night mode, select the Day or Night Station List command button. The following window appears.

Include

1000 01.01 Smith, John	↑
1001 01.02 "Station Undefined	
1002 01.03 "Station Undefined	
1003 01.04 "Station Undefined	
1004 01.05 "Station Undefined	↓

None

All

Sort

Cancel

Ok

Exclude

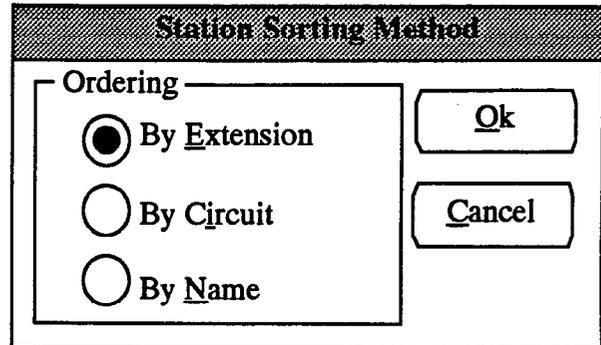
1008 02.01 "Station Undefined	↑
1009 02.02 "Station Undefined	
1010 02.03 "Station Undefined	
1011 02.04 "Station Undefined	
1012 02.05 "Station Undefined	↓

- **INCLUDE or EXCLUDE:** To include a station, locate that station on the Exclude list and select it by pressing the SPACE BAR; it will automatically move to the Include list. To remove a station from the list, exit and select another user group then place the desired station in a new user group. This proce-

cedure must be followed to ensure that a station is always part of a user group.

- **ALL:** To include all stations in the list, select the All command button. (The None command button cannot be used in this window.)
- **OK or CANCEL:** When the station lists appear as desired, select the OK command button. To exit from the window without saving changes, select the Cancel command button.
- **SORT:** To sort the stations and list them numerically by extension number or circuit number, or to list them alphabetically by name, select the Sort command button. The following window appears. Choose the desired sorting method by selecting the

corresponding option button. Then select the OK command button. When the list of stations returns, the list box will show the stations in the selected order. To exit without changing the sorting method, select the Cancel command button.



The image shows a dialog box titled "Station Sorting Method". It contains a section labeled "Ordering" with three radio button options: "By Extension" (which is selected), "By Circuit", and "By Name". To the right of these options are two buttons: "Ok" and "Cancel".

Area Code Programming

Allowed Area Codes Restricted Area Codes

All None Extend

200
201
202
203
204
205
206
207
208
209
210

Extended Area Codes

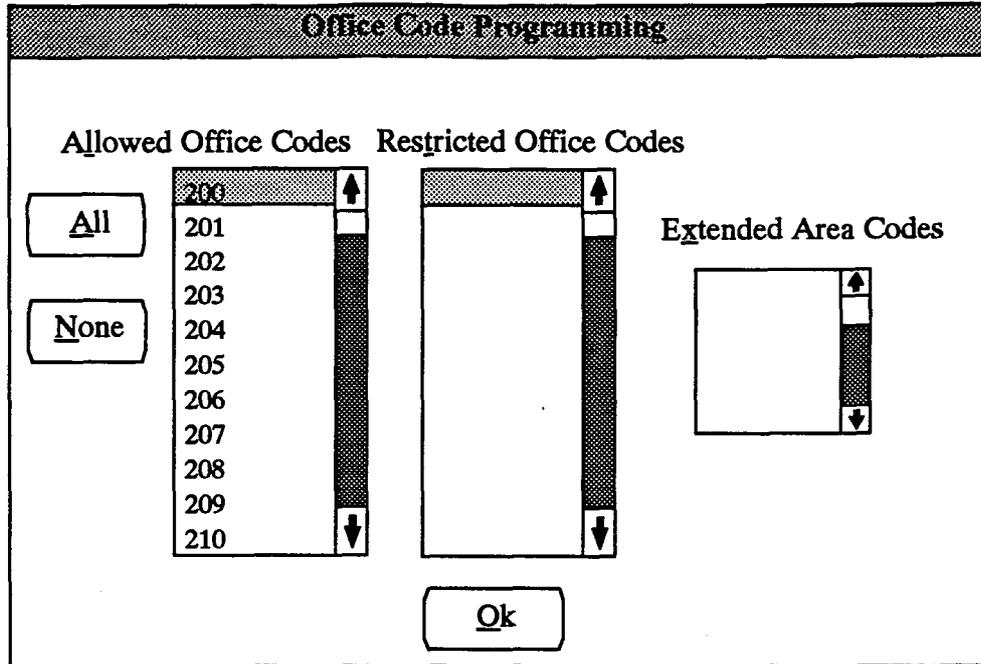
Ok

11.16 AREA CODES: To program the area codes for a specific user group, highlight the desired line in the User Groups list box then select the Area Codes command button. An area code programming window will appear as shown above.

- **ALLOWED and RESTRICTED AREA CODES:** To allow users in the user group to access area codes, the codes must be placed in the Allowed list. To place an area code in the Allowed Area Codes list box, locate that area code on the Restricted Area Codes list and select it by pressing the SPACE BAR; it will automatically move to the Allowed list. To remove an area code from the Allowed list, select the code in the Allowed list to move it to the Restricted list.
- **ALL or NONE:** To include all area codes in the allowed list, select the All command button. To ex-

clude all codes from the list, select the None command button.

- **EXTEND:** There can be up to four extended area codes per user group, each with individual lists of allowed and restricted office codes. To create an extended area code, move the desired code to the Allowed list box and highlight it. Then select the Extend command button. The area code moves to the Extended Area Codes list box. Office codes can then be programmed as allowed or restricted, for that area code as described on the next page. To remove an extended area code from the list, highlight the code in the Extended Area Codes list box and select it by pressing the SPACE BAR; it automatically moves to the Allowed Area Codes list box.
- **OK:** When all area code programming has been completed, select the OK command button to return to the User Group programming window.



11.17 OFFICE CODES: To program the office codes for the extended area codes in a specific User Group, highlight the desired line in the User Groups list box then select the Office Codes command button. An office code programming window will appear as shown above.

- **EXTENDED AREA CODES:** Begin programming by selecting the extended area code to be programmed. Locate the desired area code in the Extended Area Codes list box then press the SPACE BAR. The Office Codes list boxes will show the current programming for that extended area code.
- **ALLOWED/RESTRICTED OFFICE CODES:** To allow users in the user group to access office codes, the codes must be placed in the Allowed Office Codes list. To place an office code in the Allowed Office Codes list box, locate it on the Restricted Office Codes list and select it by pressing the SPACE BAR; it will automatically move to the

Allowed list. To remove an office code from the Allowed list, select the code in the Allowed list to move it to the Restricted list.

- **ALL or NONE:** To include all office codes in the allowed list, select the All command button. To exclude all codes from the list, select the None command button.
- **OK:** When all office code programming has been completed, select the OK command button to return to the User Group programming window.

11.18 EXIT: When programming is finished, select the Exit command button. A window appears that asks "Perform Update to Database?" To update the database and exit to the Applications Menu, select Yes. Or, select No to exit without saving any changes. To return to the Area/Office Code Allowed/Restricted window without updating the database, select the Cancel button.

C. SCOS INFORMATION (SCOS)

11.19 To prepare for programming this information, list all unrestricted stations and those that are affected by each of the following restrictions. (Refer to Figure 5-21, page 5-224, for a program planning sheet. Refer to FEATURES page 4-27 for further explanation of SCOS.)

- **Restrict operator access (0+):** Calls that begin with 0 are not permitted, including international calls. If this restriction is not set, all calls beginning with 0 are permitted, unless the station also has SCOS 3.
- **Restrict toll access (1+):** Calls that begin with 1 are not permitted unless the number is on the allowed long distance list and the station has allowed long distance number access.
- **Restrict international access (01+):** Calls that begin with 01 are restricted. If this restriction is not set, all calls beginning with 01 are permitted regardless of other restrictions.
- **Restrict eight-digit call access (7+):** Calls are not permitted if they are over seven digits in length, unless the number is in the allowed long distance number list and the station has allowed long distance number access.

- **Use area/office code tables (table-driven toll):** Calls can only be placed to the allowed area and office codes, as determined by the station's user group.
- **Use LCR Only:** Calls can only be placed using the Least-Cost Routing (LCR) feature.
- **Restrict alternate carrier:** Calls cannot be placed to any of the numbers on the alternate carrier number list if this option is selected. Allowed long distance numbers override alternate carrier number restrictions.
- **Enable allowed long distance list:** Calls can be placed to any of the numbers on the allowed long distance number list.

11.20 LCR advances determine the number of facility groups to which a station will be allowed to advance when the facility groups are busy. If there is not an advance limit, the station is limited to the first facility group in the selected route group. If one advance is allowed, the station can move to the next facility group when the first one is busy. If two advances are allowed, it can advance to the third group, and so on. The station can be given unlimited advances to allow access to all facility groups.

11.21 When SCOS Information is selected from the Toll Restriction menu, or the SCOS command is entered, the window appears as shown below.

SCOS Information																																			
<div style="display: flex; justify-content: space-between; border-bottom: 1px solid black;"> <u>A</u>ctions <u>S</u>etup <u>E</u>xit </div>																																			
<p style="text-align: center; margin: 0;">Station Class of Service Programming</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr style="background-color: #cccccc;"> <td style="padding: 2px;">00 Remove ALL Restrictions</td> <td style="text-align: center; width: 20px;">↑</td> </tr> <tr> <td style="padding: 2px;">01 Restrict Operator Access</td> <td></td> </tr> <tr> <td style="padding: 2px;">02 Restrict Toll Access</td> <td></td> </tr> <tr> <td style="padding: 2px;">03 Restrict International Access</td> <td></td> </tr> <tr> <td style="padding: 2px;">04 Restrict Eight Digit Calls</td> <td></td> </tr> <tr> <td style="padding: 2px;">05 Use Area/Office Tables</td> <td></td> </tr> <tr> <td style="padding: 2px;">06 Use LCR Only</td> <td></td> </tr> <tr> <td style="padding: 2px;">07 Restrict Alternate Carriers</td> <td></td> </tr> <tr> <td style="padding: 2px;">08 Enable Allowed Long Distance List</td> <td style="text-align: center;">↓</td> </tr> </table>	00 Remove ALL Restrictions	↑	01 Restrict Operator Access		02 Restrict Toll Access		03 Restrict International Access		04 Restrict Eight Digit Calls		05 Use Area/Office Tables		06 Use LCR Only		07 Restrict Alternate Carriers		08 Enable Allowed Long Distance List	↓	<p style="text-align: center; margin: 0;">LCR Advances</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%; padding: 2px;">Day Mode</th> <th style="width: 50%; padding: 2px;">Night Mode</th> </tr> </thead> <tbody> <tr style="background-color: #cccccc;"> <td style="padding: 2px;">Unlimited</td> <td style="padding: 2px;">Unlimited</td> </tr> <tr> <td style="padding: 2px;">No Advances</td> <td style="padding: 2px;">No Advances</td> </tr> <tr> <td style="padding: 2px;">01 Advance</td> <td style="padding: 2px;">01 Advance</td> </tr> <tr> <td style="padding: 2px;">02 Advances</td> <td style="padding: 2px;">02 Advances</td> </tr> <tr> <td style="padding: 2px;">03 Advances</td> <td style="padding: 2px;">03 Advances</td> </tr> <tr> <td style="padding: 2px;">04 Advances</td> <td style="padding: 2px;">04 Advances</td> </tr> <tr> <td style="padding: 2px;">05 Advances</td> <td style="padding: 2px;">05 Advances</td> </tr> </tbody> </table>	Day Mode	Night Mode	Unlimited	Unlimited	No Advances	No Advances	01 Advance	01 Advance	02 Advances	02 Advances	03 Advances	03 Advances	04 Advances	04 Advances	05 Advances	05 Advances
00 Remove ALL Restrictions	↑																																		
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<div style="display: flex; justify-content: space-around; margin: 0;"> <div style="border: 1px solid black; border-radius: 10px; padding: 5px 20px; margin: 5px;">Day List</div> <div style="border: 1px solid black; border-radius: 10px; padding: 5px 20px; margin: 5px;">Night List</div> <div style="border: 1px solid black; border-radius: 10px; padding: 5px 20px; margin: 5px;">Exit</div> </div>																																			

11.22 STATION CLASS OF SERVICE PROGRAMMING DAY/NIGHT LISTS, and LCR ADVANCES: To program the list of stations that have a specific SCOS designation, highlight the desired SCOS in the Station Class of Service Programming list box and then select the Day List or Night List command button. A window appears as shown below. To program LCR Advance, highlight and select the desired LCR advance number in either the Day Mode or Night Mode LCR Advances list box. The following window appears.

Include	
1003 01.01 Smith, John	↑
1001 01.02 ~Station Undefined	
1002 01.03 ~Station Undefined	
1003 01.04 ~Station Undefined	
1004 01.05 ~Station Undefined	↓

Exclude	
1008 02.01 ~Station Undefined	↑
1009 02.02 ~Station Undefined	
1010 02.03 ~Station Undefined	
1011 02.04 ~Station Undefined	
1012 02.05 ~Station Undefined	↓

None
All
Sort
Cancel
Ok

- **INCLUDE or EXCLUDE:** To include a station, locate that station on the Exclude list and select it by pressing the SPACE BAR; it will automatically move to the Include list. To remove a station from an SCOS list, select the station in the Include list to move it to the Exclude list. To remove a station from the LCR Advances list, select another advance list and include it there. This ensures that a station always appears on an LCR Advance list.

NOTE: When a station that was previously programmed with "unrestricted" station class of service (00) is removed from that class of service using

the list box, it is automatically given all station toll restriction classes of service (01-08).

- **ALL or NONE:** To include all stations in either list, select the All command button. To exclude all stations from the SCOS list, select the None command button. Stations cannot be deleted from the LCR Advances list.
- **OK or CANCEL:** When finished, select the OK command button. To exit from the window without saving changes, select Cancel.
- **SORT:** To sort the stations and list them numerically by extension number or circuit number, or to list them alphabetically by name, select the Sort command button. The following window appears. Choose the desired sorting method by selecting the corresponding option button. Then select the OK command button. The list box will show the stations in the selected order. To exit without changing the sorting method, select the Cancel button.

Station Sorting Method

Ordering

By Extension
 By Circuit
 By Name

Ok
Cancel

11.23 EXIT: When programming is finished, select the Exit command button. A window appears that asks "Perform Update to Database?" To update the database and exit to the Applications Menu, select Yes. Or, select No to exit without saving any changes. Select Cancel to return to the SCOS Information window without updating the database.

D. TOLL SECURITY

11.24 When Toll Security is selected from the Toll Restriction menu, or the TOLL command is entered, the window appears as shown below. It is used for programming the toll security weekly toll limit information. Refer to page 4-30 in FEATURES for a detailed explanation. For a program planning sheet, refer to Figure 5-22, on page 5-227.

11.25 This program determines whether 7- and 10-digit calls and/or operator-assisted and international calls will be monitored by the weekly toll limit feature. If calls are monitored, it also determines the weekly dollar limit for the call type(s).

11.26 Data in this programming area can be changed only after the Database Programming feature code (029) has been entered at an attendant station. The programming privilege will remain in effect until you end the programming session or allow the session to time out.

NOTE: If a system database restore is performed, the Remaining Days value of the Toll Security Weekly Limit feature is reset to 0. It is not restored to its previous value.

11.27 7/10 DIGIT ENABLED: If this box is checked (by selecting it and pressing SPACE BAR), all 7-digit and 10-digit calls will be monitored by the weekly toll limit feature. The weekly limit information below can

be programmed when there is a check in the 7/10 Digit Enabled box.

11.28 OPERATOR/INTERNATIONAL ENABLED: If this box is checked (by selecting it and pressing SPACE BAR), all operator-assisted and international calls will be monitored by the weekly toll limit feature. The weekly limit information below can be programmed when there is a check in the Operator/International Enabled box.

11.29 WEEKLY TOLL LIMIT: Enter the desired weekly dollar limit (0-65,000) for the type of calls being monitored (7/10 digit or operator/International).

11.30 CLEAR ACCUMULATED WEEKLY TOTAL: When this box is checked, the weekly limit above it is reset to 0 when you update the database. (The check is removed automatically after the update.)

11.31 REMAINING DAYS: This appears for reference only. It indicates the number of days that the weekly toll limit feature will remain enabled. This number can be increased only by Inter-Tel Services personnel (see page 6-41). In the default state, it is set to 0.

11.32 EXIT: When programming is finished, select the Exit command button. A window appears that asks "Perform Update to Database?" To update the database and exit to the Applications Menu, select Yes. Or, select No to exit without saving any changes. Select Cancel to return to the Toll Security window without updating the database.

Toll Security	
<p><u>A</u>ctions <u>S</u>etup <u>E</u>xit</p>	
<p><input type="checkbox"/> 7/10 Digit Enabled</p> <div style="border: 1px solid black; padding: 5px; margin-top: 5px;"> <p>7/10 Digit Toll Calls</p> <p>Weekly Toll Limit: <input style="width: 80px;" type="text"/></p> <p>Accumulated Weekly Total: 0</p> <p><input type="checkbox"/> Clear Accumulated Weekly Total</p> </div>	<p><input type="checkbox"/> Operator/International Enabled</p> <div style="border: 1px solid black; padding: 5px; margin-top: 5px;"> <p>Operator/International Toll Calls</p> <p>Weekly Toll Limit: <input style="width: 80px;" type="text"/></p> <p>Accumulated Weekly Total: 0</p> <p><input type="checkbox"/> Clear Accumulated Weekly Total</p> </div>
<p>Remaining Days: 0</p>	
<div style="border: 1px solid black; display: inline-block; padding: 5px 20px; margin: 0 auto;">Exit</div>	

12. LEAST-COST ROUTING (LCR)

12.1 Programming LCR requires some preparation. Refer to page 4-32 in FEATURES for a description of the feature. Then, follow the planning steps listed below. For a program planning sheet, refer to Figure 5-23, on page 5-228.

- **Facility groups:** Determine the types of trunk groups available and assign them to up to 24 facility groups (32 in an expanded system). For example, place all local trunk groups in one facility group, in-state WATS in another, etc. Each facility group can contain any or all of the system trunk groups.

NOTE: E&M trunks can be placed in LCR facility groups to allow the system to route outgoing calls through the E&M destination site's trunks. The E&M trunks are put into the facility groups and the dial rules are programmed to dial the other system's trunk access code and then echo the digits dialed. This is useful when calls that are toll calls from the 416/832 site can be placed as local calls through the other site's trunks.

- **Area codes and office codes to be accessed by LCR:** Customers may wish to use LCR for all outgoing calls, all long distance calls, or calls to specific cities. List the area codes to which the customer wishes to place calls using LCR. Also list office codes within the area codes for more specific LCR use.
- **Route groups:** Group the area codes and office codes that have common access in up to 19 route groups. For example, non-toll local area and office codes can be in one group, while toll codes are in another. A route group for "800+" calls could also be programmed. (Route group 1 is used for 911 and 411 calls and is normally used for non-toll, local calls and calls to the telephone company operator.) To provide route groups for calls that begin with 0, 01, and 011, there are three permanently programmed route groups (these route groups cannot be deleted):
 - Route Group 17 is for operator-assisted (0+) calls.
 - Route Group 18 is for operator-assisted international (01+) calls.
 - Route Group 19 is for station-to-station international (011+) calls.

NOTE: Because area and office codes do not need to be checked when these route groups are used, only facility groups and time blocks are programmed for them.

- **Rank the facility groups within the route groups:** Each route group is divided into day, evening, and

night/weekend time blocks. Rank the facility groups, from most- to least-economical, for each time block. For example, direct-dial trunks may be the least-economical route during the day, but at night they may be the most-economical route. A facility group can appear in more than one route group.

- **Dial rules needed:** If the trunk groups in the facility groups require special digits (for example, SCC access codes), up to 28 dial rules can be programmed. In addition, there are four permanently programmed rules in the database; they are as follows:

— *Dial Rule 1 — Echo toll field:* When LCR is selected, the station user dials the number as if a direct dial trunk was being used, including the area code and "1" if necessary. If LCR selects a trunk that requires a "1," its facility group must have this dial rule programmed to tell the system to echo (send) the "1".

NOTE: It may be desirable to program dial rule number five to add a "1," even though dial rule number one can be used to echo the toll field. This allows users to dial without knowing whether the "1" is required. If "1" is needed, the dial rules tell the system to add it. Users only have to remember to dial the area code when necessary. If dial rule number five is programmed as described, do not include dial rule number one.

— *Dial Rule 2 — Echo area code:* The system includes the area code in the number if this dial rule is programmed for the facility group. If this dial rule is not programmed, the system drops the area code from the dialed number.

— *Dial Rule 3 — Echo local address or country code and national number:* All facility groups must have this dial rule. It tells the system to send the seven-digit telephone number that the user has dialed.

— *Dial Rule 4 — Echo Extension Number:* This dial rule includes the extension number of the station placing the call in the dialed number. This is especially useful in areas where the 911 operator needs to know the extension number when an emergency call is placed from a business location.

- **Assign the dial rules to the facility groups:** List the dial rules for the facility groups in the order they are to be used. For example, to add the "1" (rule 5), echo the area code (rule 2), and echo the telephone number dialed (rule 3), enter 5, 2, 3. (For international calls, only rules 1 and 3 are needed.)

Least Cost Routing																																	
<u>A</u> ctions <u>S</u> etup <u>E</u> xit																																	
Route Groups	Facility Groups																																
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr style="background-color: #cccccc;"><td style="padding: 2px;">01 Everything</td><td style="text-align: center; padding: 2px;">▲</td></tr> <tr><td style="padding: 2px;">02</td><td style="text-align: center; padding: 2px;"> </td></tr> <tr><td style="padding: 2px;">03</td><td style="text-align: center; padding: 2px;"> </td></tr> <tr><td style="padding: 2px;">04</td><td style="text-align: center; padding: 2px;"> </td></tr> <tr><td style="padding: 2px;">05</td><td style="text-align: center; padding: 2px;"> </td></tr> <tr><td style="padding: 2px;">06</td><td style="text-align: center; padding: 2px;"> </td></tr> <tr><td style="padding: 2px;">07</td><td style="text-align: center; padding: 2px;"> </td></tr> <tr><td style="padding: 2px;">08</td><td style="text-align: center; padding: 2px;">▼</td></tr> </table>	01 Everything	▲	02		03		04		05		06		07		08	▼	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr style="background-color: #cccccc;"><td style="padding: 2px;">01 All Lines</td><td style="text-align: center; padding: 2px;">▲</td></tr> <tr><td style="padding: 2px;">02</td><td style="text-align: center; padding: 2px;"> </td></tr> <tr><td style="padding: 2px;">03</td><td style="text-align: center; padding: 2px;"> </td></tr> <tr><td style="padding: 2px;">04</td><td style="text-align: center; padding: 2px;"> </td></tr> <tr><td style="padding: 2px;">05</td><td style="text-align: center; padding: 2px;"> </td></tr> <tr><td style="padding: 2px;">06</td><td style="text-align: center; padding: 2px;"> </td></tr> <tr><td style="padding: 2px;">07</td><td style="text-align: center; padding: 2px;"> </td></tr> <tr><td style="padding: 2px;">08</td><td style="text-align: center; padding: 2px;">▼</td></tr> </table>	01 All Lines	▲	02		03		04		05		06		07		08	▼
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<table border="1" style="width: 100%; border-collapse: collapse;"> <tr style="background-color: #cccccc;"><td style="padding: 2px;">01 Echo Toll Field</td></tr> <tr><td style="padding: 2px;">02 Echo Area Code</td></tr> <tr><td style="padding: 2px;">03 Echo Loc Address</td></tr> <tr><td style="padding: 2px;">04 Echo Extension Number</td></tr> <tr><td style="padding: 2px;">05</td></tr> <tr><td style="padding: 2px;">06</td></tr> <tr><td style="padding: 2px;">07</td></tr> <tr><td style="padding: 2px;">08</td></tr> </table>	01 Echo Toll Field	02 Echo Area Code	03 Echo Loc Address	04 Echo Extension Number	05	06	07	08	<div style="border: 1px solid black; padding: 5px; display: inline-block;">Exit</div>																								
01 Echo Toll Field																																	
02 Echo Area Code																																	
03 Echo Loc Address																																	
04 Echo Extension Number																																	
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12.2 The window shown above can be reached by selecting Least-Cost Routing from the Applications menu or entering the LCR command.

12.3 ROUTE GROUPS: The Route Groups list box shows each group number (01–19) and its description. Each route group must be programmed with area codes, office codes, and facility groups in time blocks, except the special 0+ route groups which only need facility groups and dial rules. To program information for a route group, select the desired line in the Route Groups list box. A programming window appears (as shown on the next page).

NOTE: Calls placed to 911 and 411 are automatically routed through Route Group 1. This route group is normally used for local calls.

12.4 FACILITY GROUPS: The Facility Groups list box shows each of the group numbers (01–32) and its description. Facility groups must be programmed with lists of trunk groups (or a single trunk group) and dial rules. A trunk group can appear in more than one facility group, but not all trunk groups need to be assigned. Any combination of up to 32 of the system dial rules can be assigned to each facility group (up to 48 digits can be dialed). To program trunk group and dial rule lists for a facility group, select the desired line in the Facility Groups list box. A Facility Group programming window appears (as shown on page 5–101).

12.5 DIAL RULES: Rules 1–4 are preset; rules 5–32 are programmable. To program a dial rule, select the de-

sired line in the Dial Rules list box. A smaller window appears as shown in the next column.

12.6 EXIT: When programming is finished, select the Exit command button. A window appears that asks “Perform Update to Database?” To update the database and exit, select Yes. Or, select No to exit without saving any changes. To return to the Least Cost Routing window without updating the database, select the Cancel button.

A. DIAL RULES

Dial Rule XX	
Dial Rule:	<input style="width: 100%;" type="text"/>
<div style="border: 1px solid black; padding: 5px; display: inline-block;">Ok</div>	

12.7 DIAL RULE: Enter or edit the dial rule. The rules can contain up to 16 digits including 0-9, #, *, and pauses and/or hookflashes. To program pauses, enter S for a short pause and L for a long pause. The length of the pause is determined by the Pause timer. To program a hookflash, enter an F.

12.8 OK: When finished, select the OK command button. The dial rule is then shown in the Dial Rules list box.

Route Group XX

Description:

Configuration

Area Code Table	↑
Office Code Table	
Day Time Block	
Evening Time Block	
Night Time Block	↓

Area/Office Code Table

Excluded

200	↑
201	
202	
203	
204	↓

Included

	↑
	↓

Facility Group

01	↑
02	
03	
04	↓

Time Block

Ordered List

[End of List]	↑
	↓

B. ROUTE GROUPS

12.9 DESCRIPTION: To give the route group a name of up to 20 characters, select the Description text box and type the name.

12.10 CONFIGURATION: To assign area and office codes to tables, or to assign facility groups to time blocks, select the desired line in the Configuration list box and refer to the procedures below.

12.11 AREA CODE TABLE and OFFICE CODE TABLE: (These options do not appear for 0+ route groups 17-19.) To construct the list of area or office codes that will be accessed by this route group, highlight and select either Area Code Table or Office Code Table in the Configuration list box. The list boxes for the selected item will appear at the bottom of the window as shown above.

- **INCLUDE or EXCLUDE:** To assign an area or office code to the route group, locate the code in the Excluded list and select it by pressing the SPACE BAR; it will automatically move to the Included list. To remove a code, select it in the Included list to move it to the Excluded list.

- **ALL or NONE:** To place all codes in one list, select the All command button. To exclude all stations, select the None command button.

12.12 TIME BLOCKS: To program the list of facility groups that will be used during a time block, highlight and select the Day Time Block, Evening Time Block, or Night Time Block in the Configuration list box. The list boxes for the selected item will appear at the bottom of the window as shown above.

- **FACILITY GROUP and ORDERED LIST:** Select groups in the Facility Group list box one at a time, in the desired order. For example, if you want it to access group 3 first, then 2, then 5, scroll to 3 and select it to move it to the Ordered List box. Then scroll to 5 and select it. Then scroll to 2 and select it. The list will appear in the Ordered List box.

- **CLEAR:** To erase the ordered list, to make changes or assign groups in a new order, select the Clear command button.

12.13 OK: When programming is completed for the route group, select the OK command button to return to the Least Cost Routing programming window.

Page 5-100

Facility Group XX

Description:

Dial Rules

01 Echo toll field	↑
02 Echo area code	█
03 Echo local address	█
04 Echo extension number	↓

Configuration

Dial Rules	↑
Trunk Groups	█
	↓

Dial Rules

01 Echo toll field	↑
02 Echo area code	█
03 Echo local address	█
04 Echo extension number	↓

Ordered List

[End of List]	↑
	█
	↓

Trunk Groups

001	↑
002	█
003	█
004	↓

Facility Group

001 All Lines	↑
	█
	↓

C. FACILITY GROUPS

12.14 The Facility Group programming window, shown above, appears when an item in the Facility Group list box (shown on page 5-99) is selected.

12.15 DESCRIPTION: To assign a descriptive name with up to 20 characters, select the Description text box and type the name.

12.16 CONFIGURATION: The Configuration list box allows you to select Dial Rules or Trunk Groups for programming. Refer to the procedures below.

12.17 DIAL RULES: To program the ordered list of dial rules needed by the facility group, highlight and select Dial Rules in the Configuration list box. The list boxes for programming the rules appear as shown above.

- **DIAL RULES and ORDERED LIST:** Select dial rules in the Dial Rules list box one at a time, in the desired order. For example if you want to use dial rule 3 first, then 2, then 5, scroll to 3 and move it to the Ordered List box. Then scroll to 5 and select it. Then scroll to 2 and select it. The list will appear in the Ordered List box. To remove a dial rule from the

ordered list, highlight it and then select it by pressing the SPACE BAR.

NOTE: If the dial rules do not tell the system to echo digits that are dialed (rules 1-4), the digits are deleted. When dialing an LCR number, the system only sends out a total of 48 digits. For this reason, the complete LCR number (including the telephone number and any assigned dial rules) should be kept under 48 digits. For international dialing, only dial rules 1 and 3 are needed.

- **CLEAR:** To erase the ordered list and start over, select the Clear command button.

12.18 TRUNK GROUPS: To construct the list of trunk groups (or designate one trunk group) that will be accessed by this facility group, highlight and select Trunk Groups in the Configuration list box. The list boxes appear at the bottom of the window.

- **TRUNK GROUPS/FACILITY GROUP:** To assign a trunk group to the facility group, locate the trunk group number in the Trunk Groups list box and select it by pressing the SPACE BAR; the group will automatically move to the Facility Group list box. To remove a trunk group from the facility group, select the trunk group in the Facility Group list box.

- **ALL or NONE:** To place all trunk groups in the facility group, select the All command button. To remove all trunk groups from the facility group, select the None command button.

NOTE: If more than one trunk group is placed in a facility group, the trunk groups will be accessed in numerical order by the station users. If you wish to have them accessed in a different order, place each trunk group in a separate facility group, place those

facility groups in the same route groups, and ensure that stations have sufficient LCR advances to reach the trunk groups. For toll restriction purposes, only the *highest numbered* trunk group in the facility group is checked (the last trunk group in the list). Make sure that the highest numbered trunk group has the desired toll restriction programming for the entire facility group.

12.19 OK: When programming is completed for the facility group, select the OK command button.

13. TRUNK PROGRAMMING

13.1 When Trunk Programming is selected from the Applications Menu window, the menu expands to show the following options:

Trunk Programming...
Individual Trunk
Trunk Groups, DID Groups, And
Ring-in/Answer Patterns
T1 Programming

13.2 Each of the options and the windows they access are described in detail in the following pages. Program planning sheets for trunk programming are in Figure 5-24, beginning on page 5-235.

A. INDIVIDUAL TRUNK (INDT)

13.3 When you select Individual Trunk from the Trunk Programming menu or enter the INDT command, the window shown on the next page appears.

13.4 For each trunk, determine the following information. (Program planning sheets for trunk programming are in Figure 5-24, beginning on page 5-235.):

- Identify the trunk group to which it will belong. Each trunk *must* be assigned to a trunk group. They can be moved from group to group, but cannot be removed from groups entirely. If any trunks will be unused, they should be assigned to a trunk group labeled UNUSED that does not have a ring-in assignment associated with it.
- Receive and transmit gain can be adjusted on a trunk-by-trunk basis if voice transmit or voice receive volume problems occur. You can adjust the receive gain and/or the transmit gain for individual circuits. Receive and transmit are measured from the perspective of the central office. That is, *receive gain* adjusts the signal that is *sent to the CO from the 416/832 System*. The signal that is *transmitted from the CO* is affected by adjusting the *transmit gain* on the 416/832 System.

- Hybrid balance can be set to ideal, loaded, or unloaded on a trunk-by-trunk basis. (T1 circuits and 4-wire E&M circuits cannot be hybrid balanced.)

— *Ideal*: The ideal balance network simulates a 600-ohm transmission line to match trunks, which are supplied by other equipment located within the same building, using private, copper wire termination (e.g., an OPX supplied by another PBX that does not use the public network or a T1 channel bank interface).

— *Unloaded*: The unloaded balance network simulates an 800-ohm transmission line which matches most CO trunks.

NOTE: The present standard for trunks from the central office is 900 ohms. However, AT&T studies indicate that an even better match can be obtained with 800 ohms for unloaded trunks and 1650 ohms for loaded trunks.

— *Loaded*: The loaded balance network simulates a 1650-ohm transmission line which more closely matches the qualities of a central office trunk that has a loading coil included in the trunk because the central office is very far from the installation (usually over 18,000 feet).

- Trunks can be loop or ground start (unless they are on a Loop Start Card).
- A ground start trunk can be programmed to begin the call as soon as dial tone current is detected or to wait for the Dialing Wait timer to expire.
- Trunks can be set for DTMF or dial pulse signals. (Dial pulse is not recommended for LSC trunks. The pulse circuitry on the LGC is more sophisticated and would provide better performance.)
- Each circuit on the EMC has two jumper straps, one for selecting the signaling type (1, 2, 4, or 5) and one for selecting the audio type (2-wire or 4-wire). The signaling and audio type for each circuit must also be programmed in the database.

Individual Trunk

Actions
Setup
Exit

Trunks

XX.XX G/L	↑
XX.XX G/L	
XX.XX DID	↓

Exit

Group #:

Receive Gain: dB

Transmit Gain: dB

Hybrid Balance

Ideal

Unloaded

Loaded

Current DT Detect

Relaxed Ring Detect

DTMF Signaling

Ignore Answer Supervision

E & M Interface

<input type="radio"/> Type 1	<input type="radio"/> Type 4	<input type="radio"/> 2-Wire
<input type="radio"/> Type 2	<input type="radio"/> Type 5	<input type="radio"/> 4-Wire

13.5 TRUNKS: To begin programming an individual trunk, scroll through the list box until the desired trunk is highlighted. Then continue programming the necessary trunk features as described below.

13.6 GROUP NUMBER: To program the trunk group number to which this trunk is assigned, select the Group # text box, and type the desired number (1-102 for standard systems, 142 for expanded systems).

13.7 RECEIVE GAIN: To set the receive gain, enter the gain amount in the Receive Gain text box (non-T1 trunks can be -9dB to +3dB; T1 range is -15dB to +15dB).

13.8 TRANSMIT GAIN: To set the transmit gain, enter the gain amount in the Transmit Gain text box (non-T1 trunks can be -3dB to +6dB; T1 range is -15dB to +15dB).

NOTE: Transmit and receive gain should not be changed unless the system is experiencing volume problems. Before changing the values contact the telephone company to ensure that their trunks are in proper order. FCC regulations specifies 6dB gain for CO-to-CO connections. Increasing the gain above zero may place the system in violation of the FCC regulations. These adjustments were intended for use with connections other than to telephone company trunks, such as a customer-

provided OPX or ringdown circuits. Raising the gain too much could cause feedback during multi-party conference calls.

13.9 HYBRID BALANCE: (Not available for T1 trunks or 4-wire E&M trunks) Balance can be set to ideal, unloaded, or loaded by selecting the desired option button in the Hybrid Balance box.

13.10 E&M INTERFACE: When programming an E&M trunk, designate the signalling type (1, 2, 4, or 5) and the audio type (2-wire or 4-wire) by selecting the appropriate option buttons. This programming must match the jumper settings on the EMC.

13.11 START TYPE: Determine whether the trunk is a ground start trunk or a loop start trunk by selecting the Start Type box and then selecting the desired option button. The selected option button will have a black dot in the center. This option is not available for EMC, LSC, or T1C circuits.

13.12 CURRENT DT DETECT: (Ground Start Trunks Only) To program the trunk to begin processing an outgoing call as soon as dial tone current is detected (bypassing the Dialing Wait timer), select the Current DT Detect check box (by pressing the SPACE BAR) to place an X in it. Selecting it again will remove the X.

13.13 RELAXED RING DETECT: If the trunk does not supply standard ringing (such as an AT&T Dimension PBX OPX), select the Relaxed Ring Detect check box (by pressing the SPACE BAR) to place an X in it. This option is not available for LSC, EMC, or T1C circuits.

13.14 DTMF SIGNALING: If the trunk uses DTMF signaling, select the DTMF Signaling check box (by pressing the SPACE BAR) to place an X in it. If the trunk uses dial pulse signaling, and the check box contains an X, remove it by selecting the check box.

13.15 IGNORE ANSWER SUPERVISION: This option applies to E&M circuits only. The answer supervision signal is transmitted by the far end telephone system to signify that the call has been answered. If this option is enabled, any signals that are shorter than the E&M Answer Recognition timer are ignored. This is used in situations where false signals are being picked up during transmission of calls. To enable the option, select the Ignore Answer Supervision check box (by pressing the SPACE BAR) to place an X in it. To re-enable the timer, remove the X by selecting the check box again.

B. TRUNK GROUPS, DID GROUPS, AND RING-IN/ANSWER PATTERNS (TRNK)

13.16 When you select Trunk Groups, DID Groups, and Ring-In/Answer Patterns from the Trunk Programming menu, or enter the TRNK command, the window appears as shown on page 5-108.

13.17 **Trunk Groups:** To prepare to program trunk groups, determine the following information. (Refer to the program planning sheet in Figure 5-25 on page 5-236.):

- Trunk group description (up to 20 characters) and display identification (up to seven characters).
- The tenant group number of the attendant (other than the primary attendant) that can place the trunk group in night mode.
- The Hookflash feature can be enabled or disabled for each trunk group. If disabled, users cannot use the Hookflash feature code (330) while using the trunks in the trunk group.
- E&M trunks can be placed in trunk groups. E&M trunk groups may be designated as immediate start, wink start, or delay start in database programming. The call routing can be programmed to automatically ring in (auto ring in) to the system's attendant or to allow callers to dial extensions as desired (dial repeating). If callers are allowed to dial extension numbers, the trunk group programming must indicate whether the 416/832 System will send dial tone. Reorder tones on E&M trunk groups can be programmed to be sent as continuous tones or a short burst of reorder tone; a short burst allows the user to try again, continuous tones prevent the user from further dialing.
- Determine if the trunk group contains all incoming-only trunks. Certain types of trunks, such as incoming WATS, need to be marked as "incoming-only" so that the system will recognize the trunks during power-up and/or testing. (This is because, on these types of trunks, ground signal is not returned on Tip and the system cannot power up the trunk unless this option is enabled.)
- Lists of stations with outgoing access for each trunk group.
- The music-on-hold channel (channel one or two, tick-tones, or silence) that will be used when callers on that trunk group are placed on hold.
- Ring-in type is determined separately for day and night modes. Ring in can be the same for both

modes, or any combination of the following can be used.

- *Single:* If the trunk group will ring at a single station, determine the circuit or extension number of the station.
- *Multiple:* If the trunk group will ring in to more than one station, list those stations by circuit or extension number in a ring-in/answer pattern and assign the pattern to the trunk group.
- *Hunt Group:* If the trunk group will ring in to a hunt group, determine the hunt group's number.
- *DISA:* If the trunk group is to be used for DISA and a security code is desired, determine the four-digit security codes (day and night) and determine if the security codes will be needed for intercom access. If using *Extended* software, also determine the toll restrictions, for each DISA trunk group, that will be applied when an outgoing call is placed.

NOTE: While DISA is designed to be reasonably secure against misuse by outside callers, there is no implied warranty that it is invulnerable to unauthorized intrusions. The installer and owner of the system should ensure that proper security measures have been taken to prevent outside callers from accessing and misusing outgoing trunks for unauthorized calls.

- Determine if the trunk group is subject to toll restriction. If the trunk group is not subject to toll restriction, the station class of service (SCOS) is not checked when a trunk in the group is used.
- The trunk group can be exempt from, or subject to, the LCR only restriction. If exempt from LCR only, stations with SCOS 6 (LCR Only) using the proper access code can directly access the trunks. If subject to LCR only, stations with SCOS 6 can access the trunk only if it is part of an LCR facility group.
- For unrestricted trunk groups, determine the call cost rate to be used for calls placed on the trunks. Call cost can be: free, local rate, ten-digit rate, or operator-assisted/international rate.
- Trunk groups that are subject to toll restriction can be designated as equal access trunks to allow 10XXX and 101XXXX codes to be used when accessing long distance carriers.
- Trunk groups can be programmed to absorb digits for PBX installations and installations in areas where the first digit(s) of the office code are absorbed. If absorbed digits are used, determine if they are repeatable (that is, they are absorbed if the absorbed digit string is dialed repeatedly).

13.18 DID Groups: There can be 11 direct inward dialing (DID) groups in a standard system and 16 in an expanded system (includes a DID group for unused trunks). For the DID groups, determine the following information:

- DID group description (up to 20 characters) and display identification (up to seven characters) for each DID number.
- List the trunks that will be in the DID group by circuit number.
- For each DID group, note the base number and the dialed number range that will be received from the central office. For example, if the customer has purchased a block of 100 DID numbers starting with 961-1000, the base number is "961" the start digits are "1000" and the number of entries is "100." The base number does not include the area code.
- Start type for the DID group can be immediate, wink, or delay depending on the type of DID trunks ordered from the telephone company.
- If the DID group is to be used for DISA and a security code is desired, determine the four-digit (seven-digit in *Extended* software) security codes for day and night modes. Also determine if the security codes will be needed for intercom access. If using *Extended* software, also determine the toll restrictions that will be applied when an outgoing call is placed.

NOTE: While DISA is designed to be reasonably secure against misuse by outside callers, there is no implied warranty that it is invulnerable to unautho-

rized intrusions. The installer and owner of the system should ensure that proper security measures have been taken to prevent outside callers from accessing and misusing outgoing trunks for unauthorized calls.

- Ring-in type (the destination of the DID number) is determined separately for day and night modes. Ring in can be the same for both modes, or any combination of the following can be used:
 - *Single:* If the DID number will ring at a single station, determine the circuit or extension number of the station.
 - *Multiple:* If the DID number will ring in to more than one station, list those stations by circuit or extension number in a ring-in/answer pattern that is assigned to the DID number.
 - *Hunt Group:* If the DID number will ring in to a hunt group, determine the hunt group's number.
 - *DISA:* The DID number can be used for DISA.

NOTE: If a DID number is not given a ring-in destination, it will ring at the primary attendant's station in both day and night modes.

13.19 Ring-In/Answer Patterns: Ring-in/answer patterns can be set up and assigned to the trunk groups and DID numbers. There can be up to 40 patterns in a standard system and up to 60 in an expanded system. These patterns designate the stations and relays that will receive direct ring-in, or stations that have allowed-answer permission, for the trunk group. Each pattern can be given a name of up to 20 characters.

Trunk Groups, DID Groups, and Ring-in Answer Patterns																																			
<u>A</u> ctions <u>S</u> etup <u>E</u> xit																																			
<p><u>T</u>ruk Groups</p> <table border="1"><tr><td>01 All Lines</td><td>↑</td></tr><tr><td>02</td><td></td></tr><tr><td>03</td><td></td></tr><tr><td>04</td><td></td></tr><tr><td>05</td><td>↓</td></tr></table>	01 All Lines	↑	02		03		04		05	↓	<p><u>R</u>ing-in/Answer Patterns</p> <table border="1"><tr><td>01 Night Ring</td><td>↑</td></tr><tr><td>02</td><td></td></tr><tr><td>03</td><td></td></tr><tr><td>04</td><td></td></tr><tr><td>05</td><td></td></tr><tr><td>06</td><td></td></tr><tr><td>07</td><td></td></tr><tr><td>08</td><td></td></tr><tr><td>09</td><td></td></tr><tr><td>10</td><td></td></tr><tr><td>11</td><td></td></tr><tr><td>12</td><td>↓</td></tr></table>	01 Night Ring	↑	02		03		04		05		06		07		08		09		10		11		12	↓
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13.20 TRUNK GROUPS: Up to 102 trunk groups, with up to 344 trunks each, can be programmed in a standard system. Expanded systems can have 142 trunk groups with up to 696 trunks each. To program the characteristics of an individual trunk group, scroll through the Trunk Groups list box until the desired group is highlighted. When a trunk group is selected, a Trunk Group programming window appears, as shown on the next page.

13.21 DID GROUPS: There can be up to 600 DID entries in a standard system and up to 800 entries in an expanded system. The entries can be divided as desired among the DID trunk groups. There is no limit to the number of entries per group as long as the system-wide maximum is not exceeded. To program a specific DID group, scroll through the DID Groups list box until the desired group is highlighted. When selected, a DID programming window appears as shown on page 5-115.

(DID group programming is also used for E&M-type T1 services that require DID digit translation, as described on page 5-110.)

13.22 RING-IN/ANSWER PATTERNS: Up to 40 ring-in/answer patterns can be set up and assigned to the trunk groups and DID numbers in a standard system (there can be up to 60 in an expanded system). These patterns designate the stations and relays that will receive direct ring-in, or have allowed-answer permission for the trunk group. Each pattern can be given a name of up to 20 characters. To program a pattern, scroll through the Ring/Answer Pattern list box until the desired pattern is highlighted. When the pattern is selected, a window appears as shown on page 5-120.

13.23 EXIT: When trunk group programming is finished, select the Exit command button to return to the Applications Menu.

Trunk Group XX Extension: XXX

Description:

Name: Tenant Grp:

Call Routing

Auto Ring-In
 Dial Repeating

Reorder Tone

Continuous
 Burst

Return Dial Tone

E & M Trunk Group
 Enable Hookflash
 One-Way Incoming Only

Music-On-Hold

Silence Music #1
 Tick Tone Music #2

Handshaking

Immediate-dial
 Delayed-dial
 Wink-start

DID Digit Translation

No DID Translation	↑
01	
02	
03	↓

Trunk Group Programming Window

13.24 DESCRIPTION: If desired, program a description for the trunk group (that will appear in the Trunk Group list) by selecting the Description text box and entering a description of up to 20 characters.

13.25 TRUNK NAME: If desired, select the Trunk Name text box and enter a name of up to seven characters (e.g., WATS 1, LOCAL 3, etc.). If no entry is made, GRP #XX appears on keyset displays.

13.26 TENANT GROUP: To assign the trunk group to a specific tenant group, select the Tenant Group text box and type the desired number.

13.27 ENABLE HOOKFLASH: The Hookflash feature, in which the user enters a feature code (330) to generate a timed hookflash, can be enabled or disabled on a trunk group basis. To allow the Hookflash feature to be used, place an X in the Enable Hookflash check box by highlighting it and pressing the SPACE BAR. If the box already contains an X, and you wish to disable the feature, highlight the check box and press SPACE BAR.

13.28 E & M TRUNK GROUP: If the trunk group is made up of E&M trunks, place an X in the E&M Trunk Group check box by selecting it. The following sections of the window change from gray to black to allow you to continue programming the E&M trunk group.

NOTE: Whenever you change the status of this check box, a warning appears that tells you that changing the trunk group type will exclude all trunks from this group. If you wish to continue, select the Yes command button. To cancel the change, select No.

- **CALL ROUTING:** Determine whether incoming calls on these trunks will be sent directly to a predetermined destination, such as the attendant (Auto Ring-In), or if callers will be allowed to dial numbers to reach extensions (Dial Repeating). Place a dot in the desired option button by selecting it. (Defaults to Dial Repeating.)
- **REORDER TONE:** Determine whether the reorder tone heard by users will be a short burst of tones or continuous reorder tones (a short burst of tone will allow the caller to try again, a continuous burst requires the caller to hang up). Place a dot in the desired option button by selecting it. (Defaults to Burst.)
- **HANDSHAKING:** For dial-repeating trunks, indicate the type of "handshaking" the E&M trunk utilize (immediate-start, delayed-dial, or wink-start). Place a dot in the desired option button by selecting it. (Defaults to Immediate-Dial.)
- **RETURN DIAL TONE:** To enable the 416/832 System to send dial tone when accessed, enable this

option. (Dial-repeating trunk groups should have this option enabled.) If disabled, the 416/832 System automatically performs the handshake and then waits to receive digits. To enable the 416/832 System to send dial tone, place an X in the Return Dial Tone check box by selecting it. (In the default state, this option is enabled.)

- **DID DIGIT TRANSLATION:** There are trunks available that function like a DID trunk for incoming calls and an E&M trunk for outgoing calls. For an outgoing call, the trunk directly accesses the central office or long distance provider and allows the usual E&M calls to be placed. For incoming DID-type calls, the trunk receives the incoming call and then waits for 2-4 additional digits to be dialed. These digits must correspond to the digits in a DID table so that the 416/832 System will know where to send the call. (The DID digit translation tables are programmed in the DID Group window shown on page 5-115.) To enable DID digit translation for the trunk group, locate the desired DID group by scrolling through the DID Translation list box. The position of the highlight bar indicates the selected group. If digit translation is not needed, highlight "No DID Translation."

13.29 ONE-WAY INCOMING ONLY: If the trunk group contains incoming-only trunks, place an X in the One-Way Incoming Only check box by selecting it. To remove the X, select it again. When you place the X in the check box, the system checks whether any stations have outgoing access for that trunk group. If there are stations with outgoing access, a window appears that asks if you wish to delete the outgoing-access assignments for those stations. Select the Yes command button to remove the outgoing-access assignments, or select the No command button to cancel the One-Way Incoming Only designation.

13.30 MUSIC-ON-HOLD: To select the music-on-hold source that will be heard by outside callers when these trunks are used, move to the Music-On-Hold box and select a music channel (1 or 2), silence, or tick-tones by selecting the desired option button.

13.31 DAY/NIGHT OUTGOING ACCESS: To program the stations that will have outgoing access for the trunk group, select the Day Out Access or Night Out Access command button. The following window appears.

The screenshot shows a window with two lists of stations. The top list is titled 'Include' and contains four entries: 1003 01.01 Smith, John (highlighted), 1001 01.02 ~Station Undefined, 1002 01.03 ~Station Undefined, and 1004 01.05 ~Station Undefined. The bottom list is titled 'Exclude' and contains five entries: 1008 02.01 ~Station Undefined, 1009 02.02 ~Station Undefined, 1010 02.03 ~Station Undefined, 1011 02.04 ~Station Undefined, and 1012 02.05 ~Station Undefined. To the right of the lists are buttons for 'None', 'All', 'Sort', 'Cancel', and 'Ok'.

- **INCLUDE or EXCLUDE:** To include a station, locate it on the Exclude list and select it by pressing the SPACE BAR; it will automatically move to the Include list. To remove a station from the list, select it in the Include list to move it to the Exclude list.
- **ALL or NONE:** To include all stations in the list, select the All command button. To exclude all stations from the list, select the None command.
- **OK or CANCEL:** When the station lists appear as desired, select the OK command button. To exit from the window without saving changes, select the Cancel command button.
- **SORT:** To sort the stations and list them numerically by extension number or circuit number, or alphabetically by name, select the Sort command button. The following window appears. Choose the desired sorting method by selecting the corresponding option button. Then select the OK command button. When the list of stations returns, the list box will show the stations in the selected order. To exit without changing the sorting method, select the Cancel command button.

The screenshot shows a window titled 'Station Sorting Method'. It has a section labeled 'Ordering' with three radio button options: 'By Extension' (which is selected), 'By Circuit', and 'By Name'. To the right of these options are buttons for 'Ok' and 'Cancel'.

Trunk Group XX Extension: XXX

Day Ring-in Type

Single Hunt/UCD

Multiple DISA

Station:

Night Ring-in Type

Single Hunt/UCD

Multiple DISA

Ring/Answer Pattern

01	↑
02	
03	
04	↓

Day Ring-in Type

Single Hunt/UCD

Multiple DISA

Hunt Group/UCD

01.	↑
02.	
03.	
04.	↓

Night Ring-in Type

Single Hunt/UCD

Multiple DISA

DISA Security Codes

Night:

Required for IC calls

Night Toll Restrictions

(0) Remove All Restrictions	No	↑
(1) Operator Access	Yes	
(2) Toll Access	Yes	
(3) International Access	Yes	↓

13.32 RING-IN: (*This is not available for Dial Repeating E&M trunks*) To program ring-in type for the trunk group, select the Ring-In command button (shown on page 5-109). The window shown above appears. Ring-in assignments can be programmed for day and night modes of operation. Each mode has four option buttons from which to choose. The selected button is indicated by a black dot as shown above.

- **SINGLE:** Select the Single option button if the trunk group will ring in to only one station. A Station text box appears, as shown above. Select the text box and type the circuit or extension number of the station that will receive the ring in. Leave it blank (or erase the existing entry) to assign no ring-in destination.

- **MULTIPLE:** If the trunk group will ring in to several stations, select the Multiple option button. A Ring/Answer Pattern list box appears as shown above. Select and scroll through the Ring/Answer Pattern list box until the desired line is highlighted. The highlighted line indicates the selected pattern. Pattern programming is explained on page 5-120.

- **HUNT/UCD:** Select the Hunt/UCD option button if the trunk group will ring in to a hunt group pilot number. A Hunt Group/UCD list box will appear as shown above. Scroll through the list box until the desired hunt group is highlighted. The highlighted line indicates the hunt group that will receive ring in for the trunk group. Hunt group programming is explained on page 5-61.

- **DISA:** To assign the trunk group for DISA ring in, select the DISA option button. A check box, text box, and list box appear as shown on the preceding page. Program the following:

- **Security Code:** A day and/or night mode security code can be assigned by selecting the text box (Day or Night) and typing the desired code. In the *Extended* software package, codes can be 4-7 digits long (using any combination of digits 0-9, *, and #). All other software packages use 4-digit security codes.

- **Security Code Required For IC Calls:** If the security code will be required before the caller can place an intercom call through DISA, select the

Required for IC Calls check box (by pressing the SPACE BAR) to place an X in it. (To remove the X, select the box and press SPACE BAR again.)

- **DISA Toll Restriction:** (Available in *Extended* software packages only.) To determine the toll restrictions that will apply to outgoing calls made through DISA, use the Toll Restriction list box. To change a toll restriction's status (Yes or No), highlight the desired toll restriction and press SPACE BAR. Changing the Remove All Restrictions line to "Yes," automatically changes all others to "No." When it is set to "Yes," changing any other restriction to "Yes" will automatically change Remove All restrictions to "No."

Toll Restrict — Trunk Group X

Subject to Toll Restrict

Exempt from LCR Only

Assigned Call Cost

Free

Local

10-Digit Toll

Operator/International

Equal Access

Absorbed Digits

Absorbed Digits Application

PBX Line

Local Central Office

Absorbed Digits Repeatable

Absorbed Strings

1.	↑
2.	█
3.	█
4.	↓

13.33 TOLL RESTRICTION: To program the toll restriction parameters for the trunk group (i.e., equal access, absorbed digits, etc.), select the Toll Restriction command button (shown on page 5-109) and refer to the window shown above.

- **SUBJECT TO TOLL RESTRICT:** If the trunk group is not subject to toll restriction, station class of service (SCOS) is not checked when a trunk in the trunk group is used for placing a call. To enable toll restriction, select the Subject to Toll Restrict check box (by pressing the SPACE BAR) to place an X in it (selecting the check box again will remove the X).
- **ASSIGNED CALL COST:** For trunk groups that are not subject to toll restriction, determine the call cost rate to be used for calls placed on the trunks. Program the appropriate call cost for the trunk group by selecting one of the following option buttons:
 - **FREE:** The call cost will be 000.
 - **LOCAL:** Local toll-call cost calculations will be used for trunks in this trunk group.
 - **10-DIGIT TOLL:** The 10-digit call cost calculations will be used.
 - **OPERATOR/INTERNATIONAL:** Operator-assisted/international call rates will be used for call cost.
- **EXEMPT FROM LCR ONLY:** To disable LCR Only restriction, select the Exempt from LCR Only check box (by pressing the SPACE BAR) to place an X in it. (Selecting the check box again will remove the X.)
- **EQUAL ACCESS:** If the trunk group is subject to toll restriction, determine whether the trunk group will be used for equal access (10XXX and 101XXXX). To enable equal access and provide accurate toll restriction when users dial equal access codes, select the Equal Access check box (by pressing the SPACE BAR) to place an X in it. (Selecting the check box again will remove the X.)
- **ABSORBED DIGITS:** Trunk groups that are subject to toll restriction can be programmed to absorb digits for PBX network installations and installations in areas where the first digit(s) of the office code are absorbed. To program the trunk group to absorb digits, select the Absorbed Digits check box (by pressing the SPACE BAR) to place an X in it. (Selecting the check box again will remove the X.) Refer to FEATURES, page 4-26, for more information about absorbed digits.
- **ABSORBED DIGITS APPLICATIONS:** If the trunk group is programmed to absorb digits, select the appropriate option button (PBX Line or Local

Central Office) to indicate whether it is due to PBX network installation or local office code absorption.

- **ABSORBED DIGITS REPEATABLE:** If the local central office absorbs digits, determine if they are "repeatable" (that is, the digit string is absorbed when it is dialed more than once), or if the digit string is processed as part of the telephone number when dialed a second time. If the digits are repeatable, select the Absorbed Digits Repeatable check box (by pressing the SPACE BAR) to place an X in it. (Selecting the check box again will remove the X.)
- **ABSORBED STRINGS:** If digits are absorbed because of the local central office, only one digit string is programmed. For PBX installations, up to eight absorbed digit strings can be programmed. To program a digit string, scroll through the Absorbed Strings list box until the desired line is highlighted. When the line is selected, a text box appears below the list box. Type the digit string, up to eight digits. An "X" may be used in the number to represent any digit 0-9. For example, 8X allows 80-89. If Local Central Office is chosen in the Absorbed Digit Applications box, only one digit string prompt will appear.
- **OK:** When toll restriction programming is completed for the trunk group, select the OK command button to return to the Trunk Group programming window.

13.34 TRUNK LIST: To program the trunks that will be included in the trunk group, select the Trunk List command button (shown on page 5-109). The following window appears. (Note that a trunk can be assigned to only one trunk group.)

The screenshot shows a window titled "Trunk List" with two columns: "Include" and "Exclude". The "Include" column contains a list of trunk numbers: 20.01, 20.02, 20.03, 20.04, 20.05, 20.06, and 20.07. The "Exclude" column is empty. Below the "Include" list is a button labeled "All". Below the "Exclude" list is a button labeled "Ok".

- **INCLUDE:** To include a trunk, locate it on the Exclude list and select it by pressing the SPACE BAR; it will automatically move to the Include list. To remove a trunk, locate it on the Include list and select it. It is automatically moved to the "unused trunk" (or "unused E&M") trunk group, from which it can later be moved to another group. This is to ensure that each trunk is always part of a trunk group.
- **ALL:** To include all trunks in the list, select the All command button.
- **OK:** When the trunk lists appear as desired, select the OK command button to return to the Trunk Group XX window on page 5-109.

13.35 EXIT: (Shown on page 5-109.) When programming is finished, select the Exit command button. A window appears that asks "Perform Update to Database?" To update the database and exit to the Trunk Groups, DID Groups, and Ring-In Answer Patterns window, select Yes. Or, select No to exit without saving any changes. To return to the Trunk Group XX window without updating the database, select the Cancel button.

13.42 DAY/NIGHT SCOS (DISA Class of Service): (Available in *Extended* software packages only.) DISA trunks can be given day and/or night mode toll restrictions like those described on page 4-27 for individual stations (except LCR-Only). When a DISA caller dials an outgoing call, the call is checked against the DISA trunk's toll restriction. If the call is disallowed, the DISA caller is sent to the primary attendant. When the Day SCOS or Night SCOS command button is selected, the following window appears.

DID SCOS Programming

Include

Day Toll Restriction

- (1) Operator Access
- (2) Toll Access
- (3) International Access
- (7) Alternate Carriers
- (8) Allowed Long Distance

Exclude

Day Toll Restriction

- (4) Eight Digit Access
- (5) Area/Office Code

Buttons: All, None, Ok, Cancel

13.43 TRUNK LIST: DID circuits are created in the System Configuration window on page 5-171. To program the circuits that will be included in the DID group, select the Trunk List command button. There can be up to 344 trunks in a DID group in a standard system and up to 696 in an expanded system. The following window appears.

Trunk List

Include

- 26.01
- 26.02
- 26.03
- 26.04
- 26.05
- 26.06
- 26.07

Exclude

Buttons: All, Ok

- **INCLUDE:** To include a trunk, locate it on the Exclude list and select it by pressing the SPACE BAR; it will automatically move to the Include list. To remove a trunk from the list, it must be included in another group. This is because each trunk must always be assigned to a group.
- **ALL:** To include all trunks in the list, highlight a line in the Include list box and select the All command button.
- **OK:** When the trunk lists appear as desired, select the OK command button to return to the DID Group programming window.

13.44 BASE NUMBER: The base number is the part of the DID number that will *not* be dialed into the system by the central office (excluding the area code). For example, if the numbers range from 961-1020 to 961-1029 and the central office will send four digits, then the base number will consist of the office code (961) of the DID numbers purchased. If the central office will send three digits, then the base number will be the office code plus the first address digit (9611). To program the base number of the DID group, select the Base Number Command button. The following window appears.

Base DID Number

Base Number: 9611

Buttons: Ok, Cancel

- **BASE NUMBER:** Select the Base Number text box and enter the digits that make up the base of the DID group (do not include the area code).
- **OK or CANCEL:** When the base number appears as desired, select the OK command button. To exit from the window without saving changes, select the Cancel command button. **NOTE:** If you select OK after changing a previously programmed base number to a base number with a different amount of digits, a window will appear warning you that all previous DID numbers will be erased. If the new base number is the same length as the previous base number, the entries in the list box will be updated with the new base number.

13.45 ADD ENTRIES: To add a number (or block of numbers) to the DID group, select the Add Entries command button. The following window appears.

- **START DIGITS:** Enter the first address digit(s) that appear after the base number of the DID numbers in the Start Digits text box. (In the example, the numbers will begin with 9611020.) Do not include the area code.
- **NUMBER OF ENTRIES:** Indicate the number of sequential numbers to be added to the DID group. (In the example shown in the window above, the numbers will begin with 9611020 and continue through 9611029 — ten DID numbers.) Each DID group can contain any or all of the equipped DID entries.
- **OK or CANCEL:** When the new entries appear as desired, select the OK command button. To exit from the window without saving changes, select the Cancel command button.

13.46 DELETE ENTRY: To delete an entry in the DID group number list, highlight the DID number to be deleted (in the Numbers list box shown on the preceding page) and select the Delete Entries command button. When the following window appears, select the Yes command button to delete the entry, or No to cancel without deleting it.

13.47 SET RING-IN: This command button is used for batch loading DID ring-in assignments. (Instructions for assigning ring-in to individual DID numbers is on the next page.) To determine ring-in assignments for a group of DID numbers, do the following:

- (1) In the Numbers list box (shown on the preceding page), place the highlight bar over the first DID number for which you wish to assign ring in. Using the example on the previous page, assume that there are ten DID numbers (961-1020 to 961-1029), and you want to use the batch loading option to assign the ring-in assignments for the last eight (961-1022 to 961-1029). The highlight bar would be placed on 961-1022.
- (2) Select the Set Ring-In command button. The following window appears.

- (3) Use the following commands to place the ring-in assignments into the Include list box in the desired order. In the example, you need eight ring-in assignments. First locate the ring-in extension for 961-1022 and select it to place it in the Include list box. Then locate the extension for 961-1023 and place it in the Include list box. Continue until there are eight extensions in the list box that correspond to the DID numbers.

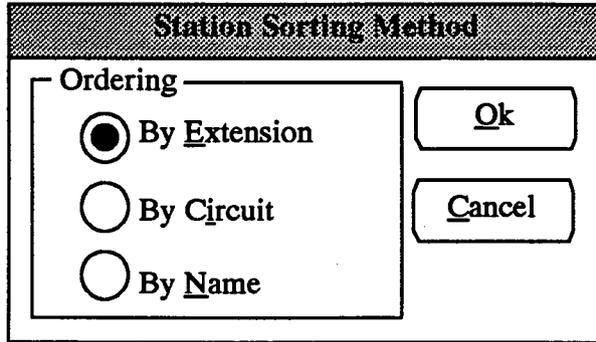
INCLUDE or EXCLUDE: To include a station, locate the desired station on the Exclude list and select it by pressing the SPACE BAR; it will automatically move to the Include list. To remove a station from the list, select the station in the Include list to move it to the Exclude list.

ALL or NONE: To include all stations in the list, select the All command button. To exclude all stations from the list, select the None command.

SORT: To sort the stations and list them numerically by extension number or circuit number, or

alphabetically by name, select the Sort command button. The following window appears. Choose the desired sorting method by selecting the corresponding option button. Then select the OK command button. When the list of stations returns, the list box will show the stations in the selected order. To exit without changing the sorting method, select the Cancel command button.

- (4) When the list of extensions appears as desired, select the OK command button. (Or, to exit from the window without saving changes, select the Cancel command button.) The ring-in assignments will appear in the Numbers list box (shown on the previous page).



The image shows a dialog box titled "Station Sorting Method". Inside the dialog, there is a section labeled "Ordering" with three radio button options: "By Extension" (which is selected), "By Circuit", and "By Name". To the right of these options are two buttons: "Ok" and "Cancel".

XXXXXX

Username:

Day Ring-in Type

Single Hunt/UCD

Multiple DISA

Night Ring-in Type

Single Hunt/UCD

Multiple DISA

Station:

Ring-In/Answer Pattern

01. Night Ring	↑
02.	
03.	↓
04.	

Day Ring-in Type

Single Hunt/UCD

Multiple DISA

Night Ring-in Type

Single Hunt/UCD

Multiple DISA

Hunt Group/UCD

01.	↑
02.	
03.	
04.	↓

13.48 DID NUMBERS: The list box shown on page 5-115 lists the DID numbers, their ring-in types, and name. When an item in the list is selected, the window shown above appears.

- **USERNAME:** Enter a name of up to 7 characters. If the Expanded DID Names feature is enabled for the Attendant Computer Consoles, the DID usernames must all be unique.
- **RING-IN TYPE:** Ring-in assignments can be programmed for day and night modes of operation. Each mode has four option buttons from which to choose. The selected button is indicated by a black dot as shown above.
 - **SINGLE:** Select the Single button if the DID number will ring in to only one station. A Station text box appears, as shown above. Select the text box and type the circuit or extension number that will receive the ring in.
 - **MULTIPLE:** If the DID number will ring in to several stations, select the Multiple button. A Ring/Answer Pattern list box appears as shown above. Select and scroll through the Ring-In/An-

swer Pattern list box until the desired line is highlighted. The highlighted line indicates the selected pattern. Pattern programming is explained on page 5-120.

- **HUNT/UCD:** Select the Hunt/UCD button if the DID number will ring in to a hunt group pilot number. A Hunt Group/UCD list box will appear as shown above. Select and scroll through the list box until the desired hunt group is highlighted. The highlighted line indicates the hunt group that will receive ring in for the DID number. Hunt group programming is explained on page 5-61.
- **DISA:** To assign the DID number for DISA ring in, select the DISA button. (Security codes can be assigned to the DID group in the window on page 5-115.)

13.49 EXIT: (Shown on page 5-115.) When programming is finished, select the Exit command button. A window appears that asks "Perform Update to Database?" To update the database and exit to the Trunk Groups, DID Groups, and Ring-In Answer Patterns window, select Yes. Or, select No to exit without saving any

changes. To return to the DID Group X window without updating the database, select the Cancel button.

Ring-In/Answer Patterns Window

13.50 The following window appears when an item is selected from the Ring-In/Answer list box shown on page 5-108.

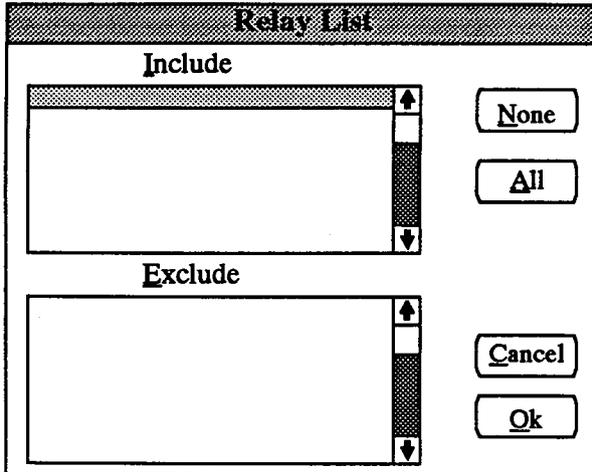
13.51 PATTERN TITLE: To assign a name of up to 20 characters for the ring-in/answer pattern, select the Pattern Title text box and enter the desired name.

13.52 RING-IN LIST: To assign the stations that will receive ring-in and can answer calls when the selected pattern is used, select the Ring-In List command button. The following window appears. Including a station in the ring-in list automatically includes it in the answer list.

13.53 ANSWER LIST: To assign the stations that will be allowed to answer (but will not receive ringing for) incoming calls when the selected pattern is used, select the Answer List command button. A window appears as follows. Note that this list will always include the stations in the ring-in list. If a station that also has ring-in is removed from the answer list, it is automatically removed from the ring-in list as well.

- **INCLUDE or EXCLUDE:** To include a station, locate the desired station on the Exclude list and select it by pressing the SPACE BAR; it will automatically move to the Include list. To remove a station from the list, select it in the Include list to move it to the Exclude list.
- **ALL or NONE:** To include all stations in the list, select the All command button. To exclude all stations, select the None command button.
- **OK or CANCEL:** When the station lists appear as desired, select the OK command button. To exit from the window without saving changes, select the Cancel command button.
- **SORT:** To sort the stations and list them numerically by extension number or circuit number, or alphabetically by name, select the Sort command button. The following window appears. Choose the desired sorting method by selecting the corresponding option button. Then select the OK command button. When the list of stations returns, the list box will show the stations in the selected order. To exit without changing the sorting method, select the Cancel command button.

13.54 RELAY LIST: To assign Matrix and Expansion Card relays that have been programmed as signal device relays to the selected ring-in/answer pattern, select the Relay List command button. The following window appears.



- **INCLUDE or EXCLUDE:** To include a relay, locate the desired relay on the Exclude list and select

it by pressing the SPACE BAR; it will automatically move to the Include list. To remove a relay from the list, select it in the Include list to move it to the Exclude list.

- **ALL or NONE:** To include all relays in the list, highlight a line in the Include list box and select the All command button. To delete all relays from the list, select the None command button while the line is highlighted.
- **OK or CANCEL:** When the relay lists appear as desired, select the OK command button. To exit from the window without saving changes, select the Cancel command button.

13.55 EXIT: (Shown on page 5-115.) When programming is finished, select the Exit command button. A window appears that asks "Perform Update to Database?" To update the database and exit to the Trunk Groups, DID Groups, and Ring-In Answer Patterns window, select Yes. Or, select No to exit without saving any changes. To return to the Ring-In/Answer Pattern window without updating the database, select the Cancel button.

C. T1 PROGRAMMING

13.56 The T1 Programming window allows you to program information that applies to all T1 trunks as well as to specific T1 Cards. The information that is programmed *common to all T1 Cards* includes:

- **Error thresholds:** The programmer can set numerical thresholds (number per hour and number per day) for T1 Card errors. If a threshold is exceeded, an error is printed on the SMDR report. (These are set to default values that, in most cases, will not need to be changed.) Possible T1 errors include the following:
 - **BPV (Bipolar Violations):** This is a non-zero signal element that has the same polarity as the previously received non-zero element.
 - **Controlled Slips:** The 416/832 System replicated or deleted one 192-bit digital signal (DS1) frame due to a lack of frequency synchronization.
 - **CRC-6 (Cyclic Redundancy Check):** The calculation carried out on a set of transmitted bits by the transmitter does not match the calculation performed by the 416/832 System.
 - **ES (Errored Seconds):** These are seconds in which at least one error occurred.
 - **OOV/COFA (Out of Frame/Change of Frame Adjustment):** OOV is a state in which the frame alignment that is received is not consistent with that which is transmitted. COFA occurs when the 416/832 System realigns its receiver to the proper frame alignment signal.
 - **SES (Severely Errored Seconds):** This is a second during which transmission performance is degraded below an acceptable level.
 - **TODV (Transmit Ones Density Violations):** If there are too few ones in a transmission (low density of pulses representing ones), the excessively long string of zeros causes a pulse density error. This condition is monitored only when the on-board CSU is enabled.
 - **UAS (Unavailable Seconds):** This is the time interval during which the T1 span is unavailable for service. This time begins with 10 or more consecutive Severely Errored Seconds and ends with 10 or more Non-Severely Errored Seconds.
- **Dialing feedback configuration:** When a number is dialed over a T1 circuit, the user hears the feedback from the signals (either DTMF or dial-pulse). By adjusting the DTMF gain control or the dial-pulse gain control, you can determine how loud the signals ap-

pear to the user. If the circuit is designated for dial-pulse signaling, you can also select the type of dial-pulse tone the user hears (23 different tones are available).

- **Reference clock back-up priorities:** One T1 Card in the system must be programmed as the system reference clock. If more than one T1 Card is installed in the system, the programmer may designate one or more of the cards as a "backup" to the system reference clock. Then, if the T1 Card acting as the system reference clock fails or is taken out of service, the next T1 Card on the back-up priority list takes over. If no backups are assigned or all T1 cards fail, the Matrix Card clock acts as the backup.

13.57 The information that is programmed *specific to each T1 Card* installed in the system includes the following. This information is determined by the equipment being used. Refer to the chart on the next page for programming requirements and refer to INSTALLATION for special cabling requirements.

- **Card type:** The type of framing scheme used by the T1 trunks connected to the card can be D4 Superframe or Extended Superframe (ESF).
- **Zero code suppression scheme:** The T1 trunk zero-suppression scheme for the trunks on the T1 card can be AMI (Bit 7), Bipolar Eight Zero Substitution (B8ZS), or "none."
- **PCM encoding law:** In pulse code modulation (PCM) systems, there are two primary methods of encoding analog signals (sampled audio waveforms) into digital signals. In North America and Japan, the "mu-law" (μ -law) method is normally used. In other places, such as Europe, the "A-law" method is widely used. The programmer must select both the transmit and receive method of encoding used by the T1C. In the United States, this will almost always be mu-law to mu-law.
- **Relay activation:** If desired, you can enable one or both of the two relays on the T1 Card. If enabled, you can attach a signaling device (such as a light or alarm) and select whether the relay is in "set" mode for a "T1 line error" (red alarm) or to indicate "T1 line OK."
- **Channel service unit (CSU) or DSX-1 Interface:** Designate whether the optional on-board CSU is installed on the T1 Card or if a DSX-1 Interface will be used. Also verify that the DSX/CSU jumper on the T1 Card is set in the proper position (to match database programming.) Then program one of the following:

- **Line build-out (LBO):** If the optional on-board CSU is installed, designate the LBO attenuation of the T1 trunk connected to the card. This value is determined by the distance to the nearest public network T1 repeater.
- **DSX-1 line length:** If the optional on-board CSU is *not* installed, designate the length of the cabling between the T1 Card and the external CSU, or between the T1 Card and the other telephone system.

NOTE: The programming prompts for LBO attenuation and DSX-1 line length assume that proper T1 cable is being used. When transmitting over shorter distances (e.g., when the nearest public network T1 repeater is less than 2000 feet from the MDF), it may be possible to use standard two-pair voice frequency cable instead; however, you may have to compensate by selecting longer LBO distances or DSX-1 line lengths. Also, no matter which type of cable is used, the transmit and receive pairs must be shielded from each other (or run in separate cables or binder groups).

- **Reference clock programming:** First determine whether the T1 Card is connected to the public net-

work. If it is, the card is automatically designated as a slave clock (the public network always acts as the master clock and the first slave clock provides the system reference clock; all other slave clocks act as backups). If the card is not connected to the public network, but is connected to another T1 Card or a card in another telephone system, determine whether the card is a master clock or a slave clock (in relation to the card on the other end).

- **Error diagnostics:** If desired, you can generate a report that shows the current T1 error counts (by hour and by day) for the selected card. The error counts can be displayed in a graph or a table.

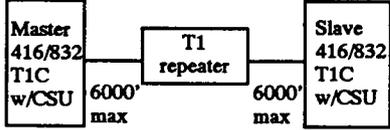
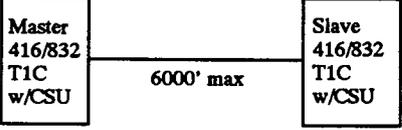
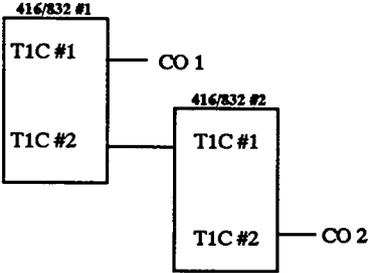
13.58 There are T1 services available that function like a DID trunk for incoming calls and an E&M trunk for outgoing calls. For an outgoing call, the trunk directly accesses another PBX and allows the usual E&M calls to be placed. For incoming DID-type calls, the T1 trunk receives the incoming call and then waits for 2-4 additional digits to be dialed. These digits must correspond to the digits in a DID table so that the 416/832 System will know where to send the call. (The DID digit translation tables are programmed in the DID Group window shown on page 5-115.)

FIGURE 5-1. T1 APPLICATIONS AND PROGRAMMING

NOTE: For all installations, the card type and zero code are programmed to match the T1 span being installed. The PCM encoding law is determined by the location in which the T1 span is installed; in the United States it will usually be "μ-law to μ-law." For the line build-out or line length option, select the number closest to the actual installation distance. If a T1C is a Master, the source of the reference clock will always be "on-board oscillator" ("external clock" is reserved for future use). Refer to page 2-22 in SPECIFICATIONS for more information.

	CSU or DSX-1	FROM PUBLIC NETWORK?	SYS. REFERENCE CLOCK?	MASTER or SLAVE
<p>416/832-to-CO with external CSU</p>				
T1C #1	DSX-1	Yes	Yes	Slave
T1C #2	DSX-1	Yes	No	Slave
<p>416/832-to-CO with onboard CSU</p>				
T1C #1	CSU	Yes	Yes	Slave
T1C #2	CSU	Yes	No	Slave
<p>416/832-to-416/832 DSX-1 with repeater(s)</p>				
Master 416/832 System	DSX-1	No	Yes	Master
Slave 416/832 System	DSX-1	Yes	Yes	Slave
<p>416/832-to-416/832 DSX-1 without repeater</p>				
Master 416/832 System	DSX-1	No	Yes	Master
Slave 416/832 System	DSX-1	Yes	Yes	Slave

FIGURE 5-1. T1 APPLICATIONS AND PROGRAMMING (Continued)

	CSU or DSX-1	FROM PUBLIC NETWORK?	SYS REFERENCE CLOCK?	MASTER or SLAVE
<p>416/832-to-416/832 CSU with repeater(s)</p> 				
Master 416/832 System	CSU	No	Yes	Master
Slave 416/832 System	CSU	Yes	Yes	Slave
<p>416/832-to-416/832 CSU without repeater</p> 				
Master 416/832 System	CSU	No	Yes	Master
Slave 416/832 System	CSU	Yes	Yes	Slave
<p>Sample T1 Network</p> 				
416/832 #1 — TIC #1	Depends on installation	Yes	Yes	Slave
416/832 #1 — TIC #2	Depends on installation	No	No	Master
416/832 #2 — TIC #1	Depends on installation	No	No	Slave
416/832 #2 — TIC #2	Depends on installation	Yes	Yes	Slave

T1 Programming		
Threshold Programming		
Threshold Name	Number/Hour	Number/Day
BPV (Bipolar Violations)	53,360	133,400
Controlled Slips	2	4
CRC-6 (Cyclic Redundancy Check)	53,184	132,960
ES (Errored Seconds)	259	648
OOV/COFA (Out-of-Frame)	7	17
SES (Severely Errored Seconds)	40	100
TODV (Transmit One's Density Violations)	2	4
UAS (Unavailable Seconds)	10	10

<p style="text-align: center;">Dialing Feedback Configuration</p> <p>DTMF Feedback Gain <input style="width: 40px;" type="text" value="0"/> dB</p> <p>Dial-Pulse Feedback Gain <input style="width: 40px;" type="text" value="-4"/> dB</p> <p>Dial-Pulse Tone Selection <input style="width: 40px;" type="text" value="7"/></p>	<p style="text-align: center;">T1 Card Programming</p> <div style="border: 1px solid black; height: 100px; width: 100%;"></div>
---	---

13.59 To reach this window, select T1 Programming from the Trunk Programming menu or enter the T1 command. The program planning sheet for this window is in Figure 5-26 on page 5-239.

13.60 THRESHOLD PROGRAMMING: T1 specifications include several error thresholds. These can be adjusted for hourly and daily thresholds. To change a value, select the desired threshold. the following window appears:

Number per <u>H</u> our	<input style="width: 150px; height: 25px;" type="text"/>
Number per <u>D</u> ay	<input style="width: 150px; height: 25px;" type="text"/>
<input style="width: 60px; height: 25px;" type="button" value="Ok"/>	<input style="width: 60px; height: 25px;" type="button" value="Cancel"/>

- **NUMBER PER HOUR:** In this text box, enter the appropriate number of errors allowed per hour.

- **NUMBER PER DAY:** In this text box, enter the number of allowed errors per day.

13.61 DIALING FEEDBACK CONFIGURATION: This value determines the volumes of the of DTMF tones, pulse-dial signals, and dial tone that are heard by the user (as feedback) when dialing. To set a value, select the appropriate text box and enter the desired value.

- **DTMF FEEDBACK GAIN:** This is the volume of the DTMF dial tones the user hears through the handset or speaker when dialing (using a DTMF T1 trunk). The allowed range is -15dB to 15dB. Default is -4dB.

- **DIAL-PULSE FEEDBACK GAIN:** This is the volume of the pulse-dial signals that the user hears when dialing (when using a pulse-dial T1 trunk). The allowed range is -15dB to 15dB. Default is -4dB.

- **DIAL-PULSE TONE SELECTION:** This is the tone that will be used for the simulated pulse dial tone. Select a channel number (1-23). Default is tone number 7.

T1 Backup Programming

Include		Exclude	
Slot	Source of Backup	Slot	Source of Backup
	Master T1 Cards		
	Matrix Card Clock		

13.62 BACKUP: This command button allows you to program backups for the system reference clock. When selected, the window shown above appears.

- **INCLUDE or EXCLUDE:** The include list can contain all T1 Cards with designated "slave" clocks, the "master" T1 Card, and the Matrix Card. The cards appear in the list according to backup priority, from highest priority (at the top of the list) to lowest priority. "Master" T1 Cards share the same priority and always appear just above the Matrix Card (which is at the bottom of the list). To change the priority of a "slave" T1C, locate that card on the In-

clude list and press SPACE BAR; it moves to the Exclude list. Then scroll to the desired new location for the card in the Include list and move the highlight to the Exclude list. Select the card again to move it back to the Include list in the new location. To completely remove a card from the list, select it in the Include list to automatically move it to the Exclude list.

- **OK or CANCEL:** When Backup programming is completed, select the OK command button. To exit without saving any changes, select the Cancel command button.

T1 Interface — Slot X

Card Type

D4 Superframe
 Extended SuperFrame (ESF)

Zero Code Suppression Scheme

AMI (Bit 7) B8ZS None

PCM Encoding Law

Receive	mu-Law to mu-Law	↑
Transmit	mu-Law to mu-Law	↓

Relay Activation

01	Relay Not Enabled	↑
02	Relay Not Enabled	↓

Channel Service Unit (CSU)

Enable On-Board CSU
 Enable DSX-1 Interface

DSX-1 Line Length

0-133 Feet 266-399 Feet
 133-266 Feet 399-533 Feet
 533-655 Feet

Clock

Error Diag

Test Prog

Ok

Cancel

13.63 T1 CARD PROGRAMMING: The list box on page 5-126 shows all T1 Cards that are configured in the system. To program a T1 Card, highlight and select it. The window shown above appears:

- **CARD TYPE:** Select the type of framing scheme, D4 Superframe or Extended Superframe (ESF), used by the T1 trunk connected to each card.
- **ZERO CODE SUPPRESSION SCHEME:** Select the type zero suppression scheme — AMI (Bit 7), Bipolar Eight Zero Substitution (B8ZS), or None — used by the T1 trunk connected to each card.
- **CHANNEL SERVICE UNIT (CSU):** Designate whether the optional on-board CSU is installed on the T1 Card or the DSX-1 interface is used. Depending on which is selected, also program one of the following.

— **LINE BUILD-OUT (LBO):** If the optional on-board CSU is installed, designate the LBO attenuation of the T1 trunk connected to the card. This value is determined by the distance to the nearest public network T1 repeater and the type of cable used. The LBO options are:

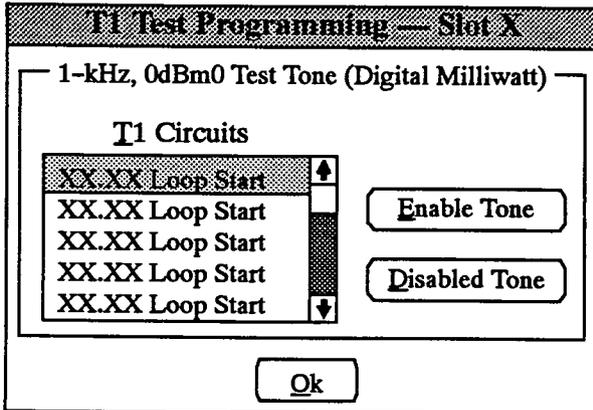
- 0dB (3000+ feet)
- 7.5dB (1600-3000 feet)
- 15dB (0-1600 feet)

— **DSX-1 LINE LENGTH:** If the optional on-board CSU is *not* installed and DSX-1 is used, designate the length of the cabling between the T1 Card and the external CSU, or between the T1 Card and the other telephone system (within the same building) to which it is connected. The line length options are:

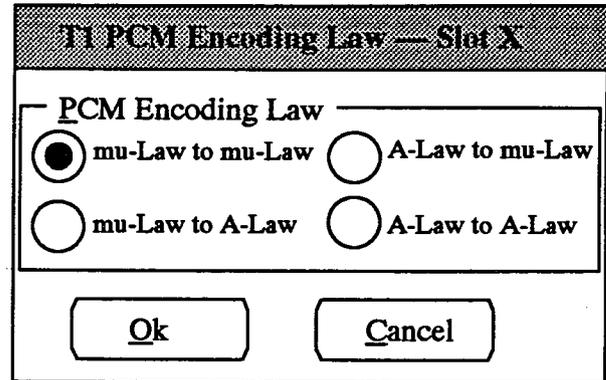
- 0-133 feet
- 133-266 feet
- 266-399 feet
- 399-533 feet
- 533-655 feet

NOTE: The programming prompts for LBO attenuation and DSX-1 line length assume that proper T1 cable (with the above characteristics) is being used. When transmitting over shorter distances (e.g., when the nearest public network T1 repeater is less than 2000 feet from the MDF), it may be possible to use standard two-pair voice frequency cable instead; however, the programmer may have to compensate by selecting longer LBO distances or DSX-1 line lengths. Also, no matter which type of cable is used, the transmit and receive pairs must be shielded from each other (or run in separate cables or binder groups).

- **TEST PROG:** *This option is not available in stand-alone sessions.* This option is used for sending a test tone over a selected T1 circuit. When the Test Prog command button is selected, the following window appears. Scroll the highlight bar to the desired circuit in the list box and then select the Enable Tone command button. To stop the tone, select the Disable Tone command button. When finished, select the OK command button to return to the T1 Interface window.



- **OK or CANCEL:** When the T1 interface programming is completed, select the OK command button. Or, to leave the slot unchanged, select the Cancel command button.
- **PCM ENCODING LAW:** (Shown in T1 Interface window on page 5-128.) Select both the transmit and receive method of encoding used by the T1 Card. In North America and Japan, the “mu-law” (μ-law) method is normally used. In other places such as Europe, the “A-law” method is widely used. In the United States, this will almost always be mu-law to mu-law. To change the receive or transmit encoding law, highlight and select Receive or Transmit in the list box. The following window appears. Place the dot in the desired option button and then select the OK command button. Or, to leave the encoding law unchanged, select the Cancel command button.

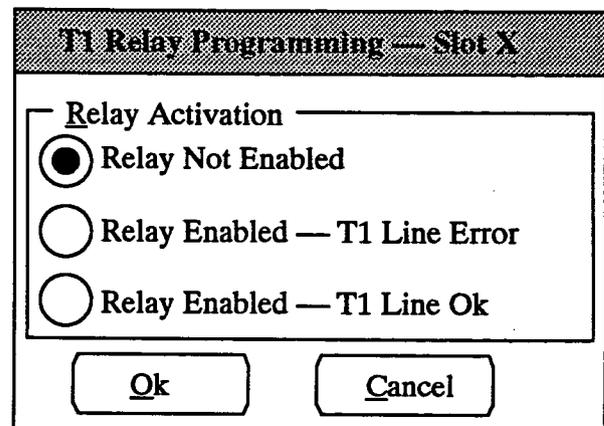


- **RELAY ACTIVATION:** (Shown in T1 Interface window on page 5-128.) If desired, you can enable either or both of the two T1C relays. Select the desired relay in the list box to access the following window. Then choose the proper activation status for the relay by placing a dot in the desired option button and selecting the OK command button. Or, to leave the relay unchanged, select the Cancel command button.

— **T1 Line Error:** If this is enabled, the relay is in “set” mode when a T1 red alarm occurs. It is in “reset” mode when there is no alarm.

— **T1 Line OK:** If this is enabled, the relay is in “set” mode when there is no alarm. It is in “reset” mode if a red alarm occurs.

NOTE: Ensure that the signalling device is installed on the relay and that the relay is programmed to achieve the desired “set” and “reset” operations. Refer to INSTALLATION, page 3-37, for T1C alarm relay jack pinout.



- **OK or CANCEL:** (Shown in T1 Interface window on page 5-128.) When T1 Card programming is completed, select the OK command button. To exit without saving any changes, select the Cancel command button.

13.64 EXIT: (Shown in the T1 Programming window on page 5-126.) When T1 programming is finished, select the Exit command button. A window appears that asks "Perform Update to Database?" To update the data-

base and exit to the Applications Menu, select Yes. Or, select No to exit without saving any changes. Select Cancel to return to the T1 Programming window without updating the database.

T1 Clock Programming — Slot X

T1 From Public Network

Provides Ref. Clock for 416/832

<p>Master/Slave Loop Operation</p> <p><input checked="" type="radio"/> Master (System Timing)</p> <p><input type="radio"/> Slave (Loop Timing)</p>	<p>Source of Reference Clock (Master Operation Only)</p> <p><input checked="" type="radio"/> On-Board Oscillator</p> <p><input type="radio"/> External Clock</p>
---	---

- **REFERENCE CLOCK PROGRAMMING:** (Shown in T1 Interface window on page 5-128.) Select the Clock command button to access the window shown above.

- **T1 FROM PUBLIC NETWORK:** First determine whether the T1 Card is connected to the public network. If it is, place an X in the T1 From Public Network Check box. The card is automatically designated as a slave clock (the public network always acts as the master clock).
- **PROVIDES REFERENCE CLOCK FOR 416/832:** The first T1 Card programmed in the system is automatically assigned as the 416/832 System reference clock. The system can have only one reference clock. If you attempt to assign the reference clock to another T1 Card by placing an X in this box, a window will appear that asks if you wish to remove the previously programmed reference clock. Select Yes to reassign the reference clock to the new T1 Card, or select No to leave the assignment unchanged.
- **MASTER/SLAVE LOOP OPERATION:** If the card is connected to another T1 Card, deter-

mine whether the card is a master clock or a slave clock (in relation to the card on the other end). Place a dot in the appropriate option button in the Master/Slave Loop Operation box.

- **SOURCE OF REFERENCE CLOCK:** If the T1 Card is designated as the reference clock for the 416/832 System and as a Master clock, this box will change from gray to black. **DO NOT** change the source clock; On-Board Oscillator should be selected. The External Clock option is reserved for future use. It is not currently supported.

NOTE: If the Source of Reference Clock option is set incorrectly (External Clock is selected), the system will use the backup clock instead of the clock on this T1 Card and the Reference Clock LED will not be lit. (The LED lights to indicate that the T1C clock is providing the reference clock.)

- **OK or CANCEL:** When the clock programming is completed, select the OK command button. Or, to leave the clock unchanged, select the Cancel command button.

T1 Error Diagnostics — Slot X

Output Type

Tabular Errors per Hour/Day

Graphical Errors per Hour

Graphical Errors per Day

Error Type	Current Hour	Current Day	
BPV (Bipolar Violations)	0	0	↑
Controlled Slips	0	0	
CRC-6 (Cyclic Redundancy Check)	0	0	
ES (Errored Seconds)	0	0	
OOV/COFA (Out-of-Frame)	0	0	
SES (Severely Errored Seconds)	0	0	
TODV (Transmit One's Density Violations)	0	0	
UAS (Unavailable Seconds)	0	0	↓

- **ERROR DIAGNOSTICS:** (Shown in T1 Interface window on page 5-128.) You can view selected reports that show the current T1 error counts (by hour and day) for the selected card in a graph or table. If using a stand-alone PC, the reports can be sent to files on the PC or to a printer port. To print the reports, the necessary printer driver must be installed on the PC. For information on installing a driver, refer to page 5-8.

— **OUTPUT TYPE:** Determine whether the output will be printed in a table or as a graph. If you want a graph, determine whether it will represent errors by the hour or by the day. Select the desired option to place a dot in the option button.

— **UPDATE:** To ensure that the error statistics are as current as possible, select the Update command button.

— **CURRENT ERRORS:** This list box shows how many errors have occurred in the current day and the current hour. To select the error type that will be shown in the graph or table, move the highlight bar to the desired error type in the list box. When you press the SPACE BAR, the table or graph is displayed on the screen (and, if enabled, can be sent to the printer).

— **PORT/FILE:** Available in stand-alone programming sessions only. Select the Port/File

command button to designate the destination printer port or PC file for the report. The following window appears. Place a dot in the desired port or file option button by selecting it. If FILE is selected, enter the destination file path name in the text box. When the destination is programmed, select the OK command button. To exit without changing the destination, select the Cancel command button.

Select Print Location

Destination

LPT1 COM1

LPT2 COM2

LPT3 FILE

PATH/FILE:

— **OK:** When finished viewing the graph or table, select the OK command button to return to the T1 Interface window.

14. ATTENDANTS

14.1 When the Attendants option is selected from the Applications Menu window, the menu expands to show the following choices:

- Attendants...
 Attendant's Console
 Alias Programming
 DSS/BLF Assignment

14.2 Each of the options and the windows they access are described in detail in the following pages.

A. ATTENDANT'S CONSOLE (CONS)

14.3 The window shown below allows you to save the Attendant Computer Console database on a floppy disk that can then be loaded into the console PC. This procedure is not necessary if the console is equipped with a modem for database downloads.

NOTE: The floppy disk must be formatted in the console PC to ensure that the console PC will be able to read the data. If the programming PC and the console PC do not have compatible disk drives, the data must be copied onto the properly formatted disk using a third PC before it can be used in the console PC. The following instructions assume that the console PC and programming PC have compatible drives.

14.4 TO CREATE A DATABASE DISK:

- (1) On the Attendant Computer Console press the CTRL, SHIFT, and X keys at the same time to display the C:\OPTERM prompt. **NOTE:** The console will not be able to place or receive calls during this procedure.

- (2) Insert the floppy disk into the console PC disk drive. Type **FORMAT A:** and press RETURN.
- (3) When disk formatting is complete, remove the floppy disk from the drive.
- (4) Insert the floppy disk in the programming PC disk drive.
- (5) Select the Attendant's Console window (shown below).
- (6) Set the database destination by selecting the Drive A:\ option button or selecting the Path option button. If Path is selected, a text box appears that allows you to type the destination path name. When you enter the path name, be sure it ends with a backslash (\).
- (7) Select the "Create Database" command button. The database is automatically loaded onto the disk and the window shows "Percent complete" to indicate progress.
- (8) When the database has been loaded onto the disk, select the Exit command button and remove the disk from the floppy drive.
- (9) Insert the disk in drive A: of the console PC.
- (10) At the C:\OPTERM prompt, type **NEWDB** and press RETURN. The PC automatically copies the data and restarts the Console.
- (11) When the "Station is Idle" prompt appears, the console is ready for use. Remove the floppy disk from the drive.

Attendant's Console

Actions
Setup
Exit

Database Dest

Drive A:\

Drive B:\

Path

Format Dest.

Create Database

Exit

Alias Programming

Actions Setup Exit

Enter the station to alias:

Alias

Current Aliases

XXXX XXXX Station Description

Exit

B. ALIAS PROGRAMMING (ALSS)

14.5 The system intercom directory is stored in the 416/832 System database and transferred to the Attendant Computer Console during database download. Aliases can be assigned to extension numbers that have more than one user or purpose so that they appear in the console directory more than once. For example, if two users share a station, one name can be programmed as the user description for that station and the other name can be programmed as an alias. If these two users also have a special function, such as "customer service" that name can also be programmed as an alias for that station. There can be a total of up to 200 aliases programmed in the system. (The program planning sheet for alias programming is in Figure 5-27 on page 5-240.)

NOTE: Aliases will not appear in the IC directory that is accessed by keysets. These aliases can only be viewed on Attendant Computer Console stations.

14.6 **ENTER THE STATION TO ALIAS:** Select the "Enter the station to alias" text box and enter the desired

extension number. (Or press F2 to display a list of stations then select the desired station.)

14.7 **ALIAS:** For each alias to be programmed for this station, select the Alias command button. The following window appears.

Adding Alias for Ext. XXXX

Description:

Ok Cancel

- **DESCRIPTION:** Select the Description text box and enter an alias of up to 20 characters.
- **OK or CANCEL:** Select the OK button to exit to the Alias Programming window. The station appears in the Current Aliases list box. Or, select the Cancel button to exit without saving the alias.

14.8 CURRENT ALIASES: To change or delete an existing alias, locate it in the Current Aliases list box and highlight it. Press the SPACE BAR. The following window appears.

The screenshot shows a dialog box titled "Deleting Aliases for...". Inside, there is a list box labeled "Aliases" with two entries: "001. Name" (highlighted) and "002. Name". To the right of the list box are two buttons: "Delete" and "Ok".

- **ALIASES:** Move the highlight bar in the Aliases list box to the alias you wish to change or delete. To change the alias, press the SPACE BAR. The following window appears.

The screenshot shows a dialog box titled "Changing Alias for Ext. XXXX". It contains a text input field labeled "Description:" and two buttons: "Ok" and "Cancel".

- **DESCRIPTION:** Select the Description text box and edit or enter the alias (up to 20 characters).
- **OK or CANCEL:** Select the OK command button to exit to the Deleting Aliases window. The alias appears in the Aliases list box. Or, select the Cancel command button to exit without changing the alias.
- **DELETE:** To delete the highlighted alias, select the Delete command button. The alias is removed from the list.
- **OK:** When all changes or deletions have been made, select the OK command button to return to the Alias Programming window.

DSS/BLF Assignment		
Actions Setup Exit		
DSS/BLF	Keymap	Associated Keyset
01.02	1 1000 01.01	~ Station Undefined
↑		
↓		

Station Pick List	
1001 01.02 ~ Station Undefined	↑
1002 01.03 ~ Station Undefined	
1003 01.04 ~ Station Undefined	
1004 01.05 ~ Station Undefined	
1005 01.06 ~ Station Undefined	↓

C. DSS/BLF ASSIGNMENT (DSS)

14.9 The window shown above can be accessed by selecting DSS/BLF Assignment from the Attendants menu or by entering the DSS command. To prepare to program the attendant stations, determine which circuits will be connected to DSS/BLF Units, the stations they will be associated with, and the stations that they will access. A program planning sheet is in Figure 5-28 on page 5-241.

14.10 There can be a maximum of 50 DSS/BLF-equipped keyset stations on the system.

- Analog IMX and DVK DSS/BLF Units are programmed to be used with specific keysets, but are not physically attached to the keysets. Each unit requires separate cabling and a separate Keyset Card (KSC) circuit. For each DSS/BLF Unit installed, one fewer keyset can be installed.
- Digital DSS/BLF Units are connected to Digital Keysets using a PC Data Port Module (PCDPM) attached to the keyset. Up to four Digital DSS/BLF Units can be connected in series to one PCDPM.

14.11 STATION PICK LIST: To assign a station circuit for DSS/BLF use, scroll through the Station Pick list until the desired station is highlighted, and select it. The following window appears which warns you that any previous programming for the station (attendant, mes-

sage center, etc.) will be erased. If you select OK, the window described on the next page appears. If you select Cancel, the window shown above returns.

*** WARNING ***	
Any references to the keyset selected by other devices due to certain designations (e.g. attendant) will be eliminated.	
<input type="button" value="Ok"/>	<input type="button" value="Cancel"/>

14.12 DSS/BLF: To change the keymap and associated keyset for an existing DSS/BLF station, select the desired station in the DSS/BLF stations list box. A window appears as shown on the next page.

14.13 DELETE DSS: To delete an existing DSS/BLF station, highlight the desired DSS/BLF station in the DSS/BLF list box and select the Delete DSS/BLF command button.

14.14 EXIT: When DSS/BLF programming is finished, select the Exit command button. A window appears that asks "Perform Update to Database?" To update the database and exit to the Applications Menu, select Yes. Or, select No to exit without saving any changes. Select Cancel to return to the DSS/BLF Assignment window without updating the database.

DSS/BLF Circuit X.X

Description:

DSS/BLF Associated Keyset

1001	01.02	~ Station Undefined	↑
1002	01.03	~ Station Undefined	
1003	01.04	~ Station Undefined	↓

DSS/BLF Keymap

1	Default DSS Map 1	↑
2	Default DSS Map 2	
3	Default DSS Map 3	↓

14.15 DESCRIPTION: To assign a description of up to 20 characters (such as Primary Att DSS1), select the Description text box and enter the desired name.

14.16 DSS/BLF ASSOCIATED KEYSSET: To assign or change the keyset that will be used in conjunction with this DSS/BLF, scroll to the desired station in the DSS/BLF Associated Keyset list box. The highlight bar indicates the selected station.

14.17 DSS/BLF KEYMAP: To assign or change the keymap that will be used in conjunction with this DSS/BLF, scroll to the desired map in the DSS/BLF Keymap list box. The highlight bar indicates the selected map. Keymaps are constructed in the Key Assignments window described on page 5-44.

14.18 OK: When programming is complete for this DSS/BLF station, select the OK command button to return to the DSS/BLF Assignment window.

15. STATION MESSAGE DETAIL

15.1 When Station Message Detail is selected from the Applications Menu window, the menu expands to show the following options:

```
Station Message Detail...
  Call Cost
    SMDA
    SMDR
```

15.2 Each of the options and the windows they access are described in detail in the following pages.

A. CALL COST FACTORS (COST)

15.3 Determine the daytime rates (in dollars per minute) for the following types of calls. Use several telephone bills from months with typical usage to calculate the average cost per minute of each type of call. Record the charges in dollars and cents from 00.00 to 99.99. You may need to adjust the calculations later to more accurately estimate actual call costs. (This program is to be used as an estimate only; refer to page 4-114 in FEATURES for details. Refer to Figure 5-29 on page 5-242 for a program planning sheet.)

- Local calls (defaults to .05)
- Seven-digit toll calls (defaults to .20)
- Ten-digit toll calls (defaults to .50)

- Operator-assisted and international calls (defaults to 1.00)
- Incoming calls (defaults to 0)

15.4 Then, determine the discount rates for night/weekend and evening calls. Record these as decimal factors. For example: if the evening discount rate is 35%, the rate is 65% of the regular rate. So it would have a factor of 0.65 times the day rate. The allowed range is between 0.00 and 1.99. The defaults are .65 for evening and .40 for night/weekend.

15.5 To access this window, select Call Cost from the Station Message Detail menu or enter the COST command. The window appears as shown above.

15.6 DAYTIME RATES IN DOLLARS PER MINUTE: Select the individual text boxes and enter the per-minute cost in dollars and cents for each of the call cost types. The range is 0.00 to 99.99.

15.7 MULTIPLICATIVE FACTORS: Select each of the text boxes and enter the number that, when multiplied by the daytime rates, produces the evening and night rates for calls. The range is 0.00 to 1.99.

15.8 EXIT: When call cost programming is finished, select the Exit command button. A window appears that asks "Perform Update to Database?" To update the database and exit to the Applications Menu, select Yes. Or, select No to exit without saving any changes. Select Cancel to return to the Call Cost window without updating the database.

Call Cost	
<u>A</u> ctions	<u>S</u> etup
<u>E</u> xit	
Daytime Rates in Dollars per Minute	
Local Call:	0.05
7-Digit Toll Call:	0.20
10-Digit Toll Call:	0.50
Operator/International Call:	1.00
Incoming Call:	0.00
Multiplicative Factors	
Evening:	0.65
Night and Weekend:	0.40
	Exit

SMDA											
A<u>ctions</u> S<u>etup</u> E<u>xit</u>											
<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <p style="text-align: center; margin: 0;"><u>O</u>utput Port</p> <p style="margin: 0;"> <input checked="" type="radio"/> Serial 1 <input type="radio"/> Serial 2 </p> </div> <div style="border: 1px solid black; padding: 5px;"> <p style="text-align: center; margin: 0;"><u>R</u>eporting Interval</p> <p style="margin: 0;"> <input checked="" type="radio"/> <u>A</u>ttendant Only <input type="radio"/> <u>D</u>aily <input type="radio"/> <u>W</u>eekly <input type="radio"/> <u>M</u>onthly </p> </div>	<div style="margin-bottom: 10px;"> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;">Review Format</div> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;">Print Report</div> </div> <p>Day of Month: <input style="width: 40px;" type="text"/></p> <p>Time of Day: <input style="width: 60px;" type="text"/></p> <p>Day of Week:</p> <table border="1" style="border-collapse: collapse; text-align: center;"> <tr><td style="padding: 2px;">Sun</td><td style="padding: 2px;">↑</td></tr> <tr><td style="padding: 2px;">Mon</td><td style="padding: 2px;"></td></tr> <tr><td style="padding: 2px;">Tues</td><td style="padding: 2px;"></td></tr> <tr><td style="padding: 2px;">Wed</td><td style="padding: 2px;"></td></tr> <tr><td style="padding: 2px;">Thu</td><td style="padding: 2px;">↓</td></tr> </table>	Sun	↑	Mon		Tues		Wed		Thu	↓
Sun	↑										
Mon											
Tues											
Wed											
Thu	↓										
<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;">Clear SMDA Data</div>	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;">E<u>x</u>it</div>										

B. SMDA

15.9 The window shown above is available in *Extended* software only and can be accessed by selecting SMDA from the Station Message Detail menu or by entering the SMDA command.

15.10 Determine the following information for the SMDA reports. (Refer to Figure 5-30 on page 5-243 for a program planning sheet.):

- **Output Port:** Select the desired output port for the SMDA reports (serial port one or two).
- **Reporting Interval:** Determine how often the reports will print (daily, weekly, or monthly). If monthly, select a day of the month for the report to be printed. (Note that if you select the 31st, reports will not print in months that do not have 31 days; for end-of-the-month printing, 12:01AM on the first may be a better choice.) Select the time of day that the reports are to be printed. If weekly, select the day of the week the report is to be printed. If desired, select "attendant only" to have SMDA reports generated only through the attendant's station (using the SMDA Report feature code — 025).

- **Format:** The following types of reports are available. Refer to page 4-115 in FEATURES for samples of the reports.

Account Code Reports
Summary Reports
System Wide
Tenant
Tenant/Department

Detailed Reports

All Users in Tenant/Dept. Groups
Top System Users
Top Users by Tenant
Top Users by Tenant/Dept. Group
Rank by Total Cost
Rank by Total Duration
Rank by Total Number of Calls

Select Device Reports

Reports can be generated for selected trunks or stations that show total number, duration, and cost of calls

- 15.11 OUTPUT PORT:** Select the desired output port for the SMDA reports by selecting the appropriate option button (serial port one or two).

15.12 REPORTING INTERVAL: Determine how often the reports will print by selecting the appropriate option button. Depending on the interval chosen, items to the right of the box will change from black to gray.

15.13 DAY OF MONTH: If Monthly was selected in the Reporting Interval box, you must select a day of the month for the report to be printed. Note that if you select the 31st, the report will not print in months that do not have 31 days; for end-of-the-month printing, 12:01AM on the first may be a better choice.

15.14 TIME OF DAY: If Daily, Weekly, or Monthly was selected in the Reporting Interval box, select the Time of Day text box and enter the time, in international 24-hour time (i.e., 9PM is 21:00), that the reports are to be printed.

15.15 DAY OF WEEK: If Weekly was chosen in the Reporting Interval box, select the day of the week the report is to be printed on by moving the highlight bar to the desired day.

15.16 CLEAR SMDA DATA: If you wish to have the SMDA data cleared from memory, select the Clear SMDA Data command button.

15.17 PRINT REPORT: To print a report immediately, select the Print Report command button. An SMDA report is sent to the output port.

15.18 REVIEW FORMAT: To determine the information that is included in the SMDA report, select the Review Format command button. The window on the following page appears.

15.19 EXIT: When SMDA programming is finished, select the Exit command button. A window appears that asks "Perform Update to Database?" To update the database and exit to the Applications Menu, select Yes. Or, select No to exit without saving any changes. Select Cancel to return to the SMDA window without updating the database.

SMDA Report Format

Account Code Reports

Clear Account Code Data Following Report

Summary Reports

System-Wide Report

Tenant Report

Tenant/Dept. Report

Selected Device Reports

Stations

Trunks

Hunt Groups

Clear Station/Trunk/Hunt Data Following Report

Detailed Reports

All Users in Tenant/Dept. Groups

Top System Users

Top Users by Tenant

Top Users by Tenant/Dept. Group

Rank by Total Cost

Rank by Total Duration

Rank by Total Number of Calls

Top 'N' Users Per Report:

Ok

15.20 ACCOUNT CODE REPORTS: To activate SMDA reports that are sorted by account code, select the Account Code Reports check box to place an X in the box. To remove the X and disable the reports, select the box again.

15.21 CLEAR ACCOUNT CODE DATA FOLLOWING REPORT: (This prompt is gray unless Account Code Reports have been enabled.) If you wish to have the memory cleared each time an account code report is printed, select the Clear Account Code Data Following Report check box to place an X in the box. To allow data to accumulate from report to report, remove the X by selecting it again.

15.22 DETAILED REPORTS: If you wish to activate any of the detailed reports, select the appropriate check boxes to places Xs in those boxes. If you select any of the Top Users options, you must also select ranking option(s) for them and indicate in the Top 'N' Users Per Report text box, how many users you wish to track.

15.23 CLEAR STATION/TRUNK/HUNT DATA FOLLOWING REPORT: If you wish to have all sta-

tion, trunk, and hunt group data cleared after each report, select the Clear Station/Trunk Data Following Report check box to place an X in the box. To allow data to accumulate from report to report, remove the X by selecting it again.

15.24 SUMMARY REPORTS: Select the desired summary reports by marking the appropriate check box(es). System-wide reports give call information for the entire system. The tenant report prints information separately for each tenant group. And, the tenant/department report provides call information for departments within each tenant group.

15.25 SELECT DEVICE REPORTS: To select the stations, hunt groups, and/or trunks that will be represented in the Selected Device report(s), select the appropriate command button. The resulting windows appear on the next page.

15.26 OK: When all SMDA formatting is complete, select the OK command button to return to the SMDA programming window.

Selected Device Reports Windows

15.27 STATIONS or HUNT GROUPS: To assign the stations or hunt groups that will be included in the Selected Stations report, select the Stations or Hunt Groups command button (shown on the preceding page). The following window appears.

- **INCLUDE or EXCLUDE:** To include a station or hunt group, locate the desired station on the Exclude list and select it by pressing the SPACE BAR; it will automatically move to the Include list. To remove a station from the list, select the station in the Include list to move it to the Exclude list.
- **ALL or NONE:** To include all stations or hunt groups in the list, select the All command button. To exclude all stations, select the None command button.
- **OK or CANCEL:** When the lists appear as desired, select the OK command button. To exit from the window without saving changes, select the Cancel command button. The SMDA programming window returns.
- **SORT:** To sort the stations or hunt groups and list them numerically by extension number or circuit number, or alphabetically by name, select the Sort command button. The following window appears. Choose the desired sorting method by selecting the corresponding option button. Then select the OK command button. When the list returns, the list box will show the stations or hunt groups in the selected

order. To exit without changing the sorting method, select the Cancel command button.

15.28 TRUNKS: To program the trunks that will be included in the Selected Trunk report, select the Trunks command button (shown on the previous page). The following window appears.

- **INCLUDE or EXCLUDE:** To include a trunk, locate it on the Exclude list and select it by pressing the SPACE BAR; it will automatically move to the Include list. To remove a trunk from the list, select the it in the Include list to move it to the Exclude list.
- **ALL or NONE:** To include all trunks in the list, select the All command button. To exclude all trunks, select the None command button.
- **OK:** When the trunk lists appear as desired, select the OK command button to return to the SMDA programming window.

C. SMDR

15.29 The station message detail reporting (SMDR) produces a record of calls and their costs. Report format is discussed in the FEATURES section, starting on page 4-123. Determine the port (serial port one or two) for the SMDR output, which stations and trunks will be included in the report, and which of the following options will be used. (Refer to Figure 5-31 on page 5-244 for a program planning sheet.):

- **Record All Incoming Calls:** Selecting this check box includes all incoming calls in the SMDR report.
- **Record All Local Calls:** Records all local, non-toll valid calls.
- **Record All Toll Calls:** Records all valid toll calls. Toll calls include calls that begin with 1 or 0, are longer than seven digits, or contain a restricted office code.
- **Record All DISA Calls:** This includes all incoming and outgoing DISA calls in the SMDR report.
- **Record All Conference Calls:** All conference calls that involve a trunk are recorded, even conference calls involving stations not listed in the station list.
- **Record All DID Calls:** This includes all calls received on DID trunks in the SMDR report.
- **Record All Ring-in Diagnostics:** A ring-in message is recorded for every incoming call (whether answered or unanswered) to indicate how long it rang. All incoming calls are recorded, even those involving stations not listed in the station list.
- **Record All DISA Calls:** This includes all DISA calls, that were blocked by weekly toll limit restrictions, in the SMDR report.

- **Suppress All Absorbed Digits:** Absorbed digits (on local or PBX trunks) will not appear in the report if this option is selected.

NOTE: If absorbed digits are repeatable on a local trunk, the absorbed digits will not appear in the SMDR report even when repeated.

- **Suppress All But The First Toll Digit:** When this option is selected, only the first digit of the toll field(s) will appear in the number dialed field (i.e., if "10XXX-1-..." was dialed, only "11" would appear).
- **Suppress All Digits After End Of Dialing:** This flag allows you to specify whether all dialed digits or just the digits that make up the valid call appear in the SMDR report. If desired, the "extra" digits (dialed after the end of dialing the telephone number) used for dialing banking machine, voice mail, automated attendants, or other purposes can be suppressed so that only the telephone number digits are recorded in the report. (This flag is not affected by the system-wide flag that suppresses digits for the keyset displays and redial buffer, described on page 5-69.)
- **Display Elapsed Time in Seconds:** To allow SMDR to give a more accurate representation of elapsed time, an option can be enabled that records the elapsed time of calls in seconds instead of minutes. For calls up to 999 seconds (about 16.67 minutes) long, the ELAPSED TIME field will show "S=XXX" (XXX represents the number of seconds). For calls lasting longer than 999 seconds, ELAPSED TIME will show "HH:MM" (hours and minutes rounded up to the nearest minute).

15.30 The SMDR programming window appears as shown on the next page when you select SMDR from the Station Message Detail menu or enter the SMDR command.

SMDR	
A ctions S etup E xit	
<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> SMDR Output Port <input checked="" type="radio"/> Serial 1 <input type="radio"/> Serial 2 </div> <input checked="" type="checkbox"/> SMDR Output Active <div style="border: 1px solid black; padding: 5px; width: fit-content; margin-bottom: 10px;">Station List</div> <div style="border: 1px solid black; padding: 5px; width: fit-content;">Exit</div>	<input checked="" type="checkbox"/> Record All Incoming Calls <input checked="" type="checkbox"/> Record All Local Calls <input checked="" type="checkbox"/> Record All Toll Calls <input checked="" type="checkbox"/> Record All DISA Calls <input checked="" type="checkbox"/> Record All Conference Calls <input checked="" type="checkbox"/> Record All DID Calls <input checked="" type="checkbox"/> Record All Ring-In Diagnostics <input checked="" type="checkbox"/> Record All Blocked DISA Calls <input type="checkbox"/> Suppress All Absorbed Digits <input type="checkbox"/> Suppress All but the First Toll Digit <input type="checkbox"/> Suppress All Digits After End-Of-Dialing <input type="checkbox"/> Display Elapsed Time in Seconds for durations less than 999 seconds

15.31 SMDR OUTPUT PORT: Select the desired output port for the SMDR by selecting the appropriate option button (serial port one or two).

15.32 SMDR OUTPUT ACTIVE: To activate the SMDR feature, place an X in the SMDR Output Active check box by selecting it (by pressing the SPACE BAR). To disable the reports, remove the X by selecting the check box again.

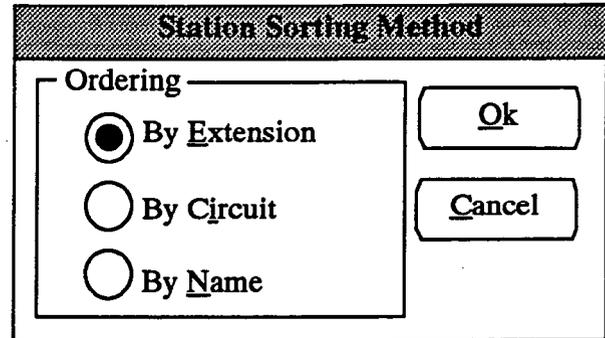
15.33 CHECK BOXES: The check boxes on the right side of the window determine the content of the output. To choose the desired options, select the appropriate check boxes (by pressing the SPACE BAR) to place an X in them. To remove an option, select the check box again to remove the X from the check box.

15.34 STATION LIST: To assign the stations that will be included in the SMDR output, select the Stations command button. The following window appears.

SMDR List of Stations											
Include											
<table style="width: 100%; border-collapse: collapse;"> <tr style="background-color: #cccccc;"> <td style="padding: 2px;">1001 01.01 Smith, John</td> <td style="text-align: center; padding: 2px;">↑</td> </tr> <tr> <td style="padding: 2px;">1002 01.02 ~Station Undefined</td> <td style="text-align: center; padding: 2px;"> </td> </tr> <tr> <td style="padding: 2px;">1003 01.03 ~Station Undefined</td> <td style="text-align: center; padding: 2px;"> </td> </tr> <tr> <td style="padding: 2px;">1004 01.04 ~Station Undefined</td> <td style="text-align: center; padding: 2px;"> </td> </tr> <tr> <td style="padding: 2px;">1004 01.05 ~Station Undefined</td> <td style="text-align: center; padding: 2px;">↓</td> </tr> </table>	1001 01.01 Smith, John	↑	1002 01.02 ~Station Undefined		1003 01.03 ~Station Undefined		1004 01.04 ~Station Undefined		1004 01.05 ~Station Undefined	↓	<input type="button" value="None"/> <input type="button" value="All"/> <input type="button" value="Sort"/> <input type="button" value="Cancel"/> <input type="button" value="Ok"/>
1001 01.01 Smith, John	↑										
1002 01.02 ~Station Undefined											
1003 01.03 ~Station Undefined											
1004 01.04 ~Station Undefined											
1004 01.05 ~Station Undefined	↓										
Exclude											
<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding: 2px;">1008 02.01 ~Station Undefined</td> <td style="text-align: center; padding: 2px;">↑</td> </tr> <tr> <td style="padding: 2px;">1009 02.02 ~Station Undefined</td> <td style="text-align: center; padding: 2px;"> </td> </tr> <tr> <td style="padding: 2px;">1010 02.03 ~Station Undefined</td> <td style="text-align: center; padding: 2px;"> </td> </tr> <tr> <td style="padding: 2px;">1011 02.04 ~Station Undefined</td> <td style="text-align: center; padding: 2px;"> </td> </tr> <tr> <td style="padding: 2px;">1012 02.05 ~Station Undefined</td> <td style="text-align: center; padding: 2px;">↓</td> </tr> </table>	1008 02.01 ~Station Undefined	↑	1009 02.02 ~Station Undefined		1010 02.03 ~Station Undefined		1011 02.04 ~Station Undefined		1012 02.05 ~Station Undefined	↓	
1008 02.01 ~Station Undefined	↑										
1009 02.02 ~Station Undefined											
1010 02.03 ~Station Undefined											
1011 02.04 ~Station Undefined											
1012 02.05 ~Station Undefined	↓										

- **INCLUDE or EXCLUDE:** To include a station, locate the desired station on the Exclude list and select it by pressing the SPACE BAR; it will automatically move to the Include list. To remove a station from the list, select the station in the Include list to move it to the Exclude list.

- **ALL or NONE:** To include all stations, select the All command button. To exclude all stations, select the None command button.
- **OK or CANCEL:** When the station lists appear as desired, select the OK command button. To exit from the window without saving changes, select the Cancel command button.
- **SORT:** To sort the stations and list them numerically by extension number or circuit number, or alphabetically by name, select the Sort command button. The following window appears. Choose the desired sorting method by selecting the corresponding option button. Then select the OK command button. When the list of stations returns, the list box will show the stations in the selected order. To exit without changing the sorting method, select the Cancel command button.



The image shows a dialog box titled "Station Sorting Method". It has a shaded header with the title. Below the header, the word "Ordering" is followed by a horizontal line. There are three radio button options: "By Extension" (which is selected), "By Circuit", and "By Name". To the right of these options are two buttons: "Ok" and "Cancel".

15.35 EXIT: When SMDR programming is finished, select the Exit command button (shown on the preceding page). A window appears that asks "Perform Update to Database?" To update the database and exit to the Applications Menu, select Yes. Or, select No to exit without saving any changes. Select Cancel to return to the SMDR window without updating the database.

16. SERVICE

16.1 When Service is selected from the Applications Menu window, the menu expands to show the following options:

Service...

- Error Message Programming
- Hybrid Balance
- Maintenance Programming
- Passwords
- Report Programming
- Report Programming (Customized)
- Save/Restore
- Serial Port Configuration
- System Configuration

16.2 Each of the options and the windows they access are described in detail in the following pages.

16.3 In addition to using these service applications, service personnel can use error messages that are logged by the system for troubleshooting purposes. These messages can be viewed on the programming screen and/or can be copied to a floppy disk. There are three types of error logs: reset records, system error messages, and system freeze records. These files can be used by Customer Service personnel during troubleshooting. To copy the error file to disk, follow the procedures given on page 5-169.

16.4 To view error messages on the PC screen, exit to the Inter-Tel logo screen. Then press ALT-S to access the Setup pull-down menu. From that menu, select M to display the error messages. When you are finished viewing the messages, press ALT-S and then M again to return to the logo screen.

Error Message Programming	
<div style="display: flex; justify-content: space-between; border-bottom: 1px solid black; margin-bottom: 10px;"> <u>A</u>ctions <u>S</u>etup <u>E</u>xit </div>	
<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <p style="margin: 0;">Error Output Port</p> <div style="display: flex; flex-direction: column; gap: 10px;"> <div style="display: flex; align-items: center;"> <input checked="" type="radio"/> Serial <u>1</u> </div> <div style="display: flex; align-items: center;"> <input type="radio"/> Serial <u>2</u> </div> </div> </div>	<div style="margin-bottom: 10px;"> <input checked="" type="checkbox"/> Error <u>M</u>essage Output Active </div> <div style="margin-bottom: 10px;"> <input checked="" type="checkbox"/> Report All <u>A</u>larms [+++] </div> <div style="margin-bottom: 10px;"> <input checked="" type="checkbox"/> Report All <u>F</u>ield Service Diagnostics [***] </div> <div style="margin-bottom: 10px;"> <input type="checkbox"/> Report All <u>E</u>ngineering Diagnostics [---] </div> <div style="margin-bottom: 10px;"> <input type="checkbox"/> <u>L</u>og All SEND Messages to History Queue </div>
<div style="border: 1px solid black; display: inline-block; padding: 5px 20px; border-radius: 10px;">Exit</div>	

A. ERROR MESSAGE PROGRAM (ERR)

16.5 Error messages are printed to give service personnel and engineers information about system status. (Refer to FEATURES, page 4-125, and TROUBLESHOOTING, page 6-7, for more information about system alarm reporting.) The following types of error messages can be enabled. A program planning sheet is in Figure 5-32 on page 5-245.

- **Report All Alarms [+++]:** An error message is recorded for all minor and major system alarms. This option does not include the field service or engineering diagnostics messages.
- **Report All Field Service Diagnostics [***]:** An error message is recorded for all field service diagnostics. Refer to TROUBLESHOOTING, page 6-9, for a listing of field service diagnostics.
- **Report All Engineering Diagnostics [---]:** An error message is recorded when the software detects an inconsistent or illogical condition in the dynamic database, when the operating system detects an error in the non-operating system software on the same circuit card, and if the operating system detects an inconsistency or error condition in its own data structures. These error messages are for engineering use only.
- **Log All SEND Messages to History Queue:** These messages provide additional troubleshooting infor-

mation (cphist.bin files) that can be used by engineering personnel.

16.6 To reach the window shown above, select Error Message Programming from the Service menu or enter the ERR command.

16.7 ERROR OUTPUT PORT: Select the desired output port for the error reports by selecting the appropriate option button (Serial 1 or Serial 2).

16.8 ERROR OUTPUT ACTIVE: To activate the error reporting feature, place an X in the Error Message Output Active check box by selecting it (by pressing the SPACE BAR). To disable the reports, remove the X by selecting the box again. If SMDR is active when activating error message output, error messages appear within the SMDR report and call information is buffered while the message prints.

16.9 REPORT/LOG ALL: The remaining check boxes determine the types of error messages to be included in the error report.

NOTE: Do not enable error reports for engineering diagnostics or log SEND messages unless requested to do so by authorized service personnel.

16.10 EXIT: When error message programming is finished, select the Exit command button. A window appears that asks "Perform Update to Database?" To update the database and exit to the Applications Menu, select Yes. Or, select No to exit without saving any changes. Select Cancel to return to the Error Message Programming window without updating the database.

Hybrid Balance													
Actions Setup Exit													
<p style="margin: 0;"><u>Circuits</u></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr style="background-color: #cccccc;"><td style="padding: 2px;">20.01 G/L</td></tr> <tr><td style="padding: 2px;">20.02 G/L</td></tr> <tr><td style="padding: 2px;">20.03 G/L</td></tr> <tr><td style="padding: 2px;">20.04 G/L</td></tr> <tr><td style="padding: 2px;">20.05 G/L</td></tr> <tr><td style="padding: 2px;">20.06 G/L</td></tr> <tr><td style="padding: 2px;">21.01 G/L</td></tr> <tr><td style="padding: 2px;">21.02 G/L</td></tr> <tr><td style="padding: 2px;">21.03 G/L</td></tr> <tr><td style="padding: 2px;">21.04 G/L</td></tr> <tr><td style="padding: 2px;">21.05 G/L</td></tr> </table> <div style="text-align: center; margin-top: 5px;"> ↑ ↓ </div>	20.01 G/L	20.02 G/L	20.03 G/L	20.04 G/L	20.05 G/L	20.06 G/L	21.01 G/L	21.02 G/L	21.03 G/L	21.04 G/L	21.05 G/L	<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <p style="margin: 0; text-align: center;">Hybrid Balance</p> <p style="margin: 0;"><input type="radio"/> Ideal</p> <p style="margin: 0;"><input checked="" type="radio"/> Unloaded</p> <p style="margin: 0;"><input type="radio"/> Loaded</p> </div> <div style="text-align: center; margin-bottom: 10px;"> <div style="border: 1px solid black; padding: 5px; display: inline-block;">Test Line</div> </div> <div style="text-align: center;"> <div style="border: 1px solid black; padding: 5px; display: inline-block;">Exit</div> </div>	<p style="margin: 0;"><u>Break Dial-Tone Digit:</u> 5</p> <p style="margin: 0;">The break dial-tone digit is dialed out the seized trunk to break dial-tone and silence the trunk. It is only used for G/L trunks.</p>
20.01 G/L													
20.02 G/L													
20.03 G/L													
20.04 G/L													
20.05 G/L													
20.06 G/L													
21.01 G/L													
21.02 G/L													
21.03 G/L													
21.04 G/L													
21.05 G/L													

B. HYBRID BALANCE (HYBR)

16.11 The 416/832 System allows the installer to match the impedance of the trunks installed in the system to the system hardware using one of three options: unloaded, loaded, or ideal. Hybrid balance can be set on a trunk-by-trunk basis. (T1 circuits and 4-wire E&M circuits cannot be hybrid balanced.) To access this program, select Hybrid Balance from the Service menu or enter the HYBR command.

16.12 CIRCUITS: To begin programming the hybrid balance for a specific trunk, scroll through the Trunks list box until the desired trunk is highlighted. All other activity will apply to that trunk.

16.13 HYBRID BALANCE: To set the hybrid balance at the desired level, select the appropriate option button.

- **IDEAL:** The ideal balance network simulates a 600-ohm transmission line to match trunks that are supplied by other equipment that is located within the same building using private, copper wire termination. For example, an OPX supplied by another PBX that does not use the public network or a T1 channel bank interface.
- **UNLOADED:** The unloaded balance network simulates an 800-ohm transmission line which matches most CO trunks. **NOTE:** The present standard for trunks from the central office is 900 ohms. However, AT&T studies indicate that an even better match can be obtained with 800 ohms for unloaded trunks and 1650 ohms for loaded trunks.

- **LOADED:** The loaded balance network simulates a 1650-ohm transmission line which more closely matches the qualities of a CO trunk that has a loading coil included in its circuitry because the central office is very far from the installation.

16.14 TEST LINE: To have internal diagnostics test the selected trunk, select the Test Line command button. The system will automatically set the hybrid balance based on the test results. *To ensure consistent results, this test should be run at least three times on each trunk.*

NOTE: If you attempt to test an incoming-only trunk, you will see a warning that states, "This circuit is incoming only, so the system cannot automatically place a call. Make sure circuit XX.XX is on an active call before proceeding." This is because ground signal is not returned on Tip and the system cannot power up the trunk for testing. Establish a call on the trunk identified in the message (circuit XX.XX) before continuing the test.

16.15 BREAK DIAL-TONE DIGIT: This is the digit that is dialed by the system during the trunk test to break dial tone (defaults to 5). Select any digit that is not recognized as a special code by the central office (or PBX, if the 416/832 System is installed behind one).

16.16 EXIT: When hybrid balance programming is finished, select the Exit command button. A window appears that asks "Perform Update to Database?" To update the database and exit to the Applications Menu, select Yes. Or, select No to exit without saving any changes. Select Cancel to return to the Hybrid Balance window without updating the database.

Maintenance Programming	
<div style="display: flex; justify-content: space-between; border-bottom: 1px solid black;"> <u>A</u>ctions <u>S</u>etup <u>E</u>xit </div>	
<div style="text-align: center; margin-bottom: 10px;"><u>D</u>eVICES</div> <div style="border: 1px solid black; padding: 5px;"> <div style="background-color: #cccccc; padding: 2px;">Individual CO Trunks</div> <div style="border: 1px solid black; height: 100px; margin-top: 5px;"></div> <div style="display: flex; justify-content: space-between; align-items: center; margin-top: 5px;"> ↑ ↓ </div> </div> <div style="text-align: center; margin-top: 20px; border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;">Exit</div>	<div style="text-align: center; margin-bottom: 10px;">CO Trunks — <u>M</u>aintenance</div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; padding: 5px; flex-grow: 1;"> <div style="border: 1px solid black; height: 100px; margin-bottom: 5px;"></div> <div style="display: flex; justify-content: space-between; align-items: center; margin-top: 5px;"> ↑ ↓ </div> </div> <div style="margin-left: 10px; display: flex; flex-direction: column; gap: 10px;"> <div style="border: 1px solid black; padding: 5px; width: 60px; text-align: center;">All</div> <div style="border: 1px solid black; padding: 5px; width: 60px; text-align: center;">None</div> </div> </div> <div style="text-align: center; margin-top: 10px;">CO Trunks — <u>A</u>vailable</div> <div style="border: 1px solid black; padding: 5px;"> <div style="background-color: #cccccc; padding: 2px;">20.01 CO Trunk</div> <div style="border: 1px solid black; padding: 2px;">20.02 CO Trunk</div> <div style="border: 1px solid black; padding: 2px;">20.03 CO Trunk</div> <div style="border: 1px solid black; padding: 2px;">20.04 CO Trunk</div> <div style="border: 1px solid black; padding: 2px;">20.05 CO Trunk</div> <div style="border: 1px solid black; padding: 2px;">20.06 CO Trunk</div> <div style="display: flex; justify-content: space-between; align-items: center; margin-top: 5px;"> ↑ ↓ </div> </div>

C. MAINTENANCE PROGRAMMING (MAIN)

16.17 This program allows you to temporarily remove a trunk from service for maintenance or repairs, and place it in service again later. While in maintenance, the trunk cannot be accessed by users and the system will not send ring signals to stations for that trunk. However, to outside callers and the central office, the trunk appears to be working and callers will hear ringing.

NOTE: Each T1C is equipped with a “make busy” switch for removing all circuits on the card from service and placing them back in again. They do not require use of this window. Pressing the switch will light the T1 Card LED and begin the process of “busying out” each circuit not in use. The circuits that are in use are then busied out as soon as the users hangs up.

16.18 The window shown above can be accessed by selecting Maintenance Programming from the Service menu or entering the MAIN command.

16.19 DEVICES: Currently, only CO Trunks appear in the Devices list box. In future software updates, other system devices may be included.

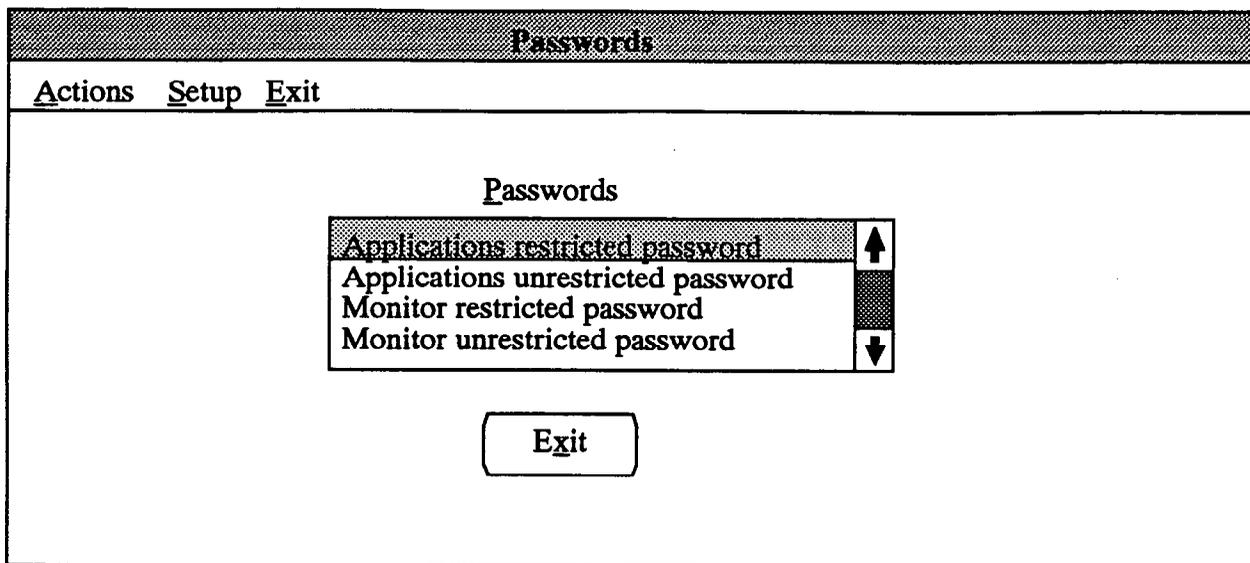
16.20 CO TRUNKS — MAINTENANCE/AVAILABLE: To remove a trunk from service, highlight it in

the Available list box. When selected, it moves to the Maintenance list box. To return a trunk to the Available list box, select it in the Maintenance list box. A message is automatically printed in the SMDR to show trunk status when a trunk is taken out of or returned to service.

NOTE: Placing a trunk in maintenance prevents all outgoing access and answering permission for the system users, however it does not make the trunk appear to be busy to outside callers. Any incoming calls will receive ringing instead of busy signal. If there is an ongoing call when the trunk is placed into maintenance, the system will wait for the call to be completed before disabling the trunk.

16.21 ALL or NONE: To remove all trunks from service, select the All command button. To move all trunks to the Available list box, select the None command button.

16.22 EXIT: When maintenance programming is complete, select the Exit command button. A window appears that asks “Perform Update to Database?” To update the database and exit to the Applications Menu, select Yes. Or, select No to exit without saving any changes. Select Cancel to return to the Maintenance Programming window without updating the database.



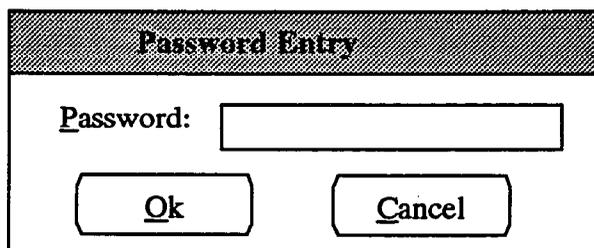
D. PASSWORDS (PASS)

16.23 To set passwords, select Passwords from the service menu or enter the PASS command. The database and the on-line monitor feature each can have two passwords assigned to them: Restricted and Unrestricted. (A program planning sheet is in Figure 5-33 on page 5-245.)

- **Applications Restricted:** When the Applications Restricted password is entered, the user can make changes in all programming areas except error message programming, hybrid balance, maintenance programming, passwords, save/restore, serial port configuration, and system configuration.
- **Applications Unrestricted:** A user who enters the Applications Unrestricted password can make programming changes in any area.
- **Monitor Restricted:** When the Monitor Restricted password is entered, the user cannot perform a reset, post messages, send commands, reset cards, copy or initialize memory, modify data, or view the Applications database records.
- **Monitor Unrestricted:** When the Monitor Unrestricted password is used, the user can make changes in any area.

NOTE: Both Monitor passwords allow access to the Applications database.

16.24 **PASSWORDS:** Choose the password to be programmed by selecting the desired line in the Password list box. The following window will appear.



- **PASSWORD:** Enter the password of up to 8 characters. The characters will not appear on the screen when typed. The system is not case sensitive; you may use upper or lower case characters. To remove an existing password, simply move the cursor to the text box and, without pressing any additional keys, press RETURN.
- **OK:** If the password is as desired, select the OK command button. The window heading will change to "Password Verification" and you must retype the password exactly as before. If the entered passwords match, you will return to the Password window, if not, you must re-enter the new password and verify it again.
- **CANCEL:** If you make a mistake while entering the password or wish to leave it unchanged, select the Cancel command button.

16.25 **EXIT:** When password programming is finished, select the Exit command button. A window appears that asks "Perform Update to Database?" To update the database and exit to the Applications Menu, select Yes. Or, select No to exit without saving any changes. Select Cancel to return to the Passwords window without updating the database.

Report Programming	
<u>A</u> ctions <u>S</u> etup <u>E</u> xit	
<p>Select <u>O</u>utput Port</p> <p><input checked="" type="radio"/> Serial <u>1</u></p> <p><input type="radio"/> Serial <u>2</u></p>	<p>Execute</p> <p>Exit</p>
<p>Select Report</p> <p><input checked="" type="radio"/> <u>S</u>tation Report</p> <p><input type="radio"/> <u>A</u>rea/Office Code Report</p> <p><input type="radio"/> <u>L</u>east Cost Routing Data Report</p>	

E. REPORT PROGRAMMING (REP)

16.26 Reports can be generated that show station configuration, area/office code programming, or Least-Cost Routing data programming.

16.27 To access the window shown above, select Report programming from the service menu or enter the REP command.

16.28 SELECT OUTPUT PORT: Select the desired output port for the report by selecting the appropriate option button (serial port 1 or 2).

16.29 SELECT REPORT: Choose the report that you would like to have printed by selecting the corresponding option button. A black dot indicates the selected report.

- **STATION REPORT:** To obtain a report that lists all stations, as shown on the next page, select the Station Report option button.

- **AREA/OFFICE CODE REPORT:** Select this option for a report that lists all the allowed, restricted, and extended area codes and the allowed and restricted office codes for each of the toll restriction user groups. The report format is shown on the next page.

- **LEAST COST ROUTING DATA REPORT:** This option activates a report that shows Least Cost Routing information including route groups, facility groups, and dial rules. The report format is shown on the next page.

16.30 EXECUTE: Select the Execute command button to generate the selected report. The reports are presented in the formats shown on the following page.

16.31 EXIT: When report programming is finished, select the Exit command button to return to the Applications Programming window.

STATION REPORT:

STATION REPORT		SUN-1-JAN-1989		HH:MM		
STA	EXT	USERNAME	EQ	ATT	TNT/DPT	REL STA
1.1	E1000	SANDY	KEY+ DSS	*	1 1	1.1
1.3	E1002		KEY	1.1	1 2	
1.4	E1003	TOM	KEY	1.1	2 1	
...						
11.1	E1080	MIKE	SL	1.1	2 1	
11.2	E1081		SL	1.1	1 1	
11.3	E1082	PAT	SL	1.1	1 2	

NOTE: The plus (+) after the KEY abbreviation indicates that a headset is enabled on that station. The asterisk (*) in the ATT column indicates that the station is an attendant.

AREA/OFFICE CODE REPORT:

AREA/OFFICE CODE TABLE REPORT	SUN-JAN-01-1992	HH:MM
User Group X		
List Of Allowed Area Codes ()		
List Of Restricted Area Codes ()		
List Of Extended Area Codes ()		
Office Code Table For Area Code XXX		
List Of Allowed Office Codes ()		
List Of Restricted Office Codes ()		

LCR REPORT:

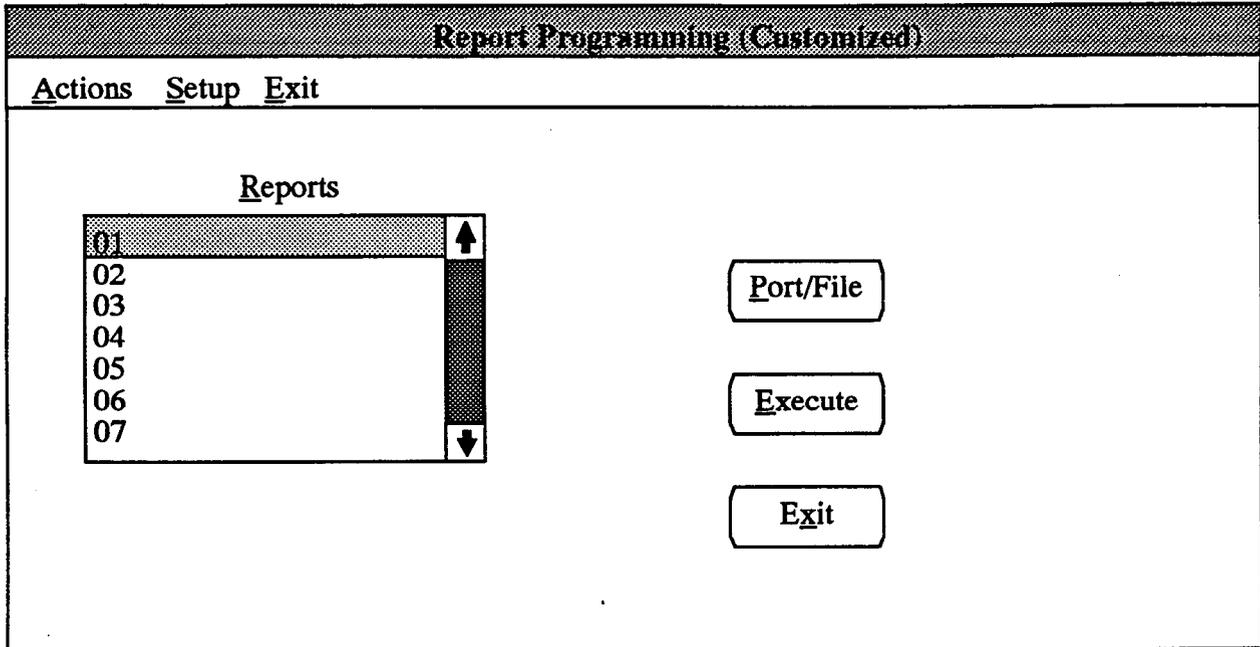
LCR REPORT	SUN-01-JAN-1989	12:00
Route Group X		
List Of Included Area Codes ()		
List Of Excluded Area Codes ()		
List Of Included Office Codes ()		
List Of Excluded Office Codes ()		
Facility Groups In Time Blocks		
Day List ()		
Evening List ()		
Night List ()		
Facility Group X		
List Of Trunk Groups ()		
Dialing Rules (numbers dialed and/or toll, area, or local indicators in order)		

F. CUSTOMIZED REPORT PROGRAMMING (CREP)

16.32 This option is available in stand-alone programming only. Customized reports are created by selecting the programming area to be reported and then selecting the information that will be included. When stations are listed in a report, they can be sorted by name, extension number, or circuit number. Reports can also be titled. The report types and their options include the following. Sample reports (with all options enabled) begin on page 5-157.

- **Area/Office Code Report:** You select the user groups that are listed in the report which can include any combination of the following items.
 - Allowed Area Codes
 - Allowed Office Codes
 - Day User Group Stations
 - Extended Area Codes
 - Night User Group Stations
 - Restricted Area Codes
 - Restricted Office Codes
- **Detailed Station Report:** You select the stations that are listed in the report which can include any combination of the following items.
 - Miscellaneous Flags
 - Miscellaneous Information
 - Outgoing Access — Day
 - Outgoing Access — Night
 - Programmable Keys
 - Secondary Call Key Assignments
 - Special Purpose Station
 - System Forwarding
 - Toll Restriction
- **DID Report:** You select the DID groups that are listed in the report which can include any combination of the following items.
 - DID Entries
 - DISA Codes
 - Trunk List
- **General Station Report:** You select the stations that are listed in the report which can include any combination of the following items.
 - Attendant
 - Equipment
 - Special Purpose Stations
 - Tenant/Department
 - Toll Restriction
- **Hunt Group Report:** You select the hunt groups that are listed in the report which can include any combination of the following items.
 - Announcement Stations
 - Hunt Group Stations
 - Overflow Information
 - Timers
- **Key Map Report:** You select the keyset, single-line, and DSS map groups and the map diagrams that are listed in the report which can include any combination of the following items.
 - Key Assignments
 - Station List
- **Least Cost Routing Data Report:** You select the route groups and facility groups that are listed in the report which can include any combination of the following items.
 - Facility Group Dial Rules
 - Facility Groups in Time Blocks
 - Local Area Code
 - Route Group Excluded Area Codes
 - Route Group Excluded Office Codes
 - Route Group Included Area Codes
 - Route Group Included Office Codes
 - Trunk Groups Accessed by Facility Groups
- **Phone List:** You select the stations, hunt groups, and page zones that are listed in the report which can include any combination of the following.
 - Hunt Groups
 - Page Zones
- **Special Purpose Flags Report:** The report lists all special purpose stations.
- **System Speed Dial Report:** The report lists the system speed-dial numbers.
- **Timer Report:** The report lists all system timers.
- **Trunk Group Report:** You select the trunk groups that are listed in the report which can include any combination of the following items.
 - Day Outgoing Access
 - Night Outgoing Access
 - Ring-In
 - Toll Restriction
 - Trunk List

16.33 Reports can be sent to files on the PC or to a printer port. To print the reports, the necessary printer drivers must be installed on the PC. For information on installing a printer driver, refer to page 5-8.



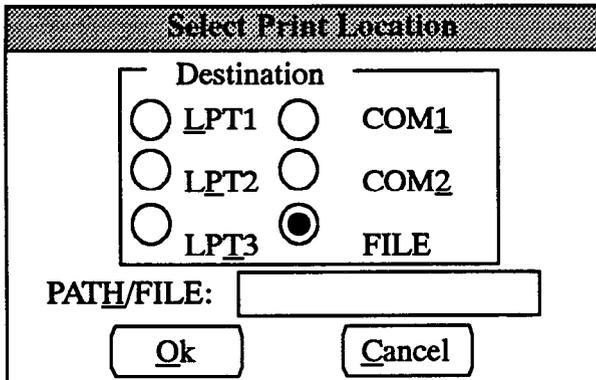
16.34 To reach this window, select Report Programming (Customized) from the Service menu or enter the CREP command. These reports can only be generated during a stand-alone programming session.

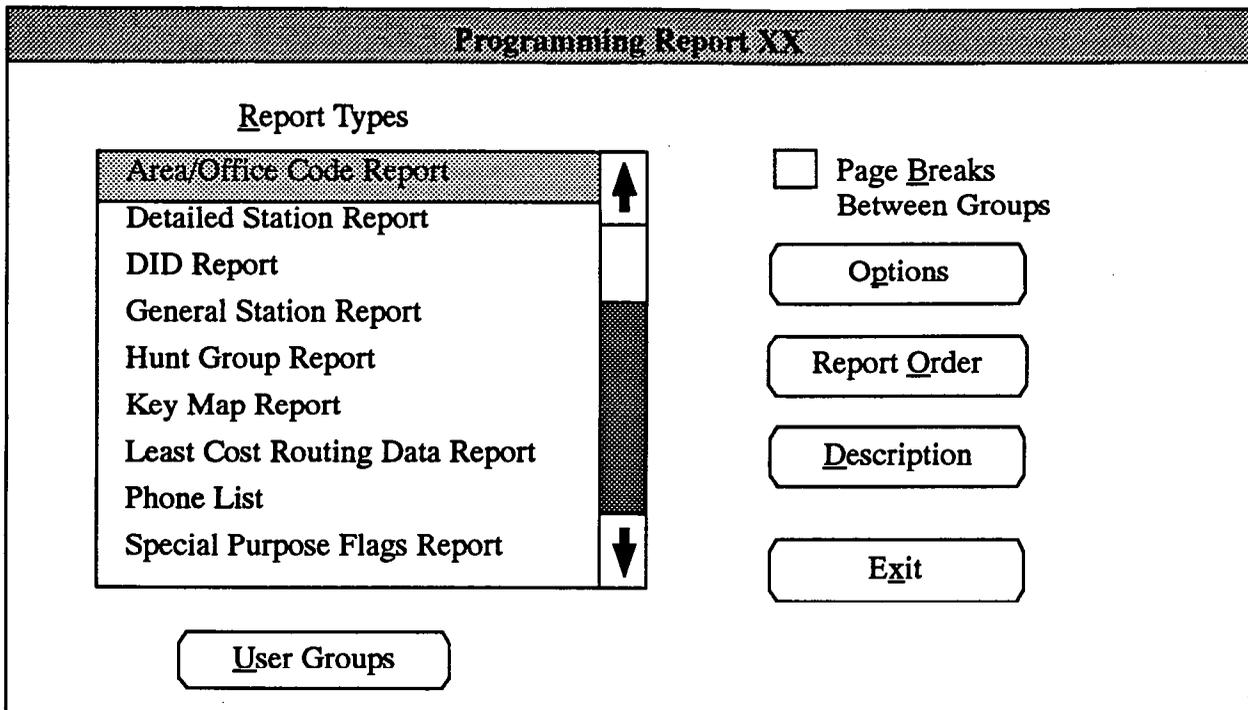
16.35 REPORTS: Scroll through the list box until the desired report number is highlighted. The window shown on the following page appears for programming the report parameters.

16.36 PORT/FILE: Select the Port/File command button to designate the destination printer port or PC file for the report. The following window appears. Place a dot in the desired port or file option button by selecting it. If FILE is selected, a text box appears; select that text box and enter the destination file path name (e.g., C:REPORT). When the destination is programmed, select the OK command button. To exit without changing the destination, select the Cancel command button.

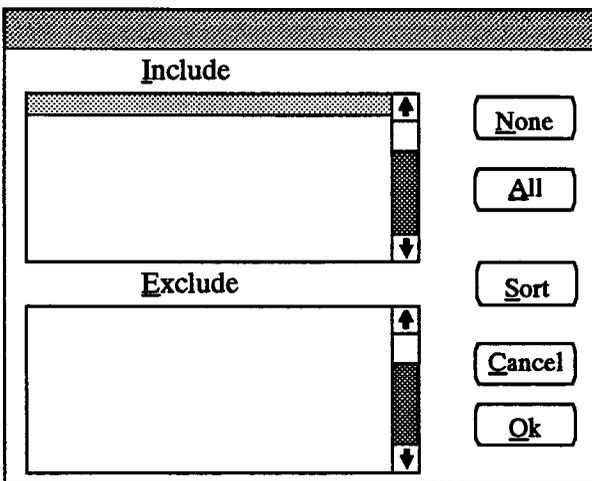
16.37 EXECUTE: Select the Execute command button to generate the selected report. A *Windows* screen appears which reminds you that a printer driver is necessary; press RETURN to clear the window. The reports are presented in the formats shown on the following page. While the report is being printed, a window appears that contains a Cancel button. Press SPACE BAR if you wish to select the Cancel button.

16.38 EXIT: When report programming is finished, select the Exit command button to return to the Applications Programming window.





- REPORT TYPES and COMMAND BUTTONS:**
 Begin programming by selecting the report type. Scroll through the list box until the desired report type is highlighted. All other programming will apply to that report type. Below the list box, one or more command buttons will appear (in the example above, the User Groups command button is shown for Area/Office Code Report programming). Select the command buttons to access list box windows (like the one shown below) that allow you to determine what elements are included in the report (user groups, stations, hunt groups, etc.).



- INCLUDE or EXCLUDE:** To include an item, locate the desired item on the Exclude list and select it by pressing the SPACE BAR; it will automatically move to the Include list. To remove an item from the list, select the item in the Include list to move it to the Exclude list.
- ALL or NONE:** To include all items, select the All command button. To exclude all items, select the None command button.
- OK or CANCEL:** When the lists appear as desired, select the OK command button. To exit from the window without saving changes, select the Cancel command button.
- SORT:** (This option is available only when selecting stations or hunt groups) To sort the list numerically by extension number or circuit number, or alphabetically by name, select the Sort command button. The following window appears. Choose the desired sorting method by selecting the corresponding option button. Then select the OK command button. When the list of stations returns, the list box will show the stations in the selected order. To exit without changing the sorting method, select the Cancel command button.

Station Sorting Method

Ordering

By Extension

By Circuit

By Name

- **OPTIONS:** Select the Options command button to access a list box window (as shown below) that shows the available options for each report type. (A complete list of report options begins on page 5-153.)

Select User Group Report Items

Include

Allowed Area Codes	↑
Allowed Office Codes	
Day User Group Stations	
Extended Area Codes	
Night User Group Stations	↓

Exclude

	↑
	↓

- **INCLUDE or EXCLUDE:** To include an option, locate the desired option on the Exclude list and select it by pressing the SPACE BAR; it will automatically move to the Include list. To remove an option from the list, select the option in the Include list to move it to the Exclude list.
- **ALL or NONE:** To include all options, select the All command button. To exclude all options, select the None command button.
- **OK or CANCEL:** When the option lists appear as desired, select the OK command button. To exit from the window without saving changes, select the Cancel command button.

- **PAGE BREAKS BETWEEN GROUPS:** Select this check box to place an X in it if you wish to have each group (circuit board, map group, hunt group, etc.) on a separate page of the report.
- **REPORT ORDER:** Detailed, General Station, Hunt Group, and Phone List reports can be sorted by extension number, circuit number, or name. Select the Report Order command button to access the following window. Place a dot in the desired sorting method by selecting it. Then select the OK button to return to the Report window. Or, to exit without changing the sorting method, select the Cancel command button.

Sort Type

Sort Type

Extension Number Name

Circuit Number

- **DESCRIPTION:** If you wish to name the report, select the description command button. A text box window appears as shown below. Enter the desired report name in the text box and then select the OK command button. Or, select the Cancel command button to leave the name unchanged. The description will appear in the Reports list box shown in the window on the previous page.

Descr:

- **EXIT:** When the report is programmed as desired, select the Exit command button to return to the window shown on the previous page.

FIGURE 5-2. CUSTOMIZED PROGRAMMING REPORT SAMPLES

AREA/OFFICE CODE REPORTS:

PROGRAMMING REPORTS - AREA/OFFICE CODE REPORT Page 1

User Group 1()

Allowed Area Codes

2xx - 200-219
3xx - 300-319
4xx - 400-419
5xx - 500-519
6xx - 600-619
7xx - 700-719
8xx - 800-819
9xx - 900-919

Restricted Area Codes

Extended Area Codes

Day User Group Stations

EXT#	CKT#	DESCRIPTION	USRNAME
1000	01.01	~Station Undefined	
1001	01.02	~Station Undefined	
1002	01.03	~Station Undefined	

Night User Group Stations

EXT#	CKT#	DESCRIPTION	USRNAME
1000	01.01	~Station Undefined	
1001	01.02	~Station Undefined	
1002	01.03	~Station Undefined	

FIGURE 5-2. CUSTOMIZED PROGRAMMING REPORT SAMPLES (Continued)

DETAILED STATION REPORTS:

PROGRAMMING REPORTS - DETAILED STATION REPORT Page 1

Extension: 1000
Description: Station Undefined
Circuit: 01.01
Name:

Miscellaneous Information

Message Center:

EXT#	CKT#	DESCRIPTION	USRNAME
Tenant/Department:		1()/1()	
Account Code Type:		Neither	
Class-of-Service Code:			

Miscellaneous Flags

Auto Att/DISA DND Breakthru: Enabled

Automatic Answer CO: Enabled

Automatic Answer IC: Enabled

Barge Initiate: Disabled

Barge Receive: Disabled

...

OHVA Transmit: Enabled

Page: Replace

Redial Mode: Dialed

Ring Intercom Always: Disabled

Transparent LCR: Disabled

Toll Restriction

Day User Group 1()

Night User Group 1()

Day LCR Advance Limit: Unlimited

Night LCR Advance Limit: Unlimited

SCOS Restrictions	Day	Yes	No	Night	Yes	No
(1) Operator Access		X				X
(2) Toll Access		X				X
(3) International Access		X				X
(4) Eight Digit Access		X				X
(5) Area/Office Codes		X				X
(6) LCR Only		X				X
(7) Alternate Carriers		X				X
(8) Allowed Long Distance		X				X

Outgoing Access - Day

TG DESCRIPTION	CODE	TG NAME	TG DESCRIPTION	CODE	TG NAME
1 All Lines		801	2		802

FIGURE 5-2. CUSTOMIZED PROGRAMMING REPORT SAMPLES (Continued)

DID REPORTS:

PROGRAMMING REPORTS - DID REPORT Page 1

DID Group 1()

Tenant Group: 1()
 Base Number:
 Music-On-Hold: Silence
 Start Type: Wink
 DISA Codes
 Day:
 Night:
 IC Calls: No

Trunk List

CKT# DESCRIPTION

DID Entries

NUMBER DAY RING-IN NIGHT RING-IN NAME

GENERAL STATION REPORTS:

PROGRAMMING REPORTS - GENERAL STATION REPORT Page 1

EXT# CKT# DESCRIPTION USRNAME EQP ATT T/DT ATXHMV DAY SCOS NGT SCOS

1000 01.01 ~Station Undefined KEY * 1 1 T M
 1001 01.02 ~Station Undefined KEY 01.01 1 1
 1002 01.03 ~Station Undefined KEY 01.01 1 1

- EQP - Equipment Type
- ATT - Station's Attendant
- T/DT - Tenant/Department
- A - Automated Attendant
- T - Attendant
- X - Fax Phone
- H - House Phone
- M - Message Center
- V - Voice Mail Station
- 1 - Operator Access
- 2 - Toll Access
- 3 - International Access
- 4 - Eight Digit Access
- 5 - Area/Office Code
- 6 - LCR Only
- 7 - Alternate Carriers
- 8 - Allowed Long Distance

FIGURE 5-2. CUSTOMIZED PROGRAMMING REPORT SAMPLES (Continued)

HUNT GROUP REPORTS:

PROGRAMMING REPORTS - HUNT GROUP REPORT Page 1

Pilot Number: 2000

Hunt Group: 1
Description:
Name:
Search Type: Linear Search
Voice Mail Hunt Group: No

Supervisor

EXT#	CKT#	DESCRIPTION	USRNAME
------	------	-------------	---------

Hunt Group Stations

EXT#	CKT#	DESCRIPTION	USRNAME
------	------	-------------	---------

Hunt Group Announcement Stations

Announcement Type: Station

EXT#	CKT#	DESCRIPTION	USRNAME
------	------	-------------	---------

OverFlow Station

OverFlow Type: Station

EXT#	CKT#	DESCRIPTION	USRNAME
------	------	-------------	---------

Timers

No Answer Advance Timer: 18
Announcement Timer: 18
Overflow Timer: 72

FIGURE 5-2. CUSTOMIZED PROGRAMMING REPORT SAMPLES (Continued)

KEY MAP REPORTS:

PROGRAMMING REPORTS - KEY MAP REPORT Page 1

Map Group 1(Typical Map)

- 1 Call Key 01
- 2 Call Key 02
- 3 Call Key 03
- 4 Call Key 04
- 5 Station Programmable Key 01
-
- 49 User Programmable Key 07 - Data
- 50 Do-Not-Disturb Mode On/Off
- 51 IC Key
- 52 Message

Station List

EXT#	CKT#	DESCRIPTION	USRNAME
1000	01.01	~Station Undefined	
1001	01.02	~Station Undefined	
1002	01.03	~Station Undefined	

DSS Map Group 1(Default DSS Map 1)

- 1 DSS/BLF Key - 1000 01.01 ~Station Undefined
- 2 DSS/BLF Key - 1001 01.02 ~Station Undefined
- 3 DSS/BLF Key - 1002 01.03 ~Station Undefined
- 4 DSS/BLF Key - 1003 01.04 ~Station Undefined
- 5 DSS/BLF Key - 1004 01.05 ~Station Undefined
- ...
- 116 DSS/BLF Key - 1115 15.04 ~Station Undefined
- 117 DSS/BLF Key - 1116 15.05 ~Station Undefined
- 118 DSS/BLF Key - 1117 15.06 ~Station Undefined
- 119 DSS/BLF Key - 1118 15.07 ~Station Undefined
- 120 DSS/BLF Key - 1119 15.08 ~Station Undefined

Station List

CKT# DESCRIPTION

ESLS/SLI (This will appear in IMX Systems only)

- 1 Station Speed Dial
- 2 Redial
- 3 Least-Cost Routing
- 4 Hold -- Individual
- 5 System Speed Dial
- 6 Station Speed Dial Programming
- 7 Queue Request
- 8 Conference
- 9 Message

FIGURE 5-2. CUSTOMIZED PROGRAMMING REPORT SAMPLES (Continued)

LEAST COST ROUTING DATA REPORTS:

PROGRAMMING REPORTS - LEAST COST ROUTING DATA REPORT Page 1

Local Area Code: 602

Route Group 1(Everything)

Route Group Included Area Codes

2xx - 200-219
3xx - 300-319
4xx - 400-419
5xx - 500-519
6xx - 600-619
7xx - 700-719
8xx - 800-819
9xx - 900-919

Route Group Excluded Area Codes

Route Group Included Office Codes

2xx - 200-299
3xx - 300-399
4xx - 400-499
5xx - 500-599
6xx - 600-699
7xx - 700-799
8xx - 800-899
9xx - 900-999

Route Group Excluded Office Codes

Facility Groups in Time Blocks

FG DAY DESCRIPTION	FG EVENING DESCRIPTION	FG NIGHT DESCRIPTION
1 All Lines	1 All Lines	1 All Lines

Facility Group 1 (All Lines)

Trunk Groups Accessed by Facility Group

TG DESCRIPTION	CODE TG NAME
1 All Lines	801

Facility Group Dial Rules

DR DIGITS	DR DIGITS	DR DIGITS
1 Echo Toll Field	2 Echo Area Code	3 Echo Loc Address
4 Echo Ext Number		

FIGURE 5-2. CUSTOMIZED PROGRAMMING REPORT SAMPLES (Continued)

PHONE LIST:

PROGRAMMING REPORTS - PHONE LIST Page 1

EXT#	DESCRIPTION	EXT#	DESCRIPTION	EXT#	DESCRIPTION
1000	~Station Undefined	1002	~Station Undefined	1004	~Station Undefined
1001	~Station Undefined	1003	~Station Undefined		

PLT#	DESCRIPTION	PLT#	DESCRIPTION	PLT#	DESCRIPTION
2000		2002		2004	
2001		2003			

ZONE	DESCRIPTION	ZONE	DESCRIPTION	ZONE	DESCRIPTION
0		2		4	
1	All Page	3			

FIGURE 5-2. CUSTOMIZED PROGRAMMING REPORT SAMPLES (Continued)

SPECIAL PURPOSE FLAGS REPORTS:

PROGRAMMING REPORTS - SPECIAL PURPOSE FLAGS REPORT Page 1

Auto Att/DISA DND Breakthrough

EXT#	CKT#	DESCRIPTION	USRNAME
1000	01.01	~Station Undefined	

Automatic Answer On CO Calls

EXT#	CKT#	DESCRIPTION	USRNAME
1000	01.01	~Station Undefined	

Automatic Answer On IC Calls

EXT#	CKT#	DESCRIPTION	USRNAME
1000	01.01	~Station Undefined	

. . .

Redial Mode - Last Number Dialed

EXT#	CKT#	DESCRIPTION	USRNAME
1000	01.01	~Station Undefined	

Ring Intercom Always Enabled

EXT#	CKT#	DESCRIPTION	USRNAME
------	------	-------------	---------

Transparent LCR Enabled

EXT#	CKT#	DESCRIPTION	USRNAME
------	------	-------------	---------

FIGURE 5-2. CUSTOMIZED PROGRAMMING REPORT SAMPLES (Continued)

SYSTEM SPEED DIAL NUMBERS:

PROGRAMMING REPORTS - SYSTEM SPEED DIAL REPORT Page 1

Displayed Speed Dial Numbers: 400

Programming Station:

EXT#	CKT#	DESCRIPTION	USRNAME
------	------	-------------	---------

1000 01.01 ~Station Undefined

Number of Digits in Bin Number: 3

#	NAME	NUMBER	TNT
0			0
1			0
2			0
3			0
4			0
5			0
6			0
7			0
8			0
9			0
10			0
11			0
. . .			
399			0

FIGURE 5-2. CUSTOMIZED PROGRAMMING REPORT SAMPLES (Continued)

TIMER REPORTS:

PROGRAMMING REPORTS - TIMER REPORT Page 1

DESCRIPTION	VALUE	UNITS	RANGE
Abandoned Call Timer	10	Min.	1- 255
Camp-On Timer	3	Sec.	0- 255
Camp-On Tone Timer	15	Sec.	5- 255
CO Hookflash	60	100th	2- 250
CO Re-Seize Timer	3	Sec.	1- 15
CO-CO Timer	35	100th	2- 250
Conference-Hold Timer	5	Min.	1- 255
Data Wait Timer	30	Sec.	1- 255
Dial Tone Wait Timer	2	Sec.	1- 50
Dial-Initiation Timer--Keyset	15	Sec.	5- 30
...			
System Forwarding Initiate	15	Sec.	2- 255
T1 Busy-Out Switch Time Out	60	Sec.	10-10000
Transfer-Available Timer	20	Sec.	10- 255
Transfer-Busy Timer	24	Sec.	10- 255
Trunk Key Debounce Timer	3	Sec.	1- 777
Trunk Preselect Timer	5	Sec.	2- 255
Trunk Ring Detection	5	10th	1- 777
Unsupervised-CO Timer	5	Min.	1- 255
Valid-Call Timer	15	Sec.	0- 60
Voice Mail Dialing Delay	5	10th	1- 250

FIGURE 5-2. CUSTOMIZED PROGRAMMING REPORT SAMPLES (Continued)

TRUNK GROUP REPORTS:

PROGRAMMING REPORTS - TRUNK GROUP REPORT Page 1

Trunk Group 1(All Lines)

Trunk Group Name:
 Enable Hookflash: Yes
 One-Way Incoming Only: No
 Tenant Group: 1()
 Music-On-Hold: Music #1

Day OutGoing Access

EXT#	CKT#	DESCRIPTION	USRNAME
1000	01.01	~Station Undefined	
1001	01.02	~Station Undefined	
1002	01.03	~Station Undefined	

Night OutGoing Access

EXT#	CKT#	DESCRIPTION	USRNAME
1000	01.01	~Station Undefined	
1001	01.02	~Station Undefined	
1002	01.03	~Station Undefined	

Trunk List

CKT#	DESCRIPTION	CKT#	DESCRIPTION	CKT#	DESCRIPTION
24.01	G/L	26.01	G/L	22.01	G/L
24.02	G/L	26.02	G/L	22.02	G/L
24.03	G/L	26.03	G/L	22.03	G/L

Toll Restrictions

Subject to Toll Restrict: Yes
 Equal Access: Yes
 Absorbed Digits: No
 Exempt from LCR Only: No

Day Ring-in Type: Single

EXT#	CKT#	DESCRIPTION	USRNAME
1000	01.01	~Station Undefined	

Night Ring-in Type: Multiple
 Ring-in/Answer Pattern: Night Ring

G. SAVE/RESTORE (SAVE)

16.39 This program allows you to save and/or load the database, copy error logs to the disks, and to reset the system.

16.40 To access the window shown above, select Save/Restore from the Service menu or enter the SAVE command.

16.41 DESTINATION/SOURCE: Select the destination drive to which you wish to send the database or error list, or the source of the database to be restored by selecting the desired option button. The options *Path A:*, *Path B:*, or *Path* can be used to designate a drive and/or directory path. When "Path" is selected, the Set Path command button can be selected to produce a window that explains destination path parameters and gives a text box for entering the destination. If you attempt to set a path that does not exist, you will see a warning window that asks if you wish to have the path created (if valid) or cancel the operation.

16.42 FORMAT DISK: To format a disk for use in the save or error file list operation, your PC must use either a 5¼-inch, 1.2MB or 3½-inch, 1.44MB disk. Insert a blank disk into the selected PC floppy disk drive, then select the Format command button to start the formatting process. The following window appears. The heads and tracks formatted are indicated as the operation progresses. The Cancel button is available throughout the process, however, the OK button appears only when the process is complete.

16.43 RESET: This button is selected to force a system reset during a programming session. The following window appears. Select the OK command button to perform the reset or the Cancel button to return to the Save/Restore window. The reset will drop *all* calls in progress, including one being used for a remote programming session.

16.44 FUNCTION TO PERFORM: Select the option button associated with the desired operation.

- **SAVE DATABASE:** Information is sent from the system to the designated destination. Select the Perform Operation command button. If you are using a floppy disk, a window appears that tells you to insert the disk in the appropriate drive. Insert the disk then select the OK command button to begin the transfer, or select the cancel button to stop. The percent complete will be indicated below the Perform Operation button while the save is in progress. When the save operation is completed, remove the floppy disk from the drive.
- **RESTORE DATABASE:** Information is transferred from the designated source to the system when the Perform Operation command button is selected. A window appears if you are using floppy disks that tells you to insert the disk that contains previously programmed database information into the appropriate drive. Insert the disk, then select the OK command button to begin the transfer, or select the Cancel button to stop. When the data has been read, another window appears to tell you that the system will reset to complete the restore operation. If you are using an on-site or modem connection, remove the disk (if one is being used), then select the Yes button to perform the reset or No to cancel the restore. A reset takes several minutes. During the reset, the 416/832 System clock will be reset to match the clock on the programming PC.

NOTE: When the Database Restore feature is used during a remote programming session, all calls are disconnected except the modem connection. Before restoring the database, ensure that the circuit card being used for the modem connection will not be reconfigured during the restoration (changed to a different type of card).

- **SAVE CVH DATABASE:** *This option is not presently available.* The CVH (convert history) database can be used by trained service personnel during system troubleshooting. When available, it will be used, like database save, to copy CVH database information to the PC.

- **COPY ERROR FILE:** There are three types of error files:
 - **ERRORLOG.TXT:** This file contains up to 60k of reset data. When the allotted memory is depleted, the oldest reset records are deleted as newer messages are written to the file.
 - **CPERRXX.BIN:** These files contain system error messages. The *XX* in the file name represents the file number. There can be up to 19 CPERR files, numbered 00–18.
 - **CPHISTXX.BIN:** These files contain system freeze records. The *XX* in the file name represents the file number. There can be up to 9 CPERR files, numbered 00–09.

To copy error files onto the PC hard disk or floppy disk, perform the following steps:

- (1) In the Function to Perform area shown on the previous page, select the Copy Error File option.
- (2) Check that the destination path is set as desired.
- (3) Select the Perform Operation command button. A list box appears that contains a list of files that have been logged due to past system resets or call processing history freezes. Each includes a date and time of the reset. Customer Service personnel may request that these files be copied to a designated destination and sent to them for troubleshooting purposes. *If floppy disks are being used*, the screen prompts you to insert a disk. Insert a blank, formatted disk into the appropriate drive. Then select the Copy command button to begin the transfer, or the Cancel button to stop. The percent complete will be indicated while the transfer of the error logs to the floppy disk is in progress. When the transfer is completed, remove the disk from the drive (if one is being used). Multiple error files can be saved on one disk.

NOTE: The files will remain in the /syshist directory until you delete them. If your PC is low on disk space, you may wish to copy the files to floppy disk for storage and delete them from your hard drive.

16.45 EXIT: When finished, select the Exit command button to return to the Applications Programming window.

Serial Port Configuration

Actions Setup Exit

Serial Port

Serial Port 1
Serial Port 2

Enable DSR Handshaking

Enable CTS Handshaking

Reset Ports

Exit

Baud Rate

300
600
1200
2400
4800
9600

H. SERIAL PORT CONFIGURATION (PORT)

16.46 This window is used to configure the two system serial ports to match the configuration of external devices to which they will be attached (such as printers, PC, etc.). A program planning sheet is shown in Figure 5-35 on page 5-247.

16.47 This window is used to set the baud rate and/or handshaking capabilities of the serial ports. It is accessed by selecting Serial Port Configuration from the Service menu or entering the PORT command.

16.48 SERIAL PORT: Begin programming by selecting the desired serial port in the list box. When the port is highlighted, all other programming applies to that port.

16.49 ENABLE DSR HANDSHAKING: If the device that is connected to the selected port supports handshaking on the DSR pin of the RS-232-C connector, select the Enable DSR Handshaking check box to place an X in it. To remove the X and disable the handshaking, select the check box again. Refer to SPECIFICATIONS, page 2-37, for information about handshaking.

16.50 ENABLE CTS HANDSHAKING: If the device that is connected to the selected port supports handshaking on the CTS pin of the RS232C connector, select the Enable CTS Handshaking check box to place an X in it. To remove the X and disable the handshaking, select the check box again. Refer to SPECIFICATIONS, page 2-37, for more information.

16.51 BAUD RATE: To set the baud rate of the serial port (110-19200), scroll the highlight bar to the desired setting in the Baud Rate list box.

16.52 RESET PORTS: On occasion, the serial port and the device that is attached to it will "lock up" while each is waiting for a "ready" command from the other. To reset the ports and clear this condition, select the Reset Ports command button.

16.53 EXIT: When serial port programming is finished, select the Exit command button. A window appears that asks "Perform Update to Database?" To update the database and exit to the Applications Menu, select Yes. Or, select No to exit without saving any changes. Select Cancel to return to the Serial Port Configuration window without updating the database.

System Configuration																															
<div style="display: flex; justify-content: space-between; font-weight: bold;"> Actions Setup Exit </div>																															
Time:	HH:MM	Date:	MM/DD/YY																												
		Time Adjust	Home Area Codes																												
System Configuration		Board Type																													
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr style="background-color: #cccccc;"><td style="padding: 2px;">01 Keyset Interface</td><td style="text-align: center; padding: 2px;">↑</td></tr> <tr><td style="padding: 2px;">02 Keyset Interface</td><td style="text-align: center; padding: 2px;"> </td></tr> <tr><td style="padding: 2px;">03 Keyset Interface</td><td style="text-align: center; padding: 2px;"> </td></tr> <tr><td style="padding: 2px;">04 Keyset Interface</td><td style="text-align: center; padding: 2px;"> </td></tr> <tr><td style="padding: 2px;">05 Keyset Interface</td><td style="text-align: center; padding: 2px;"> </td></tr> <tr><td style="padding: 2px;">06 Keyset Interface</td><td style="text-align: center; padding: 2px;"> </td></tr> <tr><td style="padding: 2px;">07 Keyset Interface</td><td style="text-align: center; padding: 2px;">↓</td></tr> </table>	01 Keyset Interface	↑	02 Keyset Interface		03 Keyset Interface		04 Keyset Interface		05 Keyset Interface		06 Keyset Interface		07 Keyset Interface	↓	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr style="background-color: #cccccc;"><td style="padding: 2px;">Nothing Installed</td><td style="text-align: center; padding: 2px;">↑</td></tr> <tr><td style="padding: 2px;">Digital Keyset Interface (DKSC)</td><td style="text-align: center; padding: 2px;"> </td></tr> <tr><td style="padding: 2px;">Keyset Interface (KSC)</td><td style="text-align: center; padding: 2px;"> </td></tr> <tr><td style="padding: 2px;">Single-Line Interface (SLC)</td><td style="text-align: center; padding: 2px;"> </td></tr> <tr><td style="padding: 2px;">DID Trunk Interface (IDC)</td><td style="text-align: center; padding: 2px;"> </td></tr> <tr><td style="padding: 2px;">CO-Trunk Interface (LGC)</td><td style="text-align: center; padding: 2px;"> </td></tr> <tr><td style="padding: 2px;">Loop Start Interface (LSC)</td><td style="text-align: center; padding: 2px;">↓</td></tr> </table>			Nothing Installed	↑	Digital Keyset Interface (DKSC)		Keyset Interface (KSC)		Single-Line Interface (SLC)		DID Trunk Interface (IDC)		CO-Trunk Interface (LGC)		Loop Start Interface (LSC)	↓
01 Keyset Interface	↑																														
02 Keyset Interface																															
03 Keyset Interface																															
04 Keyset Interface																															
05 Keyset Interface																															
06 Keyset Interface																															
07 Keyset Interface	↓																														
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Digital Keyset Interface (DKSC)																															
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Single-Line Interface (SLC)																															
DID Trunk Interface (IDC)																															
CO-Trunk Interface (LGC)																															
Loop Start Interface (LSC)	↓																														
<input type="checkbox"/> Non-blocking for voice channels	Upper +30VDC Modules = 1 Lower +30VDC Modules = 1																														
Configuration		Exit																													
Move Board																															

I. SYSTEM CONFIGURATION (CONF)

16.54 This window is used to set the system time, date, and local area code of the system location. It is also used to set up the circuit card configuration of the equipment cabinet cardfile and dedicate voice channels to specific cards. To access it, select System Configuration from the Service menu or enter the CONF command.

16.55 TIME and DATE: To set the system time or date that will appear on all keyset displays and in the SMDR/SMDA reports, select the Time text box and type the hour (in 24-hour format), a colon, and the minutes, then select the Date text box and enter two digits for the month, a slash (/), two digits for the date, another slash, and two digits for the year.

16.56 SYSTEM CONFIGURATION and BOARD TYPE: Because the cardfile has universal slots — any type of card (except the MXC) can be installed in any slot — this program is needed to “tell” the database which type of card is in each slot. To configure a card

slot for a particular type of card, first locate the desired card position in the System Configuration list box and *highlight* it. Then, press the SPACE BAR to *select* it. The highlight bar will move to the Board Type list box automatically. Locate and select the desired card type. The card type description will appear in the System Configuration box. **NOTE:** You cannot change the board type of a KSC slot if any of the circuits have associated DSS/BLF circuits. First, you must remove the DSS/BLF association from those circuits.

16.57 +30VDC MODULES REQUIRED: This number indicates the total number of +30VDC modules that must be installed in the main and expansion cabinets to support the configuration as programmed. The number is automatically calculated and changes as you assign cards to their cardfile slots. Modules required are identified as “Upper” and “Lower” to determine how many modules should be installed in each cabinet. (The Main Equipment Cabinet is the “upper” cabinet and the Expansion cabinet is the “lower” one.)

16.58 MOVE BOARD: *This option is available only in stand-alone programming sessions.* If you wish to move a board from its assigned location in the cardfile to an available slot, select the Move Board command button. The following window appears. The list box shows all available slots. Move the highlight bar to the desired slot and then select the OK command button. Or, to leave the slot assignment unchanged, select the Cancel command button.

Move Board

Choose New Slot

28
29
30
31
32
33
34

Ok Cancel

16.59 TIME ADJUST: *This option is not available in stand-alone or remote programming sessions.* The 416/832 System time is controlled by the internal clock in the PC. However, internal clocks in PCs are sometimes inaccurate. For this reason, the 416/832 software contains a utility for making automatic daily adjustments to the system clock. To make an adjustment to your system clock, if necessary, select the Time Adjust command button. The following window appears. Enter the time, in seconds, that the clock needs to be adjusted *per day*. The allowed range is -7000 to 7000 seconds. The system time will be adjusted by this amount once during each 24-hour period (at 2:00 AM).

Real Time Clock Adjustment

Adjustment:

Ok Cancel

16.60 HOME AREA CODES: In many areas, the telephone company has created call-cost arrangements that refer to "home" and "local" area codes. The home area code is the area code within which the system resides. The local area codes are additional area codes that, when called, use the local or toll local call-cost rate instead of the long distance rate. Up to three local area codes can be programmed and then extended within toll restriction programming to provide proper call costing. The Home Area Codes window, below, appears when the Home Area Codes command button is selected. Program the area codes as follows:

Home Area Codes

Home Area Code:

Local Area Code #2:

Local Area Code #3:

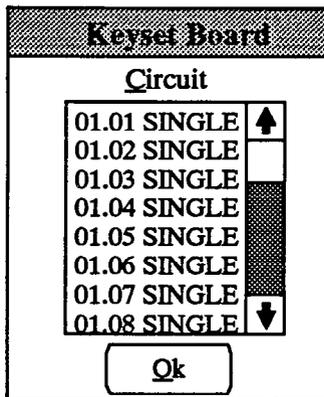
Local Area Code #4:

Ok Cancel

- **HOME/LOCAL AREA CODE:** To program the area code(s) for the system location, select the desired text box(es) and enter the code(s).
- **OK/CANCEL:** When finished, select OK to save your changes. Or to leave the codes unchanged, select the Cancel command button.

16.61 CONFIGURATION: Keypad Interface, DID Trunk Interface, and T1 cards require additional programming to configure them.

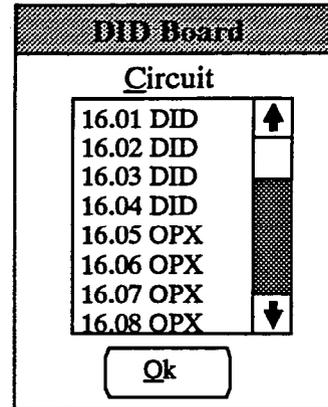
- KSC (IMX Only):** IMX dual-circuit version Keypad Interface cards (KSC-Ds) can have "single" circuits that support one keypad or "dual" circuits that can support two 8-line IMX AIM keysets. Highlight the desired Keypad Interface card in the System Configuration list box, then select the Configuration command button. A window appears as shown below. The list box shows the configuration of each of the eight circuits on the card. Selecting a circuit changes the configuration between Single and Dual. Assign the proper configuration to each circuit, then select the OK command button to return to the System Configuration window. Dual circuits have "A" and "B" stations, represented by the circuit number and a letter (for example, 1.1A and 1.1B). The "A" station will automatically be assigned the default extension number (for example, 1.1A would be extension 100). The "B" station does not have a default extension number or any individual station programming defaults such as page zone, outgoing access, toll restriction, etc.



NOTE: Older versions of the keypad interface card — standard KSCs — do not support dual circuits. If you attempt to configure a KSC, you will receive an error message. When programming on a stand-alone PC, the error message will appear even if you are configuring a KSC-D because the software does not have installed hardware with which to verify the card type. To clear the error message, press the TAB key to highlight the OK command button, then press the SPACE BAR to select it.

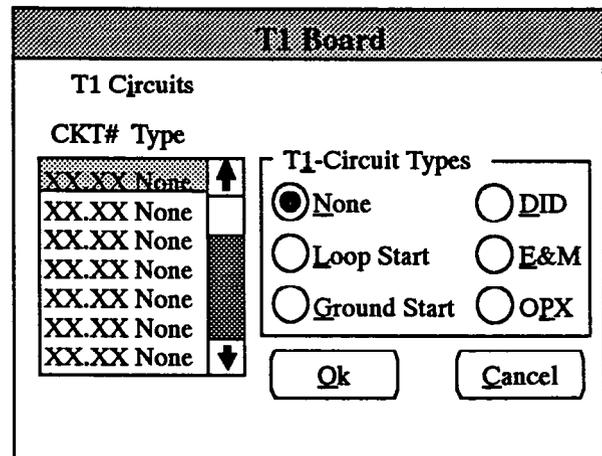
- DID:** DID Trunk Interface cards can contain DID (direct inward dialing) or OPX (off-premises extension) trunks. Highlight the DID Trunk Interface card in the System Configuration list box, then select the

Configuration command button. A window appears as shown below. The list box shows the configuration of each of the eight circuits on the card. Selecting a circuit changes the configuration between DID and OPX. Assign the proper configuration to each circuit, then select the OK command button to return to the System Configuration window.



NOTE: OPXs are single-line stations that must be programmed in Station programming to determine the OPX station status, ring cadence, and ring type. Also, the straps on the DID card must be set correctly (refer to SPECIFICATIONS, page 2-20).

- T1C:** To view the programmed circuit types, scroll through the T1 Cards list box. The option buttons change to indicate the current programming for a circuit as you highlight the circuit in the list box. To program the circuit type of a T1 Card circuit, highlight the desired circuit in the T1 Cards list box. Then move to the Circuit Types options and select the desired option button. Repeat this process for each circuit, then select the OK command button. Or, To exit without saving any changes, select the Cancel command button.



16.62 NON-BLOCKING FOR VOICE CHANNELS: Each voice bus (PCM highway) has 32 available time slots (voice channels) that are allocated for outside calls, intercom calls, and pages on a first-come, first-served basis. The software automatically distributes all equipped cards among the voice buses to make the best possible use of the available times slots. If there is a large number of cards installed in a single cabinet, two or more cards may be assigned to the same PCM highway.

16.63 This option, which should be used only if necessary, allows the programmer to dedicate voice channels to a single card and therefore prevent having voice channels blocked when the system traffic is heavy. (Non-blocking designations decrease the number of boards that can be assigned to a voice bus.) To dedicate channels to a card, *highlight* that card in the System Configuration list box, then select the check box for Non-blocking for voice channels to place an X in it. To remove the X and release the voice channels, select the check box again. LGCs and LSCs require eight channels each for non-blocking. KSCs and SLCs require up to 16 channels. For voice channel distribution information refer to pages 2-6 through 2-8 in SPECIFICATIONS.

NOTE: Designating one or more cards as non-blocking may increase the chances that the remaining cards will experience blocking. If too many cards are designated as non-blocking (i.e., all available system voice channels are used up), the system generates an error message (whenever the system is powered up or voice channels

are rebalanced) to indicate that non-blocking status is not guaranteed.

16.64 To generate voice channel allocation data for traffic analysis, perform the following steps:

- (1) Exit to the Inter-Tel logo screen.
- (2) Press ALT-F7 to access the On-Line Monitor.
- (3) *If necessary*, enter the Monitor Unrestricted password.
- (4) Press ALT-R to access the Resources menu, then press B to select the Board-to-Voice Bus Mapping option. The report is displayed, similar to the one shown below.

16.65 If any board in a voice bus is designated as "non-blocking," that voice bus will be marked "N" in the Blocking category. The example below is a Board-to-Voice Bus Mapping report for a standard 416 system with 27 boards. The actual values depend on the size and configuration of the system. Expanded 832 systems will show 54 board slots and 16 voice channels.

16.66 EXIT: When finished, select the Exit command button. A window appears that asks "Perform Update to Database?" To update the database and exit to the Applications Menu, select Yes. Or, select No to exit without saving any changes. Select Cancel to return to the System Configuration window without updating the database.

FIGURE 5-3. SAMPLE BOARD-TO-VOICE BUS MAPPING REPORT

<u>Board Number</u>	<u>01</u>	<u>02</u>	<u>03</u>	<u>04</u>	<u>05</u>	<u>06</u>	<u>07</u>	<u>08</u>	<u>09</u>	<u>10</u>	<u>11</u>	<u>12</u>	<u>13</u>	
Voice-Bus Number	05	06	01	02	03	04	05	06	01	02	03	04	05	
Time Slots Used	16	13	08	08	08	08	08	08	08	08	08	08	08	
Blocking?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
<u>Board Number</u>	<u>14</u>	<u>15</u>	<u>16</u>	<u>17</u>	<u>18</u>	<u>19</u>	<u>20</u>	<u>21</u>	<u>22</u>	<u>23</u>	<u>24</u>	<u>25</u>	<u>26</u>	<u>27</u>
Voice-Bus Number	06	01	02	03	04	05	06	01	02	03	04	05	06	07
Time Slots Used	08	08	08	08	08	08	08	08	08	08	08	08	08	16
Blocking?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	NA
<u>Voice-Bus Number</u>	<u>01</u>	<u>02</u>	<u>03</u>	<u>04</u>	<u>05</u>	<u>06</u>	<u>07</u>	<u>08</u>						
Time Slots Allocated	32	32	32	32	48	45	16	00						
Blocking?	Y	Y	Y	Y	Y	Y	N	Y						

FIGURE 5-4. INDIVIDUAL STATION PROGRAMMING (STN)

TO USE: Make a copy of this 3-page programming sheet for each station in the system.

Circuit number	
Extension number	
Full name	
User name	
Station Exchange Password	

Miscellaneous Flags —

Allow Private Intercom Override	Enabled <i>or</i> Disabled
Auto Att/VM/DISA DND Breakthrough	Enabled <i>or</i> Disabled
Auto Answer CO (keyset only)	Enabled <i>or</i> Disabled
Auto Answer IC (keyset only)	Enabled <i>or</i> Disabled
Barge Initiate (keyset only)	Enabled <i>or</i> Disabled
Barge Receive	Enabled <i>or</i> Disabled
Camp-On Tones	Enabled <i>or</i> Disabled
CO Reseize (keyset only)	Enabled <i>or</i> Disabled
Dial Pulse (single-line only)	Yes <i>or</i> No
DID Camp-On Tones	Enabled <i>or</i> Disabled
Do-Not-Disturb Allowed	Enabled <i>or</i> Disabled
DND Override (keyset only)	Enabled <i>or</i> Disabled
DTMF Feedback Tone (single-line only)	Enabled <i>or</i> Disabled
E&M Camp-On Tones	Enabled <i>or</i> Disabled
Handsfree (keyset only)	Enabled <i>or</i> Disabled
Headset (keyset only)	Enabled <i>or</i> Disabled
LCR Facility Group Camp On	Enabled <i>or</i> Disabled
Message Lamp (single-line only)	Yes <i>or</i> No
Music Channel	One <i>or</i> Two
Off Premises Extension (single-line only)	Yes <i>or</i> No
OHVA Receive (keyset only)	Enabled <i>or</i> Disabled
OHVA Transmit	Enabled <i>or</i> Disabled
Page Remove/Replace (keyset only)	Remove <i>or</i> Replace
Redial Mode (keyset only)	Dialed <i>or</i> Saved
Ring Cadence (single-line only)	Normal <i>or</i> Extended
Ring Intercom Always	Enabled <i>or</i> Disabled
Ring Type for OPX (single-line only)	AC <i>or</i> DC
Transparent LCR	Enabled <i>or</i> Disabled

FIGURE 5-4. INDIVIDUAL STATION PROGRAMMING (Continued)

Miscellaneous Station Information—

Attendant	
Alt. Msg. Source	
Message Center	
Acct Code Type: S/F/L/None	
Index	
Validate?	Yes or No
Class-of-service code:	
Tenant/Dept. #	
Ring zone	

Outgoing Access —

Day Trunk Groups:	
Night Trunk Groups:	

Programmable Keys —

Key Map Number:	
Station Programmable Keys:	
1	
2	
3	
4	
5	
6	
7	
8	

Secondary Call Key Assignments —

If this is a principal station:

List of secondary stations:

If this is a secondary station:

SEC. KEY	ASSOCIATED STN	RING PRIN. FIRST?
01		Yes or No
02		Yes or No
03		Yes or No
04		Yes or No
05		Yes or No
06		Yes or No
07		Yes or No
08		Yes or No
09		Yes or No
10		Yes or No
11		Yes or No
12		Yes or No
13		Yes or No
14		Yes or No
15		Yes or No
16		Yes or No

Special Purpose Stations —

Fill in appropriate information if the station serves as any of the following special purpose stations:

Attendant:

List of stations served:

Message Center:

List of stations served:

FIGURE 5-4. INDIVIDUAL STATION PROGRAMMING (Continued)

Special Purpose Stations (continued) —

Fill in appropriate information if the station serves as any of the following special purpose stations:

Automated Attendant —

Recall Destination:	
Digit Translation:	
1:	6:
2:	7:
3:	8:
4:	9:
5:	0:

House Phone —

Day Number:
Night Number:

FAX Station (single-line only) —

Message Center:

Voice Mail Station (single-line only): *Yes or No*

System Forwarding —

Forwarding Path 1:		
Call Type(s):	Ring-in IC Calls DISA/AA Transfer	Recall DID E&M
Condition(s):	Busy No Ans.	DND Immediate
System Mode(s):	Day	Night
Ring Principal:	Yes or No	

Forwarding Path 2:		
Call Type(s):	Ring-in IC Calls DISA/AA Transfer	Recall DID E&M
Condition(s):	Busy No Ans.	DND Immediate
System Mode(s):	Day	Night
Ring Principal:	Yes or No	

Forwarding Path 3:		
Call Type(s):	Ring-in IC Calls DISA/AA Transfer	Recall DID E&M
Condition(s):	Busy No Ans.	DND Immediate
System Mode(s):	Day	Night
Ring Principal:	Yes or No	

Toll Restriction —

SCOS	DAY MODE	NIGHT MODE
0 Unrestricted	Yes or No	Yes or No
1 Operator Access	Yes or No	Yes or No
2 Toll Access	Yes or No	Yes or No
3 International	Yes or No	Yes or No
4 Eight Digit	Yes or No	Yes or No
5 Area/Office Code	Yes or No	Yes or No
6 LCR Only	Yes or No	Yes or No
7 Alternate Carrier	Yes or No	Yes or No
8 Enable ALD	Yes or No	Yes or No
User Group Number		
LCR Advance Limit		

FIGURE 5-5. KEY ASSIGNMENTS (KEY)

TO USE: These pages give sample key maps for each station instrument type. Defaults, if any, are shown. Copy the diagrams, identify the key map, and change the names of the appropriate keys to reflect their assignments in each key-map.

KEYSET KEY MAP NUMBER: _____ DESCRIPTION: _____

STATIONS: _____

EXECUTIVE DIGITAL KEYS

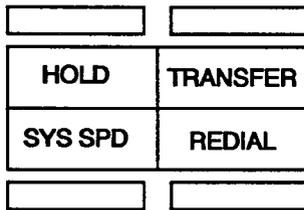
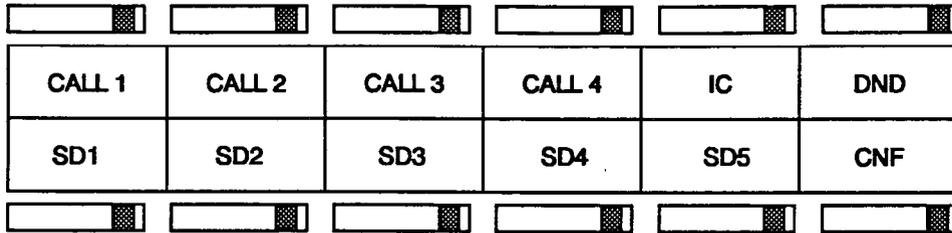


FIGURE 5-5. KEY ASSIGNMENTS (Continued)

KEYSET KEY MAP NUMBER: _____ DESCRIPTION: _____

STATIONS: _____

STANDARD DIGITAL KEYSET

	CALL 1	SD1	
	CALL 2	SD2	
	CALL 3	SD3	
	CALL 4	SD4	
	IC	SD5	
	DND	CNF	

HOLD	TRANSFER
SYS SPD	REDIAL

	SPKR	MSG
--	------	-----

	MUTE	FWD
--	------	-----

	∇ VOLUME ▲
--	------------

	SPCL
--	------

ANSWER	OUTGOING
--------	----------

1	ABC 2	DEF 3
GHI 4	JKL 5	MNO 6
PRS 7	TUV 8	WXY 9
*	OPER 0	#

FIGURE 5-5. KEY ASSIGNMENTS (Continued)

KEYSET KEY MAP NUMBER: _____ DESCRIPTION: _____

STATIONS: _____

IMX 12-LINE AND 24-LINE KEYSETS

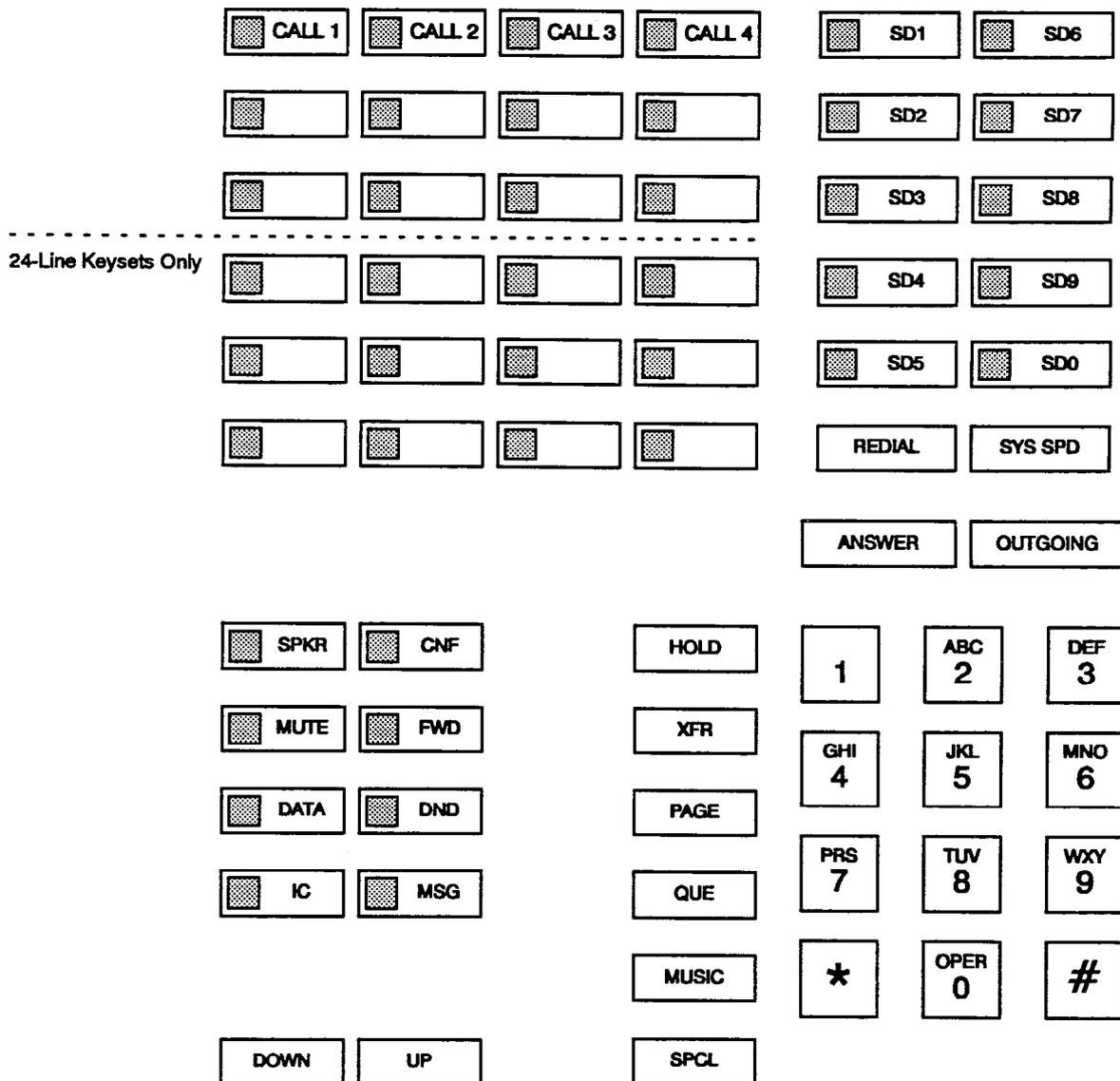


FIGURE 5-5. KEY ASSIGNMENTS (Continued)

KEYSET KEY MAP NUMBER: _____ DESCRIPTION: _____

STATIONS: _____

IMX 8-LINE KEYSETS

CALL 1 CALL 2 CALL 3 CALL 4

SPKR IC FWD MSG

MUTE CNF DND PAGE

ANSWER OUTGOING

HOLD

XFR

QUE

SPCL

1	ABC 2	DEF 3
GHI 4	JKL 5	MNO 6
PRS 7	TUV 8	WXY 9
*	OPER 0	#

FIGURE 5-5. KEY ASSIGNMENTS (Continued)

KEYSET KEY MAP NUMBER: _____ DESCRIPTION: _____

STATIONS: _____

INTER-TEL/DVK 24-LINE KEYSSET

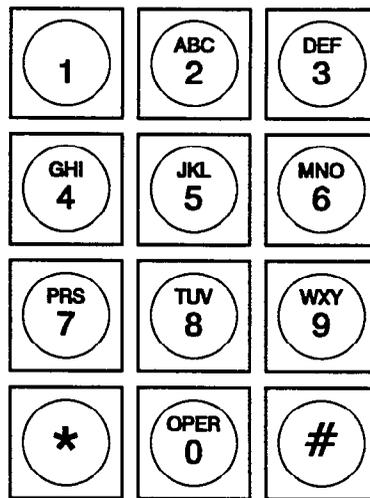
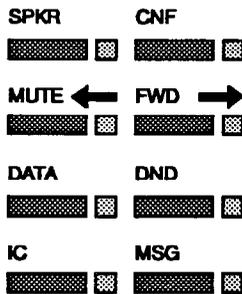
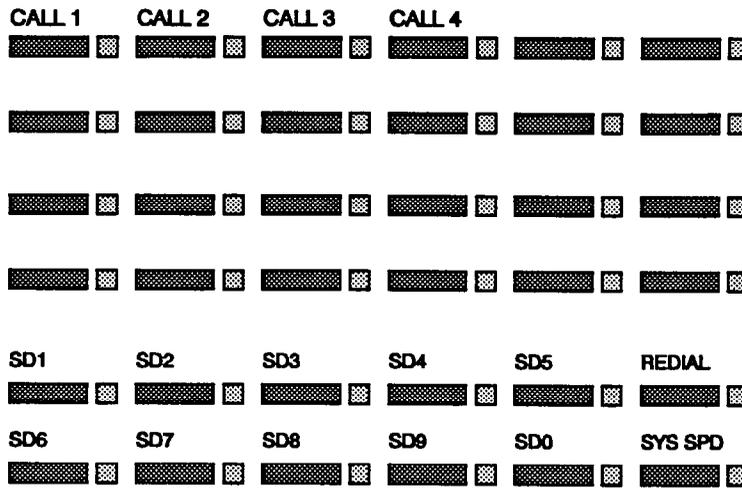
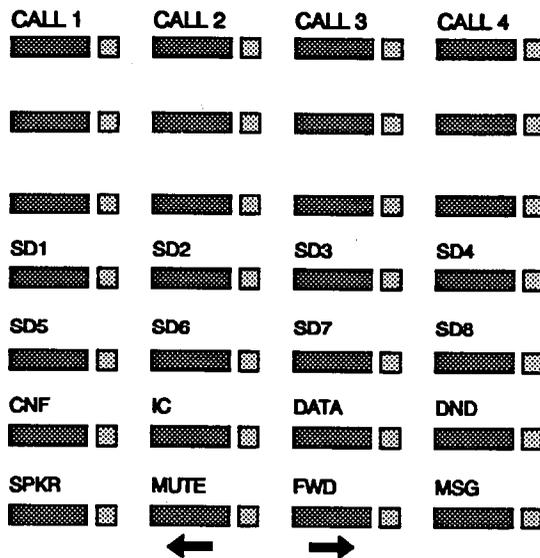


FIGURE 5-5. KEY ASSIGNMENTS (Continued)

KEYSET KEY MAP NUMBER: _____ DESCRIPTION: _____

STATIONS: _____

INTER-TEL/DVK 12-LINE & 8-LINE KEYSETS



HOLD

XFR

PAGE

QUE

REDIAL

SPCL

VOL UP

VOL DN

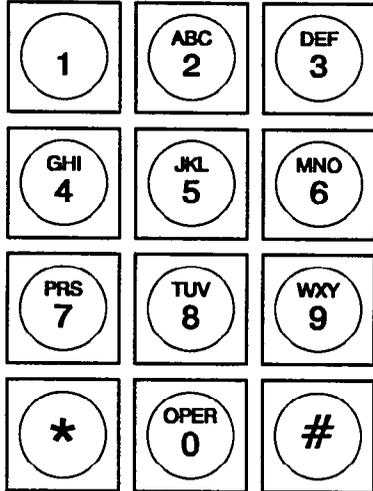


FIGURE 5-5. KEY ASSIGNMENTS (Continued)

DSS/BLF KEY MAP NUMBER: _____ DESCRIPTION: _____

STATIONS: _____

DIGITAL DSS/BLF UNIT

FIGURE 5-5. KEY ASSIGNMENTS (Continued)

DSS/BLF KEY MAP NUMBER: _____ DESCRIPTION: _____

STATIONS: _____

IMX DSS/BLF UNIT

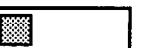
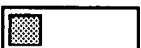
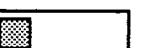
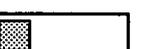
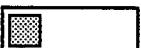
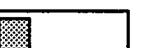
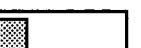
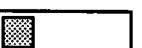
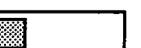
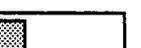
					
					
					
					
					
					
					
					
					
					

FIGURE 5-5. KEY ASSIGNMENTS (Continued)

DSS/BLF KEY MAP NUMBER: _____ DESCRIPTION: _____

STATIONS: _____

INTER-TEL/DVK DSS/BLF UNIT

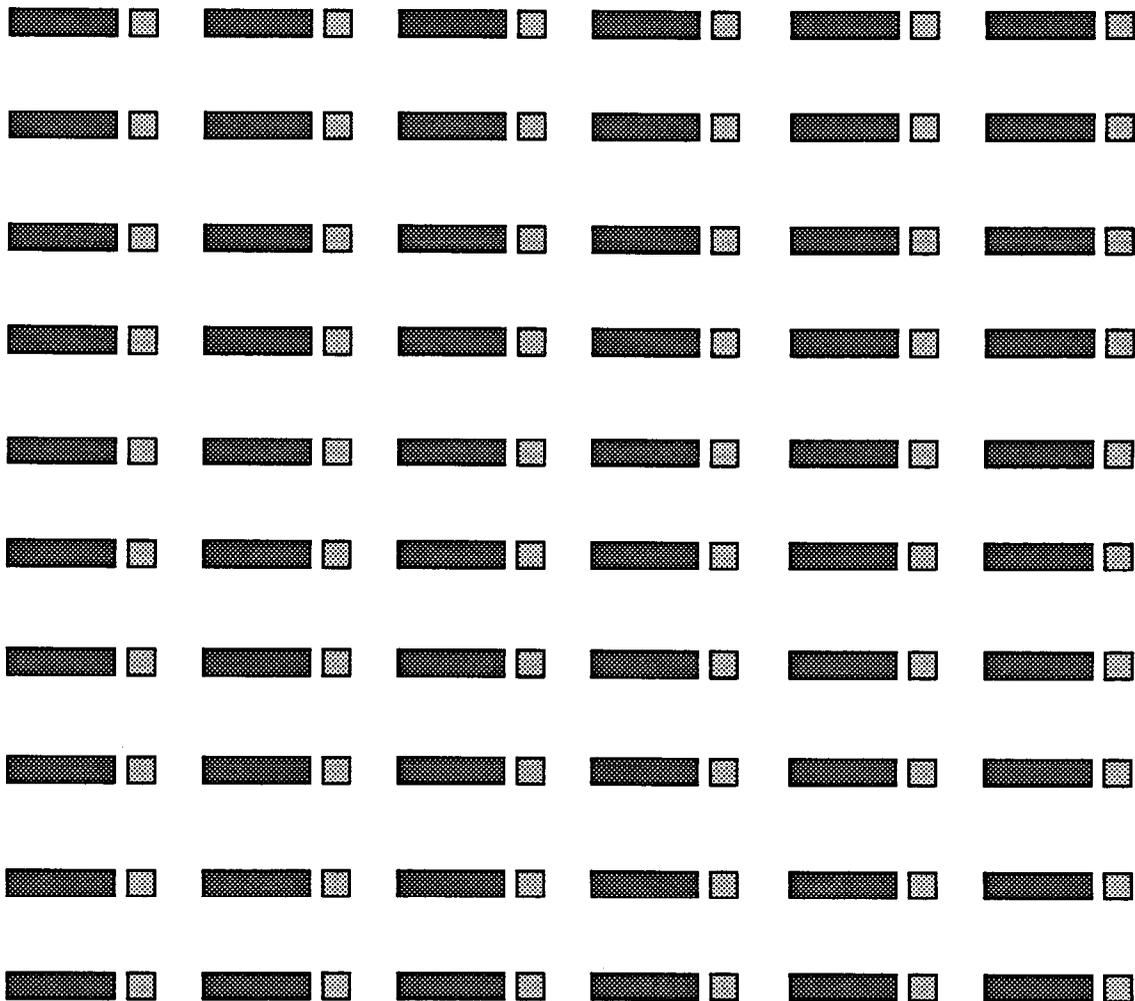


FIGURE 5-5. KEY ASSIGNMENTS (Continued)

SINGLE-LINE KEY MAP NUMBER: _____ DESCRIPTION: _____

STATIONS: _____

ENHANCED SINGLE-LINE SET (ESLS)

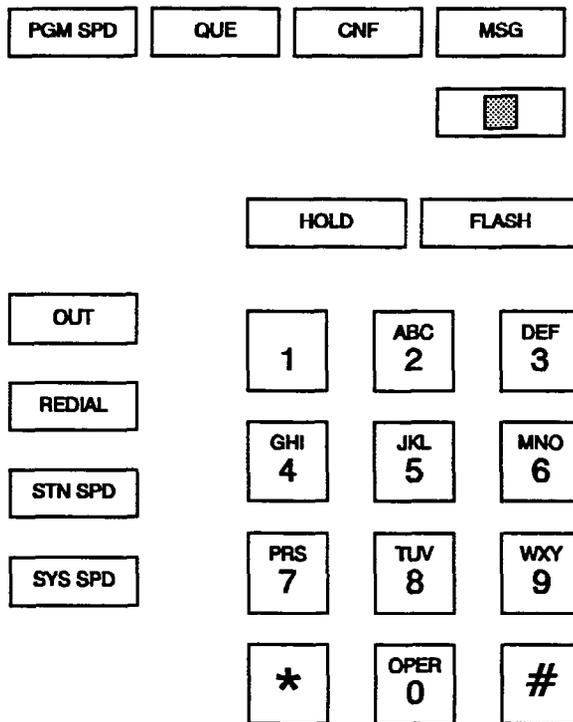


FIGURE 5-5. KEY ASSIGNMENTS (Continued)

SINGLE-LINE KEY MAP NUMBER: _____ DESCRIPTION: _____

STATIONS: _____

SINGLE-LINE INSTRUMENT (SLI)

1	ABC 2	DEF 3	STN SPD
GHI 4	JKL 5	MNO 6	REDL
PRS 7	TUV 8	WXY 9	LCR
*	OPER 0	#	HOLD
FLASH			

FIGURE 5-6. RING ZONE PROGRAMMING (ZONE)

RING ZONE	STATIONS
Immediate	
Zone 1	
Zone 2	
Zone 3	

FIGURE 5-7. STATION FEATURES (SFEA)

FEATURE	STATIONS WITH FEATURE ENABLED
Allow private intercom override	
Auto attendant/VM/DISA DND breakthru allowed	
Automatic answer on CO calls (keysets only)	
Automatic answer on IC calls (keysets only)	
Barge receive	
Barge transmit (keysets only)	
Camp-on tones disabled	
CO resize (keysets only)	
Dial pulse (single-line only)	
DID camp-on tones disabled	
Do-not-disturb allowed	
Do-not-disturb override allowed (keysets only)	
DTMF feedback enabled	
E&M camp-on tones disabled	
Handsfree (keysets only)	
LCR facility group camp-on allowed	
Message lamp (single-line only)	
Music channel one	
OHVA receive enabled (keysets only)	
OHVA transmit enabled	
Page remove (keysets only)	
Redial mode — Last number dialed (keysets only)	
Ring intercom always enabled	
Station exchange enabled	
Transparent LCR	

FIGURE 5-8. ACCOUNT CODES (ACCT)

Length of all account codes is: _____ (4-8) digits.

Standard Account Codes:

000 _____	026 _____	052 _____	078 _____	104 _____
001 _____	027 _____	053 _____	079 _____	105 _____
002 _____	028 _____	054 _____	080 _____	106 _____
003 _____	029 _____	055 _____	081 _____	107 _____
004 _____	030 _____	056 _____	082 _____	108 _____
005 _____	031 _____	057 _____	083 _____	109 _____
006 _____	032 _____	058 _____	084 _____	110 _____
007 _____	033 _____	059 _____	085 _____	111 _____
008 _____	034 _____	060 _____	086 _____	112 _____
009 _____	035 _____	061 _____	087 _____	113 _____
010 _____	036 _____	062 _____	088 _____	114 _____
011 _____	037 _____	063 _____	089 _____	115 _____
012 _____	038 _____	064 _____	090 _____	116 _____
013 _____	039 _____	065 _____	091 _____	117 _____
014 _____	040 _____	066 _____	092 _____	118 _____
015 _____	041 _____	067 _____	093 _____	119 _____
016 _____	042 _____	068 _____	094 _____	120 _____
017 _____	043 _____	069 _____	095 _____	121 _____
018 _____	044 _____	070 _____	096 _____	122 _____
019 _____	045 _____	071 _____	097 _____	123 _____
020 _____	046 _____	072 _____	098 _____	124 _____
021 _____	047 _____	073 _____	099 _____	125 _____
022 _____	048 _____	074 _____	100 _____	126 _____
023 _____	049 _____	075 _____	101 _____	127 _____
024 _____	050 _____	076 _____	102 _____	
025 _____	051 _____	077 _____	103 _____	

Stations With Standard Account Codes:

FIGURE 5-8. ACCOUNT CODES (Continued)

Forced Account Codes:

000 _____	035 _____	070 _____	105 _____
001 _____	036 _____	071 _____	106 _____
002 _____	037 _____	072 _____	107 _____
003 _____	038 _____	073 _____	108 _____
004 _____	039 _____	074 _____	109 _____
005 _____	040 _____	075 _____	110 _____
006 _____	041 _____	076 _____	111 _____
007 _____	042 _____	077 _____	112 _____
008 _____	043 _____	078 _____	113 _____
009 _____	044 _____	079 _____	114 _____
010 _____	045 _____	080 _____	115 _____
011 _____	046 _____	081 _____	116 _____
012 _____	047 _____	082 _____	117 _____
013 _____	048 _____	083 _____	118 _____
014 _____	049 _____	084 _____	119 _____
015 _____	050 _____	085 _____	120 _____
016 _____	051 _____	086 _____	121 _____
017 _____	052 _____	087 _____	122 _____
018 _____	053 _____	088 _____	123 _____
019 _____	054 _____	089 _____	124 _____
020 _____	055 _____	090 _____	125 _____
021 _____	056 _____	091 _____	126 _____
022 _____	057 _____	092 _____	127 _____
023 _____	058 _____	093 _____	128 _____
024 _____	059 _____	094 _____	129 _____
025 _____	060 _____	095 _____	130 _____
026 _____	061 _____	096 _____	131 _____
027 _____	062 _____	097 _____	132 _____
028 _____	063 _____	098 _____	133 _____
029 _____	064 _____	099 _____	134 _____
030 _____	065 _____	100 _____	135 _____
031 _____	066 _____	101 _____	136 _____
032 _____	067 _____	102 _____	137 _____
033 _____	068 _____	103 _____	138 _____
034 _____	069 _____	104 _____	139 _____

FIGURE 5-8. ACCOUNT CODES (Continued)

Forced Account Codes (continued):

140 _____	175 _____	210 _____	245 _____
141 _____	176 _____	211 _____	246 _____
142 _____	177 _____	212 _____	247 _____
143 _____	178 _____	213 _____	248 _____
144 _____	179 _____	214 _____	249 _____
145 _____	180 _____	215 _____	250 _____
146 _____	181 _____	216 _____	251 _____
147 _____	182 _____	217 _____	252 _____
148 _____	183 _____	218 _____	253 _____
149 _____	184 _____	219 _____	254 _____
150 _____	185 _____	220 _____	255 _____
151 _____	186 _____	221 _____	256 _____
152 _____	187 _____	222 _____	257 _____
153 _____	188 _____	223 _____	258 _____
154 _____	189 _____	224 _____	259 _____
155 _____	190 _____	225 _____	260 _____
156 _____	191 _____	226 _____	261 _____
157 _____	192 _____	227 _____	262 _____
158 _____	193 _____	228 _____	263 _____
159 _____	194 _____	229 _____	264 _____
160 _____	195 _____	230 _____	265 _____
161 _____	196 _____	231 _____	266 _____
162 _____	197 _____	232 _____	267 _____
163 _____	198 _____	233 _____	268 _____
164 _____	199 _____	234 _____	269 _____
165 _____	200 _____	235 _____	270 _____
166 _____	201 _____	236 _____	271 _____
167 _____	202 _____	237 _____	272 _____
168 _____	203 _____	238 _____	273 _____
169 _____	204 _____	239 _____	274 _____
170 _____	205 _____	240 _____	275 _____
171 _____	206 _____	241 _____	276 _____
172 _____	207 _____	242 _____	277 _____
173 _____	208 _____	243 _____	278 _____
174 _____	209 _____	244 _____	279 _____

FIGURE 5-8. ACCOUNT CODES (Continued)

Forced Account Codes (continued):

280 _____	315 _____	350 _____	385 _____
281 _____	316 _____	351 _____	386 _____
282 _____	317 _____	352 _____	387 _____
283 _____	318 _____	353 _____	388 _____
284 _____	319 _____	354 _____	389 _____
285 _____	320 _____	355 _____	390 _____
286 _____	321 _____	356 _____	391 _____
287 _____	322 _____	357 _____	392 _____
288 _____	323 _____	358 _____	393 _____
289 _____	324 _____	359 _____	394 _____
290 _____	325 _____	360 _____	395 _____
291 _____	326 _____	361 _____	396 _____
292 _____	327 _____	362 _____	397 _____
293 _____	328 _____	363 _____	398 _____
294 _____	329 _____	364 _____	399 _____
295 _____	330 _____	365 _____	400 _____
296 _____	331 _____	366 _____	401 _____
297 _____	332 _____	367 _____	402 _____
298 _____	333 _____	368 _____	403 _____
299 _____	334 _____	369 _____	404 _____
300 _____	335 _____	370 _____	405 _____
301 _____	336 _____	371 _____	406 _____
302 _____	337 _____	372 _____	407 _____
303 _____	338 _____	373 _____	408 _____
304 _____	339 _____	374 _____	409 _____
305 _____	340 _____	375 _____	410 _____
306 _____	341 _____	376 _____	411 _____
307 _____	342 _____	377 _____	412 _____
308 _____	343 _____	378 _____	413 _____
309 _____	344 _____	379 _____	414 _____
310 _____	345 _____	380 _____	415 _____
311 _____	346 _____	381 _____	416 _____
312 _____	347 _____	382 _____	417 _____
313 _____	348 _____	383 _____	418 _____
314 _____	349 _____	384 _____	419 _____

FIGURE 5-8. ACCOUNT CODES (Continued)

Forced Account Codes (continued):

420 _____	455 _____	490 _____	525 _____
421 _____	456 _____	491 _____	526 _____
422 _____	457 _____	492 _____	527 _____
423 _____	458 _____	493 _____	528 _____
424 _____	459 _____	494 _____	529 _____
425 _____	460 _____	495 _____	530 _____
426 _____	461 _____	496 _____	531 _____
427 _____	462 _____	497 _____	532 _____
428 _____	463 _____	498 _____	533 _____
429 _____	464 _____	499 _____	534 _____
430 _____	465 _____	500 _____	535 _____
431 _____	466 _____	501 _____	536 _____
432 _____	467 _____	502 _____	537 _____
433 _____	468 _____	503 _____	538 _____
434 _____	469 _____	504 _____	539 _____
435 _____	470 _____	505 _____	540 _____
436 _____	471 _____	506 _____	541 _____
437 _____	472 _____	507 _____	542 _____
438 _____	473 _____	508 _____	543 _____
439 _____	474 _____	509 _____	544 _____
440 _____	475 _____	510 _____	545 _____
441 _____	476 _____	511 _____	546 _____
442 _____	477 _____	512 _____	547 _____
443 _____	478 _____	513 _____	548 _____
444 _____	479 _____	514 _____	549 _____
445 _____	480 _____	515 _____	550 _____
446 _____	481 _____	516 _____	551 _____
447 _____	482 _____	517 _____	552 _____
448 _____	483 _____	518 _____	553 _____
449 _____	484 _____	519 _____	554 _____
450 _____	485 _____	520 _____	555 _____
451 _____	486 _____	521 _____	556 _____
452 _____	487 _____	522 _____	557 _____
453 _____	488 _____	523 _____	558 _____
454 _____	489 _____	524 _____	559 _____

FIGURE 5-8. ACCOUNT CODES (Continued)

Forced Account Codes (continued):

560 _____	595 _____	630 _____	665 _____
561 _____	596 _____	631 _____	666 _____
562 _____	597 _____	632 _____	667 _____
563 _____	598 _____	633 _____	668 _____
564 _____	599 _____	634 _____	669 _____
565 _____	600 _____	635 _____	670 _____
566 _____	601 _____	636 _____	671 _____
567 _____	602 _____	637 _____	672 _____
568 _____	603 _____	638 _____	673 _____
569 _____	604 _____	639 _____	674 _____
570 _____	605 _____	640 _____	675 _____
571 _____	606 _____	641 _____	676 _____
572 _____	607 _____	642 _____	677 _____
573 _____	608 _____	643 _____	678 _____
574 _____	609 _____	644 _____	679 _____
575 _____	610 _____	645 _____	680 _____
576 _____	611 _____	646 _____	681 _____
577 _____	612 _____	647 _____	682 _____
578 _____	613 _____	648 _____	683 _____
579 _____	614 _____	649 _____	684 _____
580 _____	615 _____	650 _____	685 _____
581 _____	616 _____	651 _____	686 _____
582 _____	617 _____	652 _____	687 _____
583 _____	618 _____	653 _____	688 _____
584 _____	619 _____	654 _____	689 _____
585 _____	620 _____	655 _____	690 _____
586 _____	621 _____	656 _____	691 _____
587 _____	622 _____	657 _____	692 _____
588 _____	623 _____	658 _____	693 _____
589 _____	624 _____	659 _____	694 _____
590 _____	625 _____	660 _____	695 _____
591 _____	626 _____	661 _____	696 _____
592 _____	627 _____	662 _____	697 _____
593 _____	628 _____	663 _____	698 _____
594 _____	629 _____	664 _____	699 _____

FIGURE 5-8. ACCOUNT CODES (Continued)

Forced Account Codes (continued):

700 _____	733 _____	766 _____	799 _____
701 _____	734 _____	767 _____	800 _____
702 _____	735 _____	768 _____	801 _____
703 _____	736 _____	769 _____	802 _____
704 _____	737 _____	770 _____	803 _____
705 _____	738 _____	771 _____	804 _____
706 _____	739 _____	772 _____	805 _____
707 _____	740 _____	773 _____	806 _____
708 _____	741 _____	774 _____	807 _____
709 _____	742 _____	775 _____	808 _____
710 _____	743 _____	776 _____	809 _____
711 _____	744 _____	777 _____	810 _____
712 _____	745 _____	778 _____	811 _____
713 _____	746 _____	779 _____	812 _____
714 _____	747 _____	780 _____	813 _____
715 _____	748 _____	781 _____	814 _____
716 _____	749 _____	782 _____	815 _____
717 _____	750 _____	783 _____	816 _____
718 _____	751 _____	784 _____	817 _____
719 _____	752 _____	785 _____	818 _____
720 _____	753 _____	786 _____	819 _____
721 _____	754 _____	787 _____	820 _____
722 _____	755 _____	788 _____	821 _____
723 _____	756 _____	789 _____	822 _____
724 _____	757 _____	790 _____	823 _____
725 _____	758 _____	791 _____	824 _____
726 _____	759 _____	792 _____	825 _____
727 _____	760 _____	793 _____	826 _____
728 _____	761 _____	794 _____	827 _____
729 _____	762 _____	795 _____	828 _____
730 _____	763 _____	796 _____	829 _____
731 _____	764 _____	797 _____	830 _____
732 _____	765 _____	798 _____	831 _____

FIGURE 5-8. ACCOUNT CODES (Continued)

Class-Of-Service Account Codes: (Enter the station extension and/or circuit number next to the account code)

000 _____	035 _____	070 _____	105 _____
001 _____	036 _____	071 _____	106 _____
002 _____	037 _____	072 _____	107 _____
003 _____	038 _____	073 _____	108 _____
004 _____	039 _____	074 _____	109 _____
005 _____	040 _____	075 _____	110 _____
006 _____	041 _____	076 _____	111 _____
007 _____	042 _____	077 _____	112 _____
008 _____	043 _____	078 _____	113 _____
009 _____	044 _____	079 _____	114 _____
010 _____	045 _____	080 _____	115 _____
011 _____	046 _____	081 _____	116 _____
012 _____	047 _____	082 _____	117 _____
013 _____	048 _____	083 _____	118 _____
014 _____	049 _____	084 _____	119 _____
015 _____	050 _____	085 _____	120 _____
016 _____	051 _____	086 _____	121 _____
017 _____	052 _____	087 _____	122 _____
018 _____	053 _____	088 _____	123 _____
019 _____	054 _____	089 _____	124 _____
020 _____	055 _____	090 _____	125 _____
021 _____	056 _____	091 _____	126 _____
022 _____	057 _____	092 _____	127 _____
023 _____	058 _____	093 _____	128 _____
024 _____	059 _____	094 _____	129 _____
025 _____	060 _____	095 _____	130 _____
026 _____	061 _____	096 _____	131 _____
027 _____	062 _____	097 _____	132 _____
028 _____	063 _____	098 _____	133 _____
029 _____	064 _____	099 _____	134 _____
030 _____	065 _____	100 _____	135 _____
031 _____	066 _____	101 _____	136 _____
032 _____	067 _____	102 _____	137 _____
033 _____	068 _____	103 _____	138 _____
034 _____	069 _____	104 _____	139 _____

FIGURE 5-8. ACCOUNT CODES (Continued)

Class-Of-Service Account Codes (continued):

140 _____	175 _____	210 _____	245 _____
141 _____	176 _____	211 _____	246 _____
142 _____	177 _____	212 _____	247 _____
143 _____	178 _____	213 _____	248 _____
144 _____	179 _____	214 _____	249 _____
145 _____	180 _____	215 _____	250 _____
146 _____	181 _____	216 _____	251 _____
147 _____	182 _____	217 _____	252 _____
148 _____	183 _____	218 _____	253 _____
149 _____	184 _____	219 _____	254 _____
150 _____	185 _____	220 _____	255 _____
151 _____	186 _____	221 _____	256 _____
152 _____	187 _____	222 _____	257 _____
153 _____	188 _____	223 _____	258 _____
154 _____	189 _____	224 _____	259 _____
155 _____	190 _____	225 _____	260 _____
156 _____	191 _____	226 _____	261 _____
157 _____	192 _____	227 _____	262 _____
158 _____	193 _____	228 _____	263 _____
159 _____	194 _____	229 _____	264 _____
160 _____	195 _____	230 _____	265 _____
161 _____	196 _____	231 _____	266 _____
162 _____	197 _____	232 _____	267 _____
163 _____	198 _____	233 _____	268 _____
164 _____	199 _____	234 _____	269 _____
165 _____	200 _____	235 _____	270 _____
166 _____	201 _____	236 _____	271 _____
167 _____	202 _____	237 _____	272 _____
168 _____	203 _____	238 _____	273 _____
169 _____	204 _____	239 _____	274 _____
170 _____	205 _____	240 _____	275 _____
171 _____	206 _____	241 _____	276 _____
172 _____	207 _____	242 _____	277 _____
173 _____	208 _____	243 _____	278 _____
174 _____	209 _____	244 _____	279 _____

FIGURE 5-8. ACCOUNT CODES (Continued)

Class-Of-Service Account Codes (continued):

280 _____	315 _____	350 _____	385 _____
281 _____	316 _____	351 _____	386 _____
282 _____	317 _____	352 _____	387 _____
283 _____	318 _____	353 _____	388 _____
284 _____	319 _____	354 _____	389 _____
285 _____	320 _____	355 _____	390 _____
286 _____	321 _____	356 _____	391 _____
287 _____	322 _____	357 _____	392 _____
288 _____	323 _____	358 _____	393 _____
289 _____	324 _____	359 _____	394 _____
290 _____	325 _____	360 _____	395 _____
291 _____	326 _____	361 _____	396 _____
292 _____	327 _____	362 _____	397 _____
293 _____	328 _____	363 _____	398 _____
294 _____	329 _____	364 _____	399 _____
295 _____	330 _____	365 _____	400 _____
296 _____	331 _____	366 _____	401 _____
297 _____	332 _____	367 _____	402 _____
298 _____	333 _____	368 _____	403 _____
299 _____	334 _____	369 _____	404 _____
300 _____	335 _____	370 _____	405 _____
301 _____	336 _____	371 _____	406 _____
302 _____	337 _____	372 _____	407 _____
303 _____	338 _____	373 _____	408 _____
304 _____	339 _____	374 _____	409 _____
305 _____	340 _____	375 _____	410 _____
306 _____	341 _____	376 _____	411 _____
307 _____	342 _____	377 _____	412 _____
308 _____	343 _____	378 _____	413 _____
309 _____	344 _____	379 _____	414 _____
310 _____	345 _____	380 _____	415 _____
311 _____	346 _____	381 _____	416 _____
312 _____	347 _____	382 _____	417 _____
313 _____	348 _____	383 _____	418 _____
314 _____	349 _____	384 _____	419 _____

FIGURE 5-8. ACCOUNT CODES (Continued)

Class-Of-Service Account Codes (continued):

420 _____	455 _____	490 _____	525 _____
421 _____	456 _____	491 _____	526 _____
422 _____	457 _____	492 _____	527 _____
423 _____	458 _____	493 _____	528 _____
424 _____	459 _____	494 _____	529 _____
425 _____	460 _____	495 _____	530 _____
426 _____	461 _____	496 _____	531 _____
427 _____	462 _____	497 _____	532 _____
428 _____	463 _____	498 _____	533 _____
429 _____	464 _____	499 _____	534 _____
430 _____	465 _____	500 _____	535 _____
431 _____	466 _____	501 _____	536 _____
432 _____	467 _____	502 _____	537 _____
433 _____	468 _____	503 _____	538 _____
434 _____	469 _____	504 _____	539 _____
435 _____	470 _____	505 _____	540 _____
436 _____	471 _____	506 _____	541 _____
437 _____	472 _____	507 _____	542 _____
438 _____	473 _____	508 _____	543 _____
439 _____	474 _____	509 _____	544 _____
440 _____	475 _____	510 _____	545 _____
441 _____	476 _____	511 _____	546 _____
442 _____	477 _____	512 _____	547 _____
443 _____	478 _____	513 _____	548 _____
444 _____	479 _____	514 _____	549 _____
445 _____	480 _____	515 _____	550 _____
446 _____	481 _____	516 _____	551 _____
447 _____	482 _____	517 _____	552 _____
448 _____	483 _____	518 _____	553 _____
449 _____	484 _____	519 _____	554 _____
450 _____	485 _____	520 _____	555 _____
451 _____	486 _____	521 _____	556 _____
452 _____	487 _____	522 _____	557 _____
453 _____	488 _____	523 _____	558 _____
454 _____	489 _____	524 _____	559 _____

FIGURE 5-8. ACCOUNT CODES (Continued)

Class-Of-Service Account Codes (continued):

560 _____	595 _____	630 _____	665 _____
561 _____	596 _____	631 _____	666 _____
562 _____	597 _____	632 _____	667 _____
563 _____	598 _____	633 _____	668 _____
564 _____	599 _____	634 _____	669 _____
565 _____	600 _____	635 _____	670 _____
566 _____	601 _____	636 _____	671 _____
567 _____	602 _____	637 _____	672 _____
568 _____	603 _____	638 _____	673 _____
569 _____	604 _____	639 _____	674 _____
570 _____	605 _____	640 _____	675 _____
571 _____	606 _____	641 _____	676 _____
572 _____	607 _____	642 _____	677 _____
573 _____	608 _____	643 _____	678 _____
574 _____	609 _____	644 _____	679 _____
575 _____	610 _____	645 _____	680 _____
576 _____	611 _____	646 _____	681 _____
577 _____	612 _____	647 _____	682 _____
578 _____	613 _____	648 _____	683 _____
579 _____	614 _____	649 _____	684 _____
580 _____	615 _____	650 _____	685 _____
581 _____	616 _____	651 _____	686 _____
582 _____	617 _____	652 _____	687 _____
583 _____	618 _____	653 _____	688 _____
584 _____	619 _____	654 _____	689 _____
585 _____	620 _____	655 _____	690 _____
586 _____	621 _____	656 _____	691 _____
587 _____	622 _____	657 _____	692 _____
588 _____	623 _____	658 _____	693 _____
589 _____	624 _____	659 _____	694 _____
590 _____	625 _____	660 _____	695 _____
591 _____	626 _____	661 _____	696 _____
592 _____	627 _____	662 _____	697 _____
593 _____	628 _____	663 _____	698 _____
594 _____	629 _____	664 _____	699 _____

FIGURE 5-8. ACCOUNT CODES (Continued)

Class-Of-Service Account Codes (continued):

700 _____	733 _____	766 _____	799 _____
701 _____	734 _____	767 _____	800 _____
702 _____	735 _____	768 _____	801 _____
703 _____	736 _____	769 _____	802 _____
704 _____	737 _____	770 _____	803 _____
705 _____	738 _____	771 _____	804 _____
706 _____	739 _____	772 _____	805 _____
707 _____	740 _____	773 _____	806 _____
708 _____	741 _____	774 _____	807 _____
709 _____	742 _____	775 _____	808 _____
710 _____	743 _____	776 _____	809 _____
711 _____	744 _____	777 _____	810 _____
712 _____	745 _____	778 _____	811 _____
713 _____	746 _____	779 _____	812 _____
714 _____	747 _____	780 _____	813 _____
715 _____	748 _____	781 _____	814 _____
716 _____	749 _____	782 _____	815 _____
717 _____	750 _____	783 _____	816 _____
718 _____	751 _____	784 _____	817 _____
719 _____	752 _____	785 _____	818 _____
720 _____	753 _____	786 _____	819 _____
721 _____	754 _____	787 _____	820 _____
722 _____	755 _____	788 _____	821 _____
723 _____	756 _____	789 _____	822 _____
724 _____	757 _____	790 _____	823 _____
725 _____	758 _____	791 _____	824 _____
726 _____	759 _____	792 _____	825 _____
727 _____	760 _____	793 _____	826 _____
728 _____	761 _____	794 _____	827 _____
729 _____	762 _____	795 _____	828 _____
730 _____	763 _____	796 _____	829 _____
731 _____	764 _____	797 _____	830 _____
732 _____	765 _____	798 _____	831 _____

FIGURE 5-9. DO-NOT-DISTURB AND REMINDER MESSAGES (MESG)

Do-Not-Disturb Messages:

MESSAGE 1 (DO-NOT-DISTURB)	(THIS MESSAGE CANNOT BE CHANGED)
MESSAGE 2 (IN MEETING UNTIL)	
MESSAGE 3 (IN MEETING)	
MESSAGE 4 (ON VACATION 'TIL)	
MESSAGE 5 (ON VACATION)	
MESSAGE 6 (CALL ME AT)	
MESSAGE 7 (CALL ME AFTER)	
MESSAGE 8 (AWAY AT)	
MESSAGE 9 (ON BREAK)	
MESSAGE 10 (OUT OF TOWN 'TIL)	
MESSAGE 11 (OUT OF OFFICE)	
MESSAGE 12 (OUT UNTIL)	
MESSAGE 13 (WITH A CLIENT)	
MESSAGE 14 (WITH A GUEST)	
MESSAGE 15 (WITH A PATIENT)	
MESSAGE 16 (UNAVAILABLE)	
MESSAGE 17 (IN CONFERENCE)	
MESSAGE 18 (AWAY FROM DESK)	
MESSAGE 19 (GONE HOME)	
MESSAGE 20 (OUT TO LUNCH)	

FIGURE 5-9. DO-NOT-DISTURB AND REMINDER MESSAGES (Continued)

Reminder Messages:

MESSAGE 1 (MEETING):	
MESSAGE 2 (STAFF MEETING):	
MESSAGE 3 (SALES MEETING):	
MESSAGE 4 (CANCEL MEETING):	
MESSAGE 5 (APPOINTMENT):	
MESSAGE 6 (PLACE CALL):	
MESSAGE 7 (CALL CLIENT):	
MESSAGE 8 (CALL CUSTOMER):	
MESSAGE 9 (CALL HOME):	
MESSAGE 10 (CALL CORPORATE):	
MESSAGE 11 (CALL ENGINEERING):	
MESSAGE 12 (CALL MARKETING):	
MESSAGE 13 (CALL ACCOUNTING):	
MESSAGE 14 (CANCEL DND):	
MESSAGE 15 (CANCEL CALL FWD):	
MESSAGE 16 (TAKE MEDICATION):	
MESSAGE 17 (MAKE RESERVATION):	
MESSAGE 18 (REVIEW SCHEDULE):	
MESSAGE 19 (LUNCH):	
MESSAGE 20 (REMINDER):	

FIGURE 5-10. EXTENSIONS, USERNAMES, AND FEATURE CODES (Continued)

Hunt Groups:

GROUP #	DESCRIPTION	USERNAME	EXTENSION
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
22			
23			
24			
25			
26			
27			
28			
29			
30			
31			
32			
33			
34			
35			
36			
37			
38			
39			
40			

FIGURE 5-10. EXTENSIONS, USERNAMES, AND FEATURE CODES (Continued)

Feature Codes:

NEW CODE	FEATURE NAME
	AIM/Digital/DVK Keypad — Default Volume (394)
	Attendant — Cancel All DND Requests (012)
	Attendant — Cancel All Station DND/FWD Requests (014)
	Attendant — Cancel All Station FWD Requests (013)
	Attendant — Cancel Station DND Request (015)
	Attendant — Cancel Station DND/FWD Request (017)
	Attendant — Cancel Station FWD Request (016)
	Attendant — Clear System Alarm (019)
	Attendant — Night Ring On/Off (010)
	Attendant — Paging Speaker Music On/Off (018)
	Attendant — Program Station Data (022)
	Attendant — Program System DND Messages (024)
	Attendant — Program System Reminder Messages (023)
	Attendant — Program System Speed Dial (020)
	Attendant — Remove All Trunks From Maintenance (028)
	Attendant — Set Time of Day (021)
	Attendant — SMDA (025)
	Attendant — Trunk Maintenance (027)
	Automatic Intercom Access (362)
	Automatic Intercom Access — Cancel (363)
	Automatic Intercom Access On/Off (364)
	Automatic Trunk Access (360)
	Automatic Trunk Access — Cancel (361)
	Automatic Trunk Access On/Off (374)
	Automatic Trunk Answer (350)

NEW CODE	FEATURE NAME
	Automatic Trunk Selection (89)
	Background Music Channel Selection (318)
	Background Music On/Off (313)
	Barge (397)
	Call Forward — All Calls (355)
	Call Forward — Cancel Any (359)
	Call Forward — If Busy (357)
	Call Forward — If No Answer (356)
	Call Forward — If No Answer or Busy (358)
	Call Splitting — Keypad (338)
	Call Splitting — Single-Line (337)
	Cancel Current Message (379)
	Cancel Misc. Operations (395)
	Conference (5)
	Data (340)
	Data Port Monitor (341)
	Date and Time Display (300)
	Do-Not-Disturb (370)
	Do-Not-Disturb — Cancel (371)
	Do-Not-Disturb Mode On/Off (372)
	Do-Not-Disturb Override (373)
	Feature Key — Default (325)
	Feature Key — Display (326)
	Feature Key — Programming (327)
	Handsfree — Disable (310)
	Handsfree — Enable (311)
	Handsfree On/Off (319)
	Headset — Disable (316)
	Headset — Enable (315)
	Headset Mode On/Off (317)
	Hold — Individual (336)
	Hold — System (335)

FIGURE 5-10. EXTENSIONS, USERNAMES, AND FEATURE CODES (Continued)

Feature Codes (continued):

NEW CODE	FEATURE NAME
	Hookflash (330)
	Hunt Group Remove (322)
	Hunt Group Replace (323)
	Hunt Remove/Replace On/Off (324)
	Least-Cost Routing (9)
	Message (365)
	Message — Cancel (366)
	Message — Silent (378)
	Microphone Mute On/Off (314)
	Optional Account Code (390)
	Page (7)
	Page Remove (332)
	Page Replace (333)
	Page Remove/Replace On/Off (334)
	Private CO Call (369)
	Queue Request (6)
	Queue Request — Cancel (376)
	Redial (380)
	Redial Mode—Last Number Dialed (320)

NEW CODE	FEATURE NAME
	Redial Mode—Last Number Saved (321)
	Release (339)
	Reminder Message (305)
	Reminder Message — Cancel (306)
	Reverse Transfer (4)
	Ring Intercom Always (367)
	Ring Intercom Always — Cancel (368)
	Ring Intercom Always On/Off (377)
	Ring Tone Selection (328)
	Speakerphone On/Off (312)
	Station Exchange (303)
	Station Monitoring (396)
	Station Speed Dial (382)
	Station Speed Dial Programming (383)
	System Directory — Intercom (307)
	System Directory — Outside (308)
	System Speed Dial (381)
	Transfer CO Call (345)
	Transfer Intercom Call (346)
	Transfer to Hold (347)

FIGURE 5-11. HUNT GROUPS (HUNT)

TO USE: (Make sufficient copies of this page and fill in information for each hunt group.)

Hunt Group Number:	
Pilot Number:	
Description:	
Username:	
Search Type:	Linear or Distributed
Announcement Station/Type:	
Overflow Station/Type/Count:	
Hunt Group Supervisor:	
Recall Destination:	
Voice Mail?	Yes or No
Voice Computer?	Yes or No Dial Rules:
Automated Attendant?	Yes or No

Timers:

TIMER	DEFAULT	RANGE	NEW VALUE
No Answer Advance	18 seconds	1-255	
Announcement	18 seconds	1-255	
Overflow	72 seconds	1-255	
Recall	180 seconds	1-65535	

Stations:

FIGURE 5-12. MISC. SYSTEM-WIDE INFORMATION (MISC)

Primary Attendant Station:	
Call Termination Digits:	

System Flags:

Account code class of service	Yes or No
Allow cross-tenant traffic	Yes or No
Allow cross-tenant voice mail/computer traffic	Yes or No
Audible message indication for SL sets	Yes or No
Auto attendant — dial during recording	Yes or No
Automated attendant — ringback tone	Yes or No
Barge	Yes or No
Barge confirmation tone	Yes or No
Broadcast alarms to all attendants	Yes or No
Broadcast station off-hook alarms	Yes or No
Drop incomplete outgoing calls	Yes or No
DSS feature key lamp status	Yes or No
Extended DTMF feedback digits	Yes or No
External paging music channel	One or Two
Handsfree announce system forward transfer	Yes or No
Hot dial pad keys	Yes or No
Hunt group transferred call type	Overflow or Ann/Overflow
Keypad identification display	Yes or No
Music-on-hold for IC calls	Yes or No
OHVA DSS immediate transmit	Yes or No
OHVA system-wide	Yes or No
Privacy release	Yes or No
Reverse transfer immediate connection	Yes or No
Standard tones for CO trunks	Yes or No
Standard tones for keysets	Yes or No
Standard tones for single-lines	Yes or No
Station DTMF digit mute	Yes or No
Station monitoring tone	Yes or No
Suppress all displayed digits after end-of-dialing	Yes or No
System "skate" type	Hold or Disconnect
System speed dial override SCOS	Yes or No
Validate voice mailbox numbers	Yes or No

FIGURE 5-13. PAGE ZONES (PAGE)

ZONE	DESCRIPTION	RELAYS	EXTERNAL PORTS	KEYSETS
0				
1				
2				
3				
4				
5				
6				
7				
8				
9				

FIGURE 5-14. RELAYS (RLAY)

MATRIX CARD RELAY	RELAY TYPE	TENANT GROUP
01	Power Failure	All
02		
03		
04		

EXP CARD RELAY	RELAY TYPE	TENANT GROUP
05		
06		
07		
08		

FIGURE 5-17. SYSTEM TIMER (TIMR)

TIMER	DEFAULT	RANGE	NEW VALUE
Abandoned Call	10	1-255 minutes	
Camp-On	3	0-255 seconds	
Camp-On Tone	15	5-255 seconds	
CO Hookflash	60	2-250 hundredths	
CO Re-Seize	3	1-15 seconds	
CO-CO Disconnect	35	2-250 hundredths	
Conference-Hold	5	1-255 minutes	
Data Wait	30	1-255 seconds	
Dial Tone Wait	2	1-50 seconds	
Dial-Initiation — Keyset	15	5-30 seconds	
Dial-Initiation — SL Set	10	5-30 seconds	
Dialing Disconnect	200	2-250 hundredths	
Dialing Wait After Connect — Ground Start	1500	0-5000 five-hundredths	
Dialing Wait After Connect — Loop Start	1500	0-5000 five-hundredths	
Dialing Wait After Hookflash	30	1-250 tenths	
Disconnect Flash Duration	15	1-250 tenths	
Disconnect Wait After Dialing	20	2-30 seconds	
DTMF Digit Duration/Pause	6	5-60 hundredths	
E&M Answer Recognition	2250	100-10000 five-hundredths	
E&M Dial Delay	35	1-100 five-hundredths	
E&M Dial Delay Hold	70	1-250 five-hundredths	
E&M Dialing Wait After Hookflash	1500	100-10000 five-hundredths	
E&M Disconnect Flash Duration	1000	100-10000 five-hundredths	
E&M Disconnect Recognition	750	100-5000 five-hundredths	
E&M Disconnect Wait After Dialing	1500	100-10000 five-hundredths	
E&M DTMF Interdigit Pause	20	1-100 five-hundredths	
E&M DTMF Tone Duration	30	1-100 five-hundredths	
E&M False Signal Debounce	25	1-100 five-hundredths	
E&M Handshake Timeout	2500	100-10000 five-hundredths	
E&M Hookflash Duration	300	100-5000 five-hundredths	
E&M Hookflash Recognition	150	100-5000 five-hundredths	
E&M Inter-Pulse Pause	20	1-100 five-hundredths	
E&M Off-Hook Debounce	5	1-50 five-hundredths	
E&M On-Hook Debounce	5	1-50 five-hundredths	

FIGURE 5-17. SYSTEM TIMER (Continued)

TIMER	DEFAULT	RANGE	NEW VALUE
E&M Post Signal Delay	15	1-250 five-hundredths	
E&M Post Seizure Delay	32	1-100 five-hundredths	
E&M Pulse Hold	30	1-100 five-hundredths	
E&M Pulse-Dial Interdigit	350	100-5000 five-hundredths	
E&M Pulse-Dial Interdigit	150	1-500 five-hundredths	
E&M Ready Timeout	2000	100-10000 five-hundredths	
E&M Receive Handshake Delay	10	1-250 five-hundredths	
E&M Seizure Debounce	1	1-10 five-hundredths	
E&M Short Circuit Debounce	500	100-10000 five-hundredths	
E&M Short Circuit Timeout	2500	100-10000 five-hundredths	
E&M Short Pause Digit	1500	100-10000 five-hundredths	
E&M Transmit Handshake Delay	50	1-250 five-hundredths	
E&M Wait for Dial Tone	500	100-10000 five-hundredths	
E&M Wink Hold	107	1-250 five-hundredths	
E&M Wink Timeout	175	1-250 five-hundredths	
Forward-No-Answer	15	3-255 seconds	
Hold	60	10-255 seconds	
IC-CO Disconnect	60	2-250 hundredths	
Inactivity Alarm	60	10-255 seconds	
Inter-Ring Silence	60	1-250 tenths	
Interdigit (Long)	15	2-255 seconds	
Interdigit (Short)	4	2-30 seconds	
LCR Advance	8	1-255 seconds	
Loop Reversal Debounce	25	1-255 five-hundredths	
Message Wait	5	1-255 seconds	
Off-Hook Voice Announce Screening	5	0-255 seconds	
Off-Line After Disconnect	10	10-250 tenths	
Page	15	0-255 seconds	
Pause Digit Length	3	1-5 seconds	
Queue Callback	15	10-255 seconds	
Recall	60	10-255 seconds	
Relaxed Ring Detection	62	1-9500 five-hundredths	
Single-Line Hookflash Maximum	7	2-20 tenths	
Single-Line Hookflash Minimum	2	1-10 tenths	
Single-Line Set Wait For Disconnect	2	1-60 seconds	

FIGURE 5-17. SYSTEM TIMER (Continued)

TIMER	DEFAULT	RANGE	NEW VALUE
System Forwarding Advance	15	2-255 seconds	
System Forwarding Initiate	15	2-255 seconds	
T1 Busy Switch Timeout	60	10-10000 seconds	
Transfer — Available	20	10-255 seconds	
Transfer — Busy	24	10-255 seconds	
Trunk Key Debounce	3	1-777 seconds	
Trunk Preselect	5	2-255 seconds	
Trunk Ring Detection	5	1-250 tenths	
Unsupervised-CO	5	1-255 minutes	
Valid-Call	15	0-60 seconds	
Voice Mail Dialing Delay	5	1-250 tenths	

FIGURE 5-18. TENANT GROUPS (TNT)

TO USE: Make a copy and fill in for each tenant group.

Tenant Group Number	
Name (Up To 20 Characters):	
Trunk Group For Auto Feature:	
Trunk Groups:	
DID Groups:	
Department 1 — Name (Up To 20 Characters): List Of Stations:	
Department 2 — Name (Up To 20 Characters): List Of Stations:	
Department 3 — Name (Up To 20 Characters): List Of Stations:	
Department 4 — Name (Up To 20 Characters): List Of Stations:	
Department 5 — Name (Up To 20 Characters): List Of Stations:	
Department 6 — Name (Up To 20 Characters): List Of Stations:	
Department 7 — Name (Up To 20 Characters): List Of Stations:	
Department 8 — Name (Up To 20 Characters): List Of Stations:	
Department 9 — Name (Up To 20 Characters): List Of Stations:	
Department 10 — Name (Up To 20 Characters): List Of Stations:	

FIGURE 5-19. ALTERNATE CARRIERS AND ALLOWED LONG DISTANCE (ALT)

Alternate Carriers: Enter numbers up to 10 digits each. The numbers should not contain the toll field, but can contain equal access digits (e.g., do not enter 1+ or 0+ numbers, except 10XXX and 101XXXX numbers).

1	_____	16	_____
2	_____	17	_____
3	_____	18	_____
4	_____	19	_____
5	_____	20	_____
6	_____	21	_____
7	_____	22	_____
8	_____	23	_____
9	_____	24	_____
10	_____	25	_____
11	_____	26	_____
12	_____	27	_____
13	_____	28	_____
14	_____	29	_____
15	_____	30	_____

Allowed Long Distance: Enter numbers up to 10 digits each, do not include toll field.

1	_____	16	_____
2	_____	17	_____
3	_____	18	_____
4	_____	19	_____
5	_____	20	_____
6	_____	21	_____
7	_____	22	_____
8	_____	23	_____
9	_____	24	_____
10	_____	25	_____
11	_____	26	_____
12	_____	27	_____
13	_____	28	_____
14	_____	29	_____
15	_____	30	_____

FIGURE 5-20. AREA/OFFICE CODE RESTRICTION USER GROUPS (AREA)

TO USE: Make a copy for each user group and fill in the information.

Office Codes Used as Area Codes? Yes or No
 Area Codes Used as Office Codes? Yes or No
 Toll Digit Allowed On Toll Local Calls? Yes or No
 Toll Digit Required On Toll Long Distance Calls? Yes or No

User Group Number	
Description	
Day List of Stations	
Night List of Stations	
Allowed Area Codes	
Restricted Area Codes	
Extended Area Codes —	Allowed Office Codes —
1:	
2:	
3:	
4:	

FIGURE 5-21. STATION CLASS OF SERVICE/LCR ADVANCES (SCOS)

STATION CLASS OF SERVICE	DAY MODE	NIGHT MODE
0. Unrestricted		
1. Restrict Operator Access		
2. Restrict Toll Access		
3. Restrict International Calls		
4. Restrict Eight-Digit Calls		
5. Use Area/Office Code Tables		
6. Use LCR Only		
7. Restrict Alternate Carriers		
8. Enable Allowed Long Distance List		

FIGURE 5-21. STATION CLASS OF SERVICE/LCR ADVANCES (Continued)

# of LCR ADVANCES	DAY MODE	NIGHT MODE
Unlimited Advances		
No Advances		
1 Advance		
2 Advances		
3 Advances		
4 Advances		
5 Advances		
6 Advances		
7 Advances		
8 Advances		
9 Advances		
10 Advances		

FIGURE 5-21. STATION CLASS OF SERVICE/LCR ADVANCES (Continued)

# of LCR ADVANCES	DAY MODE	NIGHT MODE
11 Advances		
12 Advances		
13 Advances		
14 Advances		
15 Advances		
16 Advances		
17 Advances		
18 Advances		
19 Advances		
20 Advances		
21 Advances		
22 Advances		

FIGURE 5-22. TOLL SECURITY (TOLL)

Monitor 7-Digit and 10-Digit Toll Calls?	Yes or No
Weekly Toll Limit:	
Monitor Operator/International Calls?	Yes or No
Weekly Toll Limit:	

FIGURE 5-23. LEAST-COST ROUTING (LCR)

Route Groups:

DESCR.	AREA CODES*	OFFICE CODES*	FACILITY GROUPS		
			D	E	N
1	I	I			
	E	E			
2	I	I			
	E	E			
3	I	I			
	E	E			
4	I	I			
	E	E			
5	I	I			
	E	E			
6	I	I			
	E	E			

* Circle I for Included codes or circle E for Excluded codes.

FIGURE 5-23. LEAST-COST ROUTING (Continued)

Route Groups (continued):

DESCR.	AREA CODES*	OFFICE CODES*	FACILITY GROUPS		
			D	E	N
7	I	I			
	E	E			
8	I	I			
	E	E			
9	I	I			
	E	E			
10	I	I			
	E	E			
11	I	I			
	E	E			
12	I	I			
	E	E			

* Circle I for Included codes or circle E for Excluded codes.

FIGURE 5-23. LEAST-COST ROUTING (Continued)

Route Groups (continued):

DESCR.	AREA CODES*	OFFICE CODES*	FACILITY GROUPS		
			D	E	N
13	I E	I E			
14	I E	I E			
15	I E	I E			
16	I E	I E			

* Circle I for Included codes or circle E for Excluded codes.

0+ Route Groups:

	DESCR.	FACILITY GROUPS		
		DAY	EVENING	NIGHT
17	0+ Operator Assisted Domestic			
18	01+ Operator Assisted International			
19	011+ Station-To-Station International			

FIGURE 5-23. LEAST-COST ROUTING (Continued)

Facility Groups:

GROUP	DESCRIPTION	TRUNK GROUPS	ORDERED LIST OF DIAL RULES	NUMBERS DIALED
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				

FIGURE 5-23. LEAST-COST ROUTING (Continued)

Facility Groups (continued):

GROUP	DESCRIPTION	TRUNK GROUPS	ORDERED LIST OF DIAL RULES	NUMBERS DIALED
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				

FIGURE 5-23. LEAST-COST ROUTING (Continued)

Facility Groups (continued):

GROUP	DESCRIPTION	TRUNK GROUPS	ORDERED LIST OF DIAL RULES	NUMBERS DIALED
25				
26				
27				
28				
29				
30				
31				
32				

FIGURE 5-23. LEAST-COST ROUTING (Continued)

Dial Rules:

1 Echo toll field	17 _____
2 Echo area code	18 _____
3 Echo local address (last seven digits)	19 _____
4 Echo extension number	20 _____
5 _____	21 _____
6 _____	22 _____
7 _____	23 _____
8 _____	24 _____
9 _____	25 _____
10 _____	26 _____
11 _____	27 _____
12 _____	28 _____
13 _____	29 _____
14 _____	30 _____
15 _____	31 _____
16 _____	32 _____

FIGURE 5-25. TRUNK GROUPS, DID GROUPS & RING-IN/ANSWER PATTERNS (TRNK)

Trunk Groups: Duplicate and fill out this form for each trunk group.

Trunk Group Number	
Description & Username	
Tenant Group	
E&M Trunk Group?	Yes or No
Enable Hookflash?	Yes or No
One-Way Incoming Only?	Yes or No
Music-On-Hold	Music #1 or Music #2 or Silence or Tick Tones
Day Ring-In	Single or Multiple or Hunt/UCD or DISA
	Station; Ring/Answer Pattern; Hunt Group; or DISA Code, IC Requ., & SCOS:
Stations with Day Outgoing Access	
Day Ring-In	Single or Multiple or Hunt/UCD or DISA
	Station; Ring/Answer Pattern; Hunt Group; or DISA Code, IC Requ., & SCOS:
Stations with Night Outgoing Access	
Trunks in Trunk Group	
Subject To Toll Restrict?	Yes or No
Exempt From LCR Only?	Yes or No
Equal Access?	Yes or No
Assigned Call Cost	Free Local 10-Digit Operator/International
Absorbed Digits & Digit Strings	PBX or Local Repeatable? Yes or No
	1: 2: 3: 4: 5: 6: 7: 8: 9: 10:
	11: 12: 13: 14: 15: 16: 17: 18: 19: 20:
	21: 22: 23: 24: 25: 26: 27: 28: 29: 30:
	31: 32: 33: 34: 35: 36: 37: 38: 39: 40:
	41: 42: 43: 44: 45: 46: 47: 48: 49: 50:
E&M Call Routing:	Auto Ring-In or Dial Repeating
E&M Reorder Tone:	Continuous or Burst
E&M Handshaking:	Immediate-Dial or Delayed-Dial or Wink-Start
Return Dial Tone?	Yes or No
E&M DID Digit Trans.:	

**FIGURE 5-25. TRUNK GROUPS, DID GROUPS &
RING-IN/ANSWER PATTERNS (Continued)**

Ring/Answer Patterns: Duplicate and fill out this form for each Ring/Answer Pattern.

Pattern Number	
Pattern Title	
Stations with Ring-In	
Stations with Answer Permission	

FIGURE 5-26. T1 PROGRAMMING (T1)

For ALL T1 Cards:

Thresholds:

	NUMBER/HOUR	NUMBER/DAY	NEW VALUE
BPV (Bipolar Violations)	53,360	133,400	
Controlled Slips	2	4	
CRC-6 (Cyclic Redundancy Check)	53,184	132,960	
ES (Errored Seconds)	259	648	
OOV/COFA (Out-of-frame)	7	17	
SES (Severely Errored Seconds)	40	100	
TODV (Transmit One's Density Violations)	2	4	
UAS (Unavailable Seconds)	10	10	

Dialing Feedback Configuration:

	DEFAULT VALUE	NEW VALUE
DTMF Dialing Gain:	-4 dB	
Pulse Feedback Gain:	-4 dB	
Pulse Tone Channel Number:	7	

Clock Backup: (List T1 Cards in order of system clock backups. The RCPU Card is always last.)

For EACH T1 Card: (Make copies of this chart for each T1 Card.)

Card Slot Number:	
Card Type:	D4 Superframe <i>or</i> ESF
Zero-Code Suppression:	AMI (Bit 7) <i>or</i> B8ZS <i>or</i> None
PCM Encoding Law:	Mu-to-Mu <i>or</i> Mu-to-A <i>or</i> A-to-A <i>or</i> A-to-Mu
Relay(s) Activated:	One <i>or</i> Two
CSU:	On-Board <i>or</i> DSX-1
LBO Attenuation:	
Line Length (in feet):	0-133 <i>or</i> 133-266 <i>or</i> 266-399 <i>or</i> 399-533 <i>or</i> 533-655
Clock—	
Loop Operation:	Master <i>or</i> Slave
T1 From Public Network:	Yes <i>or</i> No
Provides System Ref. Clock:	Yes <i>or</i> No

FIGURE 5-29. CALL COST (COST)

CALL COST TYPE	DEFAULT RATE	NEW RATE IN \$ PER MINUTE
Local Call	0.05	
7-Digit Toll	0.20	
10-Digit Toll	0.50	
Operator/International	1.00	
Incoming Call	0.00	

MULTIPLICATIVE FACTOR	DEFAULT RATE	NEW RATE
Evening	0.65	
Night/Weekend	0.40	

FIGURE 5-30. SMDA (SMDA)

Output port:	Serial 1 <i>or</i> Serial 2
Reporting interval: <i>Select one and fill in information.</i>	Attendant Only: Yes <i>or</i> No Daily: Time of day: Weekly: Day of week: Time of day: Monthly: Day of month: Time of day:
Format — Account Code report Summary reports Detailed reports	Clear account code data following report? Yes <i>or</i> No
	System-wide <i>or</i> Tenant <i>or</i> Tenant/Department
	<i>Select all that apply:</i> All users in tenant/dept. groups Yes <i>or</i> No Top system users Yes <i>or</i> No Top users by tenant Yes <i>or</i> No Top users by tenant/dept. Yes <i>or</i> No Rank by total cost Yes <i>or</i> No Rank by total duration Yes <i>or</i> No Rank by total number of calls Yes <i>or</i> No Number of "top" users per report:
Stations included:	
Hunt Groups included:	
Trunks included:	
Clear station/hunt/trunk data following report?	Yes <i>or</i> No

FIGURE 5-31. SMDR (SMDR)

Output port:	Serial 1 <i>or</i> Serial 2
Is Output Active?	Yes <i>or</i> No
Calls to be recorded in reports:	<i>Select all that apply:</i> All Incoming Calls Yes <i>or</i> No All Local Calls Yes <i>or</i> No All Toll Calls Yes <i>or</i> No All DISA Calls Yes <i>or</i> No All Conference Calls Yes <i>or</i> No All DID Calls Yes <i>or</i> No All Ring-In Diagnostics Yes <i>or</i> No
Suppress all absorbed digits?	Yes <i>or</i> No
Suppress all but the first toll digit?	Yes <i>or</i> No
Suppress all digits after end of dialing?	Yes <i>or</i> No
Display elapsed time in seconds?	Yes <i>or</i> No
List of stations to be included:	

FIGURE 5-32. ERROR REPORTS (ERR)

Output port:	Serial 1 <i>or</i> Serial 2
Is output active?	Y <i>or</i> N
Report all alarms [+++] ?	Y <i>or</i> N
Report all field service diagnostics [***] ?	Y <i>or</i> N
Report all engineering diagnostics [---] ?	Y <i>or</i> N
Log all SEND messages to history queue?	Y <i>or</i> N

FIGURE 5-33. PASSWORDS (PASS)

Applications Restricted Password:	
Applications Unrestricted Password:	
Monitor Restricted Password:	
Monitor Unrestricted Password:	

FIGURE 5-34. SERIAL PORT CONFIGURATION (PORT)

Serial Port 1:

Enable DSR Handshaking:	Yes or No							
Enable CTS Handshaking:	Yes or No							
Baud Rate (circle one):	110	300	600	1200	2400	4800	9600	19200

Serial Port 2:

Enable DSR Handshaking:	Yes or No							
Enable CTS Handshaking:	Yes or No							
Baud Rate (circle one):	110	300	600	1200	2400	4800	9600	19200

FIGURE 5-35. SYSTEM CONFIGURATION (CONF)

Home Area Code: _____ Time Adjustment: _____

Local Area Codes: 2 _____, 3 _____, 4 _____

SLOT	BOARD TYPE
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	
21	
22	
23	
24	
25	
26	
27	

FIGURE 5-35. SYSTEM CONFIGURATION (Continued)

TO USE: Fill in the following charts for KSC, DID, and T1C circuit programming.

KSC Circuits: Indicate whether the circuits in each board are single or dual.

KSC SLOT	CIRCUIT 1	CIRCUIT 2	CIRCUIT 3	CIRCUIT 4	CIRCUIT 5	CIRCUIT 6	CIRCUIT 7	CIRCUIT 8

IDC Circuits: Indicate whether the circuits in each board are DID or OPX.

IDC SLOT	CIRCUIT 1	CIRCUIT 2	CIRCUIT 3	CIRCUIT 4	CIRCUIT 5	CIRCUIT 6	CIRCUIT 7	CIRCUIT 8

FIGURE 5-35. SYSTEM CONFIGURATION (Continued)

T1C Circuits: Indicate whether the circuits in each board are loop start, ground start, DID, E&M, or OPX.

T1C CIRCUIT	T1C SLOT NUMBERS									
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										

TROUBLESHOOTING

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1. INTRODUCTION

1.1 This section of the manual describes the troubleshooting procedures to follow in the event of a system or station instrument malfunction. System repair is limited to replacing parts (keysets, cards, cables, disk drives, power supply modules, etc.).

2. TROUBLESHOOTING CHECKLIST

2.1 To save time, perform the troubleshooting procedures in the following order:

- (1) Check for proper light-emitting diode (LED) indications on the system status panel and on the telecommunication cards (refer to Figure 6-1 on the following pages).
- (2) Check the alarm message and field service diagnostic output (see pages 6-7 to 6-10).

- (3) Check the system voltages as outlined in INSTALLATION (see page 3-103).

- (4) Isolate the problem and refer to the appropriate troubleshooting chart (see page 6-12).

NOTE: For additional troubleshooting procedures and important diagnostic information, refer to the new *256/832 Troubleshooting/Diagnostics Manual*, which will be published at a later date. In the interim, certified technicians may contact Customer Support for any necessary troubleshooting assistance.

3. LIGHT-EMITTING DIODE (LED) INDICATIONS

3.1 LEDs on the system status panel and on the front edge of the telecommunication cards indicate specific functions. Figure 6-1 on the following pages lists the various LEDs and describes their purposes.

FIGURE 6-1. LIGHT-EMITTING DIODE (LED) INDICATIONS

LOCATION	LED	DESCRIPTION
System Status Panel	Power Alarm	Lit red when the system power supply temperature is abnormally high. Unlit when the temperature is normal.
	Major Alarm	Lit red when a major alarm has occurred. The light goes out when the problem is corrected.
	Minor Alarm	Lit yellow when a minor alarm has occurred. The light goes out when the alarm message is cleared as described in FEATURES on page 4-112.
	CPU Active	Lit green to show that the main processor is operating properly. If unlit, system needs repair.
	Disk Active	Lit or flashes green when the hard disk drive is being accessed. Unlit when the hard disk drive is inactive.
Matrix Card	Card Active	Lit green to show that the card is communicating properly with the rest of the system. If flashing, record the flash rate (1-7) and return the card for repair. If unlit, check for improper connection; if still unlit, return the card for repair.
	External Clock Active	The system is receiving clock signals from an external source (e.g., from the public network via a T1 Card).
Keyset Card	Card Active	Lit green to show that the card is communicating properly with the rest of the system. If flashing, record the flash rate (1-7) and return the card for repair. If unlit, check for improper connection; if still unlit, return the card for repair.
	Individual Circuits (1-8)	Unlit when the associated station instrument is inactive. Lit green when the instrument is connected to a voice channel (e.g., on an active call). If lit red, a data error has occurred; check the alarm message and field service diagnostic output.
Digital Keyset Card (IMX systems only)	Card Active	Lit green to show that the card is communicating properly with the rest of the system. If flashing, record the flash rate (1-7) and return the card for repair. If unlit, check for improper connection; if still unlit, return the card for repair.
	Individual Circuits (1-16)	Unlit when the associated station instrument is inactive. Lit green when the instrument is connected to a voice channel (e.g., on an active call).
Single-Line Card	Card Active	Lit green to show that the card is communicating properly with the rest of the system. If flashing, record the flash rate (1-7) and return the card for repair. If unlit, check for improper connection; if still unlit, return the card for repair.
	Individual Circuits (1-16)	Unlit when the associated station instrument is inactive. Lit green when the instrument is off hook. If lit red, return the card for repair.

FIGURE 6-1. LIGHT-EMITTING DIODE (LED) INDICATIONS (CONT'D)

LOCATION	LED	DESCRIPTION
Inward Dialing Card	Card Active	Lit green to show that the card is communicating properly with the rest of the system. If flashing, record the flash rate (1-7) and return the card for repair. If unlit, check for improper connection; if still unlit, return the card for repair.
	Individual Circuits (1-8)	Unlit when the associated station instrument or trunk is inactive. Lit green when the instrument is off hook or the trunk is in use. If lit red, return the card for repair.
Loop/Ground Start Card and Loop Start Card	Card Active	Lit green to show that the card is communicating properly with the rest of the system. If flashing, record the flash rate (1-7) and return the card for repair. If unlit, check for improper connection; if still unlit, return the card for repair.
	Individual Circuits (1-8)	Unlit when the associated trunk is inactive. Lit green when the trunk is in use. Flashes when numbers are being dialed. Flutters when a call is ringing in. If lit red, there is a problem with the trunk.
E&M Card	Card Active	Lit green to show that the card is communicating properly with the rest of the system. If flashing, record the flash rate (1-7) and return the card for repair. If unlit, check for improper connection; if still unlit, return the card for repair.
	Individual Circuits (1-4)	Unlit when the associated trunk is inactive. Lit green when the trunk is in use. Flashes when numbers are being dialed. Flutters when a call is ringing in. If lit red, there is a problem with the trunk.
T1 Card	Primary Processor Active	Lit green to show that the primary processor on the card is active and is communicating properly with the rest of the system. If flashing, record the flash rate (1-7) and return the card for repair. If unlit, check for improper connection; if still unlit, return the card for repair. NOTE: The card is not completely on-line until the Secondary Processor Active LED is also lit (see page 6-6.)
	Reference Clock	Lit green to show that the card is providing the system with the clock timing necessary to control all communication components in the system (i.e., the entire system is synchronized to the card). Unlit when another card is providing the system reference clock. NOTE: When this LED is lit on one of the T1 Cards in the system, the External Clock Active LED on the Matrix Card should also be lit.
	Individual Circuits (1-24)	Unlit when the associated T1 circuit is inactive. Lit green when the T1 circuit is in use. Flashes when numbers are being dialed. Flutters when a call is ringing in. (The order of the circuit LEDs is shown in the diagram on the following page.)

FIGURE 6-1. LIGHT-EMITTING DIODE (LED) INDICATIONS (CONT'D)

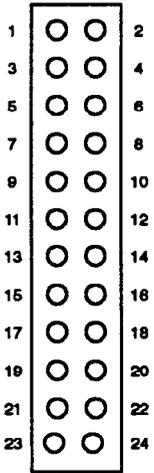
LOCATION	LED	DESCRIPTION
<p>T1 Card (continued)</p>	<p>Individual Circuits (1-10)</p>  <p>CIRCUIT LEDs</p>	<p>When the Red Alarm LED is flashing (see next page), one or more of the first ten Individual Circuit LEDs will also flash to indicate the following error condition(s):</p> <p>NOTE: Error conditions (1) and (2) below occur only when the T1 Card is not equipped with the optional on-board CSU Module. Error conditions (3) and (4) occur only when the T1 Card is equipped with the on-board CSU module.</p> <ol style="list-style-type: none"> (1) <i>Alarm 0, Receiver Loss of Signal from Network:</i> The card is not properly receiving the T1 signal from outside the system. Check for improper connection. If the problem persists, contact the T1 provider. (2) <i>Alarm 1, Transmitter Loss of Signal from T1 Card to Network:</i> The card is not properly transmitting the T1 signal to outside the system. Check for improper connection. If the problem persists, replace the card and return it for repair. (3) <i>Alarm 2, Receiver Loss of Signal from CSU:</i> The card is not properly receiving the T1 signal from outside the system. Check for improper connection. If the problem persists, contact the T1 provider. (4) <i>Alarm 3, Transmitter Loss of Signal from CSU to Network:</i> The card is not properly transmitting the T1 signal to outside the system. Check for improper connection. If the problem persists, replace the card and return it for repair. (5) <i>Alarm 4, Receiving Yellow Alarm:</i> The card is receiving a yellow alarm error condition from outside the system. Check for improper connection or wiring. If the problem persists, contact the T1 provider. (6) <i>Alarm 5, Receiving Blue Alarm:</i> The card is receiving a blue alarm error condition (also called Alarm Indication Signal [AIS]) from outside the system. Check for improper connection or wiring. If the problem persists, contact the T1 provider. (7) <i>Alarm 6, T1 Signal Out-of-Frame:</i> There is a problem with the master/slave synchronization or the framing scheme. Check database programming, and check for improper connection or wiring. If the problem persists, contact the T1 provider, or replace the card and return it for repair. (8) <i>Alarm 7, Severely Errored Seconds:</i> Indicates that one or more severe errors have been detected for at least one second. Check for improper connection or wiring. If the problem persists, contact the T1 provider, or replace the card and return it for repair. (9) <i>Alarm 8, Transmitting Blue Alarm:</i> If error conditions (1) or (3) above are detected (loss of receive signal), the card sends out a blue alarm signal. (10) <i>Alarm 9, Remote Loopback State:</i> Currently reserved for engineering diagnostic purposes only.

FIGURE 6-1. LIGHT-EMITTING DIODE (LED) INDICATIONS (CONT'D)

LOCATION	LED	DESCRIPTION
T1 Card (continued)	Red Alarm	<p>Flashes when the T1 Card has detected some type of red alarm error condition for at least two to three seconds (e.g., loss of the T1 signal), either internally or from outside the system. All calls on the card are dropped, all attendant stations display SYSTEM ALARM #29, and one or more of the first ten Individual Circuit LEDs on the card flash to indicate the exact error condition(s) (see previous page). Check the alarm message and field service diagnostic output and attempt to correct the problem. When the card receives a clean signal for 10 to 20 seconds, the Red Alarm LED is unlit and normal call processing resumes.</p> <p>NOTE: If, while the Red Alarm LED is flashing, the T1 Card detects a receive signal, it transmits a yellow alarm to outside the system. If the card detects a loss of receive signal, it transmits a blue alarm to outside the system.</p>
	Yellow Alarm	<p>Flashes when the T1 Card has detected (is receiving) a yellow alarm error condition (e.g., a red alarm error condition from outside the system or a loss of frame synchronization). If the yellow alarm condition occurs for less than two to three seconds, normal call processing continues and no calls are dropped. However, if the yellow alarm condition lasts more than two or three seconds, the card goes into a red alarm condition (see above).</p> <p>NOTE: If this LED is the only one on the card that is flashing, it may indicate a database programming inconsistency (e.g., the card is jumpered for CSU mode, while the database is programmed for DSX mode). Check the alarm message and field service diagnostic output for a programming conflict and correct the problem.</p>
	Blue Alarm	<p>Flashes when the T1 Card has detected (is receiving) a blue alarm error condition (i.e., a stream of continuous ones from outside the system). This "keep alive" signal, also called Alarm Indication Signal (AIS), is sent from the remote site when it is in a yellow or red alarm condition. If the blue alarm condition occurs for less than two to three seconds, normal call processing continues and no calls are dropped. However, if the blue alarm condition lasts more than two or three seconds, the card goes into a red alarm condition (see above).</p>

FIGURE 6-1. LIGHT-EMITTING DIODE (LED) INDICATIONS (CONT'D)

LOCATION	LED	DESCRIPTION
T1 Card (continued)	Secondary Processor Active	<p>Lit green to show that the secondary processor on the card is active and that the entire card is now on-line. If unlit after the card has been powered up over 30 seconds, check for improper connection; if still unlit, return the card for repair.</p> <p>NOTE: After the Primary Processor Active LED is lit (see page 6-3), the Secondary Processor on the card performs a self-test that takes approximately 30 seconds. After successful completion of the self-test, the Secondary Processor Active LED is then lit.</p>
	Secondary Processor Halted	<p>Lit red to show that the card has detected an unrecoverable error and has halted the secondary processor. Although the card's Primary Processor may still be active, the card will not function properly; return the card for repair.</p>

4. ALARM MESSAGES, FIELD SERVICE DIAGNOSTICS, AND POWER-UP STATUS MESSAGES

4.1 Alarm messages can be programmed to appear on keyset displays, in the SMDR printout, or as a separate error printout. When listed in a printout, alarm messages are preceded by +++ and the time of day when the alarm occurred.

4.2 Minor alarm messages can be programmed to appear on all attendant stations' displays or on the primary attendant's display only. Refer to PROGRAMMING, page 5-67, for designating which attendant(s) will receive minor alarm messages. Major alarm messages will appear on all display keysets, regardless of programming.

4.3 Possible alarm messages and the associated troubleshooting procedures are outlined in the following sections.

A. MINOR ALARMS THAT ARE USER CORRECTABLE

- (1) **#01 EXT XXXX — Station Off-Hook:** The indicated station is off hook and the Inactivity Alarm timer has expired. (The station's display shows STATION OFF HOOK, and the station's associated key on DSS/BLF Units and other keyset speed-dial keys flutters continuously.) Locate the station and place the handset back in its cradle — the alarm clears automatically.
- (2) **#02 SMDR Print Timeout, #03 Error Print Timeout, and #04 SMDA Print Timeout:** The indicated printer is not working properly (the cable may be loose, or the printer may be out of paper or ribbon).

B. MINOR ALARMS REQUIRING ATTENTION FROM SERVICE PERSONNEL

NOTE: Before replacing any major hardware components, use the save/restore program to save the customer's database (see page 5-168 in PROGRAMMING). The saved database can then be restored if necessary.

- (1) **#10 EXT XXXX — Excessive Data Errors:** Check the operation of the indicated keyset. The error may be caused by a defective keyset (perform keyset self-test), defective wiring (check wiring), defective station cable, or a defective Keyset Card.

- (2) **#11 Write Protect Circuit Fail:** The circuitry that prevents the software from accidentally writing to the database is no longer functioning. The Pro68/Pro68E Card, HDLC Card, or Pro68-to-HDLC interface cable may be defective.
- (3) **#15 Watchdog Interrupt Inop.:** The watchdog interrupt function is inoperative. It will not be able to detect a loop and allow the system to recover. Re-enable the "watchdog" timer by removing the jumper strap on the HDLC Card and reconnecting the system status panel cable. If the alarm message persists, contact Customer Support.
- (4) **#16 Background Detected Timer Fail:** The interval timer is inoperative. Contact Customer Support and report the circumstances under which the alarm message occurred.
- (5) **#17 Watchdog Timeout in Minor Init:** The watchdog function has timed out during an attempted initialization. Contact Customer Support and report the circumstances under which the alarm message occurred.
- (6) **#21 EXT XXXX-Excessive Hardware Failures:** Replace or repair the indicated station's cabling and/or replace the station card or station instrument.
- (7) **#26 Power Supply Alarm:** The main and/or expansion power supply is generating abnormally high heat, or the expansion power supply is turned off. If overheating, check the fans in the power supply chassis or replace any defective modules.
- (8) **#27 PC Hard-Drive Error:** The hard disk drive is defective. Replace the hard disk drive and return it for repair.
- (9) **#28 Expansion Board Went Off-Line:** The system has detected an "off-line" alarm condition for the Expansion Card. This alarm occurs when the expansion power supply is turned off, the Expansion Card is removed while power is on, or when the Expansion Card is defective. If necessary, replace the Expansion Card and return it for repair.
- (10) **#29 T1 Line In Trouble Or Off-Line:** A T1 Card has encountered a red alarm error condition and all calls on the card have been dropped. Check the alarm message and field service diagnostic output and attempt to correct the problem.

- (11) **#30 Toll Security Feature Expired:** The Weekly Toll Limit feature is no longer in effect. It can be re-enabled only by Inter-Tel Services personnel.
- (12) **#31 Toll Security Limit Exceeded:** The weekly limit for one or both types of monitored calls is 100% depleted. The programmer can set the limit to a higher value or reset it to zero. (When this alarm is displayed, any further alarms will not overwrite the display.)
- (13) **#32 Toll Security Data Changed:** The weekly toll limit information has been changed in the database.
- (14) **#33 DISA Security Limit Exceeded:** A DISA caller has entered an invalid password three consecutive times. The incoming DISA trunk is disconnected and will not answer again for five minutes.
- (15) **#34 Toll Security Limit At 80%:** The weekly limit for one or both types of monitored calls is 80% depleted. The programmer can set the limit to a higher value or reset it to zero. (When this alarm is displayed, any further alarms will not overwrite the display.)

C. MAJOR ALARMS THAT REQUIRE IMMEDIATE ATTENTION

4.4 If a major alarm is detected by the system, the red **MAJOR ALARM LED** on the system status panel will light. When a major alarm occurs, do the following:

- (1) Attempt to reset the system by using the reset switch on the front of the Matrix Card or the HDLC Card or by using the programming terminal (refer to **PROGRAMMING**, page 5-168). If the system does not recover from the alarm, continue to the next step.
- (2) Turn **OFF** the **AC POWER** for at least ten seconds and then turn it **ON** again.
- (3) If the system still does not recover from the alarm, check the system voltages as outlined in **INSTALLATION** on page 3-103. Using the troubleshooting charts beginning on page 6-12, try to isolate the defective part(s).

NOTE: When returning a faulty part, indicate all applicable error messages on the material return authorization (MRA) tag.

D. FIELD SERVICE DIAGNOSTICS

4.5 Field service diagnostics can be programmed to appear in the SMDR printout or as a separate error printout. When listed in a printout, field service diagnostics are preceded by *** and the time of day when the error message occurred. Possible field service diagnostics and the associated troubleshooting procedures are as follows:

- (1) **HDLC Errors: ?? XX:** This indicates a hardware problem in error handling. Contact Customer Support and report the error message and the circumstances under which it occurred.
- (2) **Card: Type Number — Inserted, Passed Init:** This indicates successful detection and initialization of the card. No action is necessary.
- (3) **Card: Type Number — Removed:** This indicates removal of the card. No action is necessary.
- (4) **STNA: X.Y [K/D1]:** The system has detected or received an error from a DKSC/KSC device (keyset, DSS/BLF Unit, or Attendant Computer Console). The possible accompanying error messages are:
 - a. **RTT Detected Transmission Error:** The system has detected a transmission error from a keyset, DSS/BLF Unit, or Attendant Computer Console. This message may occur when the line cord is removed from a keyset, DSS/BLF Unit, or Attendant Computer Console and when the 25-pair cable is removed from a Keyset Card. In these cases, no action is required. However, if the error message occurs repeatedly for a DKSC/KSC circuit or a group of DKSC/KSC circuits for which the line cord(s) or the station cable is not being removed, all station cabling and wiring should be checked. If the problem persists, replace the station instrument and/or the Keyset Card and return for repair.
 - b. **?? XX:** The system has detected an invalid data byte from a keyset, DSS/BLF Unit, or Attendant Computer Console. This message may occur when the line cord is removed from a keyset, DSS/BLF Unit, or Attendant Computer Console and when the 25-pair cable is removed from a Keyset Card. In these cases, no action is required. However, if the error occurs repeatedly for a DKSC/KSC circuit or a group of DKSC/KSC circuits for which the line cord or the station cable is not being removed, all station cabling and wiring should be checked. If the problem persists, replace the station instrument and/or the Keyset Card and return for repair.
 - c. **RTT Detected No-Response Error:** The system has detected a lack of response from a keyset, DSS/BLF Unit, or Attendant Computer Console. This message generally indicates a hardware problem. Check all station cabling and wiring. If the problem persists, replace the station instrument and/or the Keyset Card and return for repair.
 - d. **Reconfigure Request:** The system has detected a temporary transmission problem from a keyset, DSS/BLF Unit, or Attendant Computer Console. If this error message occurs only intermittently, no action is necessary. However, if the error occurs repeatedly for a DKSC/KSC circuit or a group of DKSC/KSC circuits, check all station cabling and wiring. If the problem persists, replace the station instrument and/or the Keyset Card and return for repair.
 - e. **Spurious Interrupt:** The indicated device has undergone a reset. The reset may have been caused by electrostatic shock or electromagnetic interference in the vicinity of the station instrument. If this error message occurs only intermittently, no action is necessary. However, if the error occurs repeatedly for a DKSC/KSC circuit or a group of DKSC/KSC circuits, check all station cabling and wiring. If the problem persists, replace the station instrument and/or the Keyset Card and return for repair.
 - f. **RTT Detected OMSCI Hardware Error:** The system has detected a faulty DKSC/KSC circuit. Replace the faulty Keyset Card and return it for repair.
 - g. **Inconsistency Error:** The system has detected inconsistent communication with a keyset, DSS/BLF Unit, or Attendant Computer Console. If this error message occurs only intermittently, no action is necessary. However, if the error occurs repeatedly for a DKSC/KSC circuit or a group of DKSC/KSC circuits, check all station cabling and wiring. If the problem persists, replace the station instrument and/or the Keyset Card and return for repair.
 - h. **Peripheral Detected Xmit Error:** A keyset, DSS/BLF Unit, or Attendant Computer Console has detected a transmission error from the system. If this error message occurs only

intermittently, no action is necessary. However, if the error occurs repeatedly for a DKSC/KSC circuit or a group of DKSC/KSC circuits, check all station cabling and wiring. If the problem persists, replace the station instrument and/or the Keyset Card and return for repair.

- i. **Peripheral Output Queue Overflow:** This indicates that the station user is pushing the keys on the station instrument at an unreasonably fast rate. If this error message occurs only intermittently, no action is necessary. However, if the error occurs repeatedly, the station user should be instructed to avoid pushing the station instrument keys so rapidly.
- j. **Lamp Software Error:** This message indicates a problem with the software. Freeze the CP history queue and notify Customer Support of the error message. Reset the identified station instrument to attempt to clear the problem.
- k. **Error Message Lost:** This indicates that DKSC/KSC error messages might have been lost. No action is necessary.
- l. **State Error:** This message indicates that the peripheral processor's RAM code has been corrupted. The indicated card should be reset (unplugged, then re-inserted). Notify Customer Support of this error message along with any prior error messages.
- m. The following errors indicate a problem with a keyset, DSS/BLF Unit, or Attendant Computer Console. When these errors occur, replace the faulty device and return it for repair.

Peripheral Watchdog Timeout
Peripheral Trap Error
Peripheral Timer Error
Peripheral SWI Error
Peripheral TDRE Error
- n. **VX** — This message may appear when a DKSC/KSC device is connected to a Keyset Card and when the system is powered up. The

message indicates the station version number sent to the system. If the message reads "V0", no action is necessary. If the message reads anything other than "V0", the DKSC/KSC device is not functioning properly and must be replaced.

- (5) The following messages indicate minor software errors. Although they detect inconsistent operation, they generally do not warrant a system reset. If any of these messages should occur, note the circumstances under which they occurred and contact Customer Support.

Invalid Input>Keyset: XX State: XXX Input: XX
Invalid Input>Keyset: XX State: XXX Timer No.: XX
Invalid Input>Line: XX State: XXX Input: XX
Invalid Input>Line: XX State: XXX Timer No.: XX
Cancel Timer Not Found = \$XX Device = \$XXXX
Invalid Error Message: Task

- (6) **Single User Abort: Device Type = TTTTTT Device Number = \$XX:** This message indicates that a minor software reset has occurred concerning the indicated device. Note the circumstances under which the message occurred and contact Customer Support.
- (7) **Last CP/CO History Freeze and Last CP/CO History Un-Freeze:** By themselves, these messages do not indicate any errors. They are printed to indicate when the last freeze and unfreeze of the CP and CO history queues took place. They should be reported along with the accompanying error messages.
- (8) **XX Requests For A DTMF Receiver Failed In The Last Six Hours Due To All DTMF Receivers Being Used:** If this message occurs frequently, additional DTMF decoders should be installed on the Matrix Card and/or the Expansion Card. (See pages 2-15 and 2-16 for additional information.)
- (9) **Any other error messages:** Note the circumstances under which the message(s) occurred and contact Customer Support.

NOTE: When returning a faulty station instrument or card, indicate all applicable error messages on the material return authorization (MRA) tag.

E. POWER-UP STATUS MESSAGES

4.6 When the system power is turned on, it should follow the power-up process described on page 3-85 in INSTALLATION. However, if the system does not power up properly, the status message displayed on the programming monitor can sometimes be used to isolate the problem. Some possible failed power-up messages and the associated troubleshooting procedures are as follows:

- (1) **HDLC Error: The MXC-HDLC cable is disconnected or the telecom card cage has no power.** This indicates that the HDLC controller has detected an external interrupt. Check to see that the Matrix Card is properly seated. The problem could also be a defective HDLC-to-MXC interface cable or a defective power supply module.

- (2) If the system stops before completing the entire power-up process, one of the messages listed below may be displayed. If so, check to see that the Pro68 Card and the HDLC Card are properly seated. The problem could also be a defective Pro68-to-HDLC interface cable, a defective Pro68 Card, or a defective HDLC Card. If the problem cannot be corrected, record the status message and contact Customer Support.

Pre-Initialization
Preliminary RAM Test
Preliminary Initialization
Write-Protect RAM Test
Performing Self-Tests
Common OS Data Initialization
System Task Data Initialization
Posting Messages To User Tasks
Minor Initialization Complete
Major Initialization Complete

5. TROUBLESHOOTING CHARTS

NOTE: For additional troubleshooting procedures and important diagnostic information, refer to the new *256/832 Troubleshooting/Diagnostics Manual*, which will be published at a later date. In the interim, certified technicians may contact Customer Support for any necessary troubleshooting assistance.

5.1 The simplified troubleshooting charts located on the following pages list symptoms, possible causes, and corrective actions for problems. Look up the problem in the appropriate chart and perform the corrective actions in the order given. The troubleshooting procedures for correcting equipment failures have been divided into six categories:

- A. System
- B. CO Trunks
- C. Features
- D. Keysets
- E. Single-Line Sets
- F. DSS/BLF Units

NOTE: Throughout the troubleshooting section of the manual, there are numerous references to replacing the defective part and returning it for repair. However, before returning any part, proper troubleshooting procedures should be used to verify that the part is actually defective. For example, if a Keyset Card (DKSC, KSC, or KSC-D) appears to be defective, swap it with a "known good" card presently installed in the system. If the problem follows the suspect card, it can be considered defective. For more information on returning defective equipment, refer to page 6-41.

A. SYSTEM

5.2 If the problem involves one of the following system features, refer to Figure 6-2 on pages 6-14 through 6-17.

- Repeated occurrence of all calls in progress dropping.
- All keysets are inoperative.
- DISA is inoperative.
- Unable to interface with a computer call-up device.
- The time of day is inaccurate.
- No music-on-hold/background music.
- RFI/EMI present over conversations.
- Faulty DID numbers displayed at attendant stations.

B. CO TRUNKS

5.3 If the problem involves one of the following CO trunk symptoms, refer to Figure 6-3 on pages 6-18 through 6-23.

- CO trunk inoperative throughout the system.
- Cannot obtain CO dial tone.
- Low volume on all CO trunks.
- Cannot break CO dial tone.
- Cannot place an outgoing call.
- Other station conversations can be heard on the CO trunk.
- Calls are dropped during conversation or when answered.
- CO trunk cannot be reseeded.
- Noise on CO trunk at all stations.
- CO trunk remains seized after the call is ended.
- Ground start trunks not functioning properly.

C. FEATURES

5.4 For problems involving the following features, refer to Figure 6-4 on pages 6-24 to 6-29.

- Feature does not appear to work properly.
- Cannot transfer CO or intercom calls to other stations.
- Cannot transfer calls to outside numbers.
- Cannot transfer incoming CO calls or place them on hold.
- Cannot initiate a conference.
- Redial feature is inoperative.
- Cannot initiate an internal page.
- Cannot initiate an external page.
- House phone is inoperative.
- Cannot initiate a call forward.
- Calls do not follow requested forward.
- Station is not receiving hunt group calls.
- Station is not receiving pages.
- Call privacy release inoperative.
- Station cannot be placed in do-not-disturb.
- Automated attendant inoperative.
- SMDA reports not generated automatically and/or cannot be generated using the attendant feature code.

D. KEYSETS

5.5 If problems involve keysets or their optional equipment, refer to Figure 6-5 on pages 6-30 through 6-35.

- Keyset is inoperative.
- A group of keysets is inoperative.
- LCD is inoperative.
- Headset is inoperative.
- Keyset squeals when placing and/or receiving calls.
- Cannot break CO dial tone.
- Data device not operating properly.
- Data noise when the keyset is off hook.
- Cannot obtain intercom dial tone.
- Cannot break intercom dial tone.
- Cannot place an intercom call.
- Cannot place a call using the speakerphone on a digital keyset.
- LRA not operating properly.
- Cannot receive off-hook voice announce calls.
- Cannot place off-hook voice announce calls.
- Erratic keyset operation.

E. SINGLE-LINE SETS

5.6 The following problems are discussed in Figure 6-6 on pages 6-36 through 6-38.

- Single-line set is inoperative.
- A group of eight or 16 single-line sets is inoperative.
- Single-line set will not ring.
- Ring trip is not provided to a group of eight or 16 single-line sets.
- AC ringer-equipped single-line sets will not ring.
- Cannot obtain intercom dial tone.
- Cannot place an intercom call.
- Cannot break CO dial tone.
- Cannot place off-hook voice announce calls.
- Single-line sets not receiving message waiting indications and/or message lamps not functioning properly.

F. DSS/BLF UNITS

5.7 For DSS/BLF Unit problems, refer to Figure 6-7 on pages 6-39 and 6-40.

- DSS/BLF Unit is inoperative.
- Incorrect LED indications.
- Calls are transferred to the wrong station.
- Cannot place immediate off-hook voice announce calls.

FIGURE 6-2. SYSTEM TROUBLESHOOTING CHART

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
Repeated occurrence of all calls in progress dropping	AC line is not isolated and dedicated	Have isolated, dedicated line installed. Refer to page 3-4 in INSTALLATION for details.
	Defective power supply module(s)	Refer to INSTALLATION, page 3-55, to perform the power supply electrical test. Replace the power supply module(s) if faulty.
	Equipment cabinet located near a strong magnetic field or other potential source of interference (copy machines, power transformer, etc.)	Relocate the equipment cabinet a minimum of 20 feet from any equipment that is a potential source of interference.
	IC-CO/CO-CO Disconnect timer(s) need(s) adjustment	See <i>dialed digits</i> field in SMDR, page 4-124 in FEATURES. Set timer(s) to a higher value. Refer to PROGRAMMING, page 5-77.
	Inter-Ring Silence timer value is set too short	Ensure timer value is set longer than the central office ringing is "off." See PROGRAMMING, page 5-77.
	Defective MXC or EXP Card	Refer to page 3-103 to test the system voltages. Replace the card(s) if faulty.

NOTE: The central office must provide a minimum of 20mA loop current.

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
All keysets in the system are inoperative; no LED indication when a trunk or call key is pressed; +30.5 ±0.9VDC measurement (as described on page 3-103) is not present (+30VDC LED on the MXC is off)	Open or loose connection in the cable between the power supply and the Telecom Motherboard, or a defective cable	Turn off the AC power. Check to see that the Telecom Motherboard power cable is properly connected. Repair or replace the power supply, the cable, and/or the Telecom Motherboard if the connection is faulty.
	Defective power supply module or connector	Use a voltmeter to check the +30VDC voltage at the power supply terminals. If the voltage is not +30.5 ±0.9VDC, replace the 30V Module, the power supply chassis, and/or the cable.
	Defective DKSC/KSC	Remove all DKSC/KSCs from the equipment cabinet. Replace the DKSC/KSCs one at a time and check the system voltages on the MXC or EXP Card (refer to page 3-103), until the defective card is isolated. Replace the faulty card.
	Defective Telecom Motherboard	Check the system voltages on the MXC or EXP Card (refer to page 3-103). Replace the Telecom Motherboard if necessary.

FIGURE 6-2. SYSTEM TROUBLESHOOTING CHART (CONT'D)

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
DISA inoperative	User error	Refer to FEATURES, page 4-38, for correct procedures.
	Telephone not compatible	User must dial in from a DTMF telephone.
	Programming error	Ensure that the trunk group is identified correctly as a day or night DISA trunk group. Refer to PROGRAMMING, page 5-111.
	Defective trunk card	Replace the defective card(s).
	Defective MXC or EXP Card	Refer to page 3-103 to test the system voltages. Replace the card(s) if faulty.

NOTE: Due to the natural characteristics of the CO trunk, the volume level of DTMF tones transmitted over the trunk may be substantially reduced before reaching the 416/832 System. This natural degradation in tone volume may adversely affect the reliability of the DISA feature. Other factors which can affect DISA performance are CO trunk noise and the quality and strength of the DTMF tones generated by the off-premises phone itself.

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
Unable to interface with computer call-up device (banking machine, answering machine, auto dialer, etc.)	Equipment being called is defective	Ensure that the called equipment is functioning correctly.
	DTMF digit duration/pause specifications of called equipment is incompatible with 416/832 System	Check with the equipment manufacturer for DTMF digit duration/pause specifications. Adjust DTMF Digit Duration/Pause timer. (Refer to page 5-77 in PROGRAMMING.) Default value is 6/100 second.
	CO trunk is designated for dial-pulse signaling	CO trunk must be designated as DTMF. Refer to page 5-103 in PROGRAMMING.
	Defective trunk card	Replace the associated trunk card.
	Defective MXC or EXP Card	Refer to page 3-103 to test the system voltages. Replace the card(s) if faulty.

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
The time of day displayed on keyset LCDs, printed on SMDA reports, etc. is inaccurate	The clock on the PC Motherboard, which controls the system clock functions, is out of tolerance or defective	If the system clock is gaining or losing <i>less</i> than ten minutes a week, the time can be adjusted automatically through database programming. (See PROGRAMMING, page 5-172, for details.) If the system clock is gaining or losing <i>more</i> than ten minutes a week, replace the PC Motherboard.

FIGURE 6-2. SYSTEM TROUBLESHOOTING CHART (CONT'D)

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
No music-on-hold/back-ground music (external music source connected)	External music source turned off or inoperative	Check the external music source for proper operation. Optimal input level is .775VRMS (0dB). Refer to INSTALLATION, page 3-142.
	Matrix Card MOH jumper strap(s) not in proper position (no MOH, but back-ground music is operative)	Move the music-on-hold jumper strap(s) on the MXC to the ON position.
	Defective cable between music source and MXC	Repair or replace the cable. Check to see that the proper connector was used. Refer to SPECIFICATIONS, page 2-14.
	Defective MXC	Replace the MXC.

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
RFI/EMI present over conversations	AC power source or grounding incorrect	Verify that the AC circuit is isolated and dedicated (see page 3-4 in INSTALLATION) and check for proper grounding (see page 3-54 in INSTALLATION).
	Grounding point is source of RFI/EMI	While the system is running on AC power, temporarily remove the grounding wire to determine if it is the source of the RFI/EMI. See page 3-54 in INSTALLATION for proper grounding requirements.
	AC power source is causing RFI/EMI	If an external battery back-up power source is installed, switch system operation to battery back-up power by unplugging the power source's AC power cord (with grounding wire connected to equipment cabinet). If RFI/EMI stops, the AC power source is the cause. Install an RFI/EMI filter or equivalent on the AC outlet.

NOTE: For further RFI/EMI troubleshooting assistance *while on site*, certified technicians should contact Customer Support with the following information:

1. Modulation — AM, FM, or other
2. Frequency of the interfering station (in Hz)
3. Broadcast power
4. Distance between equipment cabinet and broadcast antenna
5. Who hears RFI:
 - Outside call — inside party only?
 - Outside call — outside party only?
 - Outside call — both parties?
 - Intercom call — one or both parties?
6. Type of instrument(s) on which RFI is heard — Standard Digital Keyset, Executive Digital Keyset, IMX 24-line keyset, IMX 24-line AIM keyset, IMX 12-line keyset, IMX 12-line AIM keyset, IMX 8-line keyset, IMX 8-line AIM keyset, Inter-Tel/DVK 24-line keyset, Inter-Tel/DVK 12-line keyset, Inter-Tel/DVK 8-line keyset, GMX 24-line keyset, GMX 12-line keyset, GX 24-line keyset, ESLS, SLI, or single-line DTMF set

FIGURE 6-2. SYSTEM TROUBLESHOOTING CHART (CONT'D)

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
Faulty DID numbers displayed at attendant stations	User error (after dialing the correct 3- or 4-digit "base" number, the user entered incorrect or incomplete "start" digits)	Only valid DID "start" digits can be properly processed by the system.
	Programming error	Ensure that all valid DID numbers have been programmed to ring in to the appropriate locations. (See page 5-107 in PROGRAMMING.)
	Defective DID trunk from central office (the system is receiving incomplete or mutilated DID "start" digits)	At the IDC block, remove the bridging clips for the trunk. On the system side of the block, use a test set to verify the DID trunk connection and the system's ability to accept and process valid digits. Also, move the trunk to a known good IDC circuit. If the problem follows the trunk, contact the telephone company.
	Defective IDC Card	Replace the associated IDC Card.

FIGURE 6-3. CO TRUNK TROUBLESHOOTING CHART

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
CO trunk inoperative throughout the system	Defective CO trunk from central office	At the associated CO block, remove the bridging clips for the trunk. On the telco side of the block, use a test set to verify the CO trunk connection. Also, move the CO trunk to a known good CO circuit. If the problem follows the trunk, contact the telephone company.
	Trunk is dedicated to a secondary carrier requiring an access code	Verify the type of CO trunk. Instruct users to dial access code if required.
	Defective cabling or mis-wired amphenol connector on the trunk card	Using a test set, ensure presence and correct location of the CO trunk at the associated CO block.
	Programming error	Ensure that the trunk is assigned to the correct trunk group and stations have been given access to it. See page 5-109 in PROGRAMMING.
	Trunk has been taken out of service by the attendant	Place the trunk back in service. Refer to FEATURES, page 4-113, or page 5-149 in PROGRAMMING.
	Defective trunk card	Replace the associated trunk card.
	Defective MXC or EXP Card	Refer to page 3-103 to test the system voltages. Replace the card(s) if faulty.

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
Cannot obtain CO dial tone	If reorder tone is heard, programming error	Ensure that the keyset has outgoing access. Refer to page 5-34 in PROGRAMMING. Check to see if the keyset is programmed for LCR only. Refer to page 5-42 PROGRAMMING. If so, check LCR programming, page 5-98 in PROGRAMMING. Ensure trunk is assigned to the correct trunk group. Refer to page 5-109 in PROGRAMMING.
	If progress tone is heard, user error	System is programmed to expect a forced account code. Refer to PROGRAMMING, page 5-32.
	Defective trunk card	Replace the associated trunk card.
	Defective MXC or EXP Card	Refer to page 3-103 to test the system voltages. Replace the card(s) if faulty.

FIGURE 6-3. CO TRUNK TROUBLESHOOTING CHART (CONT'D)

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
Low volume on all CO trunks; cannot break CO dial tone	Defective trunk card	Measure -12VDC at the MXC or EXP Card test points. (See page 3-103.) If it is not within tolerance, remove all trunk cards and check voltage again. If the voltage returns to normal, replace the cards one at a time until the defective card is isolated and replaced.
	Defective CO trunk from central office	At the CO block, remove the bridging clips for the trunk. On the telco side of the block, use a test set to verify the CO trunk connection. Also, move the CO trunk to a known good CO circuit. If the problem follows the trunk, contact the telephone company.
	Open or loose connection in the cable between the power supply and cardfile	If, with all trunk cards removed, the -12VDC is still not within tolerance, turn off the system and check the cable and connector with an ohmmeter. Replace or repair the faulty cable.
	Defective power supply module(s)	With all trunk cards removed, measure -12VDC at the power supply connector(s). If not within tolerance, replace the power supply module(s).
	Hybrid balance mismatch	Select the balance network — ideal, loaded, or unloaded — that best matches the trunk's impedance. See PROGRAMMING, page 5-148.

NOTE: See also keyset problems on page 6-32.

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
Cannot break CO dial tone	CO circuit is programmed for wrong signaling type	Ensure that CO trunk and CO circuit use same type signaling (DTMF or dial pulse). See PROGRAMMING, page 5-103.
	Defective CO trunk from central office	At the CO block, remove the bridging clips for the trunk. On the telco side of the block, use a test set to verify the CO trunk connection. Also, move the CO trunk to a known good CO circuit. If the problem follows the trunk, contact the telephone company.
	Timer error	If trunk is DTMF, the DTMF Digit Duration/Pause timer setting may not be compatible with the trunk. See PROGRAMMING, page 5-77.
	Defective trunk card	Replace the associated trunk card.
	Defective MXC or EXP Card	Refer to page 3-103 to test the system voltages. Replace the card(s) if faulty.

NOTE: See also keyset problems on page 6-32.

FIGURE 6-3. CO TRUNK TROUBLESHOOTING CHART (CONT'D)

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
Cannot place an outgoing call; CO dial tone is present; intercom works	Programming error	Check station class of service (SCOS). See PROGRAMMING, page 5-42. Check that equal access and absorbed digit programming for the trunk group are correct. See PROGRAMMING, page 5-113. If using LCR, check LCR programming on page 5-98 in PROGRAMMING.
	Defective CO trunk from central office	At the CO block, remove the bridging clips for the trunk. On the telco side of the block, use a test set to verify the CO trunk connection. Also, move the CO trunk to a known good CO circuit. If the problem follows the trunk, contact the telephone company.
	Defective station instrument	Replace the station instrument and/or perform the keyset self-test as outlined in INSTALLATION, pages 3-107, 3-116, or 3-128.
	Defective trunk card	Replace the associated trunk card.
	Defective MXC or EXP Card	Refer to page 3-103 to test the system voltages. Replace the card(s) if faulty.

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
Other station conversations can be heard on the CO trunk (crosstalk)	Defective CO trunk(s)	Isolate the trunk(s) with crosstalk by removing the bridging clips from the CO block. On the telco side of the block, attach a test set to each trunk and check for crosstalk. If present, contact the telephone company.
	Defective cabling or mis-wired amphenol connector on the trunk card	Using a test set, ensure presence and correct location of the CO trunk at the associated CO block.
	Defective station card	Replace the associated station card.
	Defective trunk card	Replace the associated trunk card.
	Defective MXC or EXP Card	Refer to page 3-103 to test the system voltages. Replace the card(s) if faulty.

FIGURE 6-3. CO TRUNK TROUBLESHOOTING CHART (CONT'D)

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
Outside calls dropped during conversation or upon answering CO trunk	User error (trunk key being pressed after initial connection is made)	Instruct users not to press the trunk key while on a call. Or, if necessary, set the CO Reseize timer to a higher value. Default value is 3 seconds. See page 5-77 in PROGRAMMING. Or, program the station to disallow CO reseize. See PROGRAMMING, page 5-30.
	Defective CO trunk from central office	At the CO block, remove the bridging clips for the trunk. On the telco side of the block, use a test set to verify the CO trunk connection. Also, move the CO trunk to a known good CO circuit. If the problem follows the trunk, contact the telephone company.
	Insufficient loop current supplied by central office	Central office must supply 20mA minimum loop current.
	IC-CO Disconnect timer value is set too short	Ensure timer value is long enough to ignore normal interruptions in CO loop current. Default value is 0.6 seconds. See page 5-77 in PROGRAMMING.
	Inter-Ring Silence timer value is set too short	Ensure timer value is set longer than the central office ring signal is "off." Refer to PROGRAMMING, page 5-77.
	Defective station instrument	Replace the station instrument and/or perform the keyset self-test as outlined in INSTALLATION, pages 3-107, 3-116, or 3-128.
	Defective trunk or station card	Replace the associated card.
	Defective MXC or EXP Card	Refer to page 3-103 to test the system voltages. Replace the card(s) if faulty.

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
CO trunk cannot be reseized	CO Reseize feature is disabled	Check station programming as described on page 5-30 in PROGRAMMING. If the CO reseize option has been disabled, the user cannot reseize a trunk until it has been disconnected by hanging up or pressing another trunk key.
	CO Reseize timer is set too high	Set the timer to a lower timer value. Default value is 3 seconds. See page 5-77 in PROGRAMMING.

FIGURE 6-3. CO TRUNK TROUBLESHOOTING CHART (CONT'D)

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
Noise on CO trunk at all stations	Defective CO trunk	At the CO block, remove the bridging clips for the trunk. On the telco side of the block, use a test set to verify the CO trunk connection. Also, move the CO trunk to a known good CO circuit. If the problem follows the trunk, contact the telephone company.
	Defective trunk card	Replace the associated trunk card.
	Defective power supply module(s)	Refer to INSTALLATION, page 3-55, to perform the power supply electrical test. Replace the power supply module(s) if faulty.
	Defective MXC or EXP Card	Refer to page 3-103 to test the system voltages. Replace the card(s) if faulty.

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
CO trunk remains seized after a call has been ended	Characteristic of some ESS central offices	Central office must provide disconnect signal. Or, install a trunk release module available from most supply houses.
	IC-CO or CO-CO Disconnect timer value set too long	Central office disconnect signal was not detected by IC-CO or CO-CO Disconnect timer. Default value of the IC-CO timer is 0.6 seconds; the CO-CO timer is 0.35 seconds. See page 5-77 in PROGRAMMING.
	Defective CO trunk	At the CO block, remove the bridging clips for the trunk. On the telco side of the block, use a test set to verify the CO trunk connection. Also, move the CO trunk to a known good CO circuit. If the problem follows the trunk, contact the telephone company.
	Defective station instrument	Replace the station instrument and/or perform the keyset self-test as outlined in INSTALLATION, pages 3-107, 3-116, or 3-128.
	Defective trunk card	Replace the associated trunk card.
	Defective MXC or EXP Card	Refer to page 3-103 to test the system voltages. Replace the card(s) if faulty.

FIGURE 6-3. CO TRUNK TROUBLESHOOTING CHART (CONT'D)

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
Ground start trunks not functioning properly	System not properly grounded	Verify that the system AC circuit is isolated and dedicated (see page 3-4 in INSTALLATION) and check for proper grounding (see page 3-54 in INSTALLATION).
	LGC jumper straps not set correctly	For each ground start circuit, both corresponding LGC jumper straps must be set in the GS position. If the strap settings are mixed, or if one or both of the straps is missing, the circuit will not function properly. Also, when setting the straps, note the unique ordering of the LGC circuits as shown in INSTALLATION on page 3-97.
	Tip and ring are reversed	At the CO block, check to make sure that tip and ring are not reversed. See INSTALLATION, page 3-14. Unlike loop start trunks, ground start trunks are polarity sensitive.
	Programming error	Ensure that the trunks are identified correctly as ground start trunks. Refer to PROGRAMMING, page 5-103.
	60Hz AC power is getting onto the trunks	Use a voltmeter to check the AC voltage between tip and earth ground while the trunks are connected to an LGC. If more than 5V (RMS) are measured, there is AC power contamination (e.g., due to faulty wiring insulation). Locate and remove the source of AC power contamination.

FIGURE 6-4. FEATURE TROUBLESHOOTING CHART

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
Feature does not work properly	User error	Refer to FEATURES for procedures. Also, ensure that the feature is available on the software package installed.
	Programming error	Check feature code programming. Refer to PROGRAMMING, page 5-58. Also, check user-programmable feature key programming. Refer to FEATURES, page 4-51, and PROGRAMMING, page 5-44.
	Defective station instrument	Replace the station instrument and/or perform the keyset self-test as described in INSTALLATION, pages 3-107, 3-116, or 3-128.
	Defective station card	Replace the associated station card.
	Defective MXC or EXP Card	Refer to page 3-103 to test the system voltages. Replace the card(s) if faulty.

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
Cannot transfer CO or intercom calls to other stations	User error (e.g., wrong feature code)	Refer to FEATURES, page 4-70, for procedures.
	Called station is in do-not-disturb	A station in do-not-disturb cannot receive transferred calls.
	Call transferred to an illegal intercom number	Use only valid intercom numbers.
	Called station is in a different tenant group and cross-tenant traffic is denied	To allow such transfers (if desired), place the two stations in the same tenant group or allow cross-tenant traffic. See PROGRAMMING, page 5-67.
	Defective station instrument	Replace the station instrument and/or perform the keyset self-test as described in INSTALLATION, pages 3-107, 3-116, or 3-128.
	Defective MXC or EXP Card	Refer to page 3-103 to test the system voltages. Replace the card(s) if faulty.

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
Cannot transfer calls to outside numbers	User error (e.g., wrong feature code)	Refer to FEATURES, page 4-70, for procedures.
	Programming error	Check trunk access and toll restriction.
	Defective MXC or EXP Card	Refer to page 3-103 to test the system voltages. Replace the card(s) if faulty.

FIGURE 6-4. FEATURE TROUBLESHOOTING CHART (CONT'D)

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
Cannot transfer incoming CO calls or place them on hold	User error	Refer to FEATURES, page 4-70, for procedures.
	Inter-Ring Silence timer is set too short	Ensure timer value is set longer than the central office ring signal is "off." Refer to PROGRAMMING, page 5-77.
	User error (trunk key being pressed after initial connection is made)	Set the CO Reseize timer to a higher value. Default value is 3 seconds. See page 5-77 in PROGRAMMING. Or, program the station to disallow CO reseize. See PROGRAMMING, page 5-30.
	Programming error	Check user-programmable feature key programming. Refer to FEATURES, page 4-51, and PROGRAMMING, page 5-44.

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
Cannot initiate a conference	User error	Refer to FEATURES, page 4-76, for correct procedures.
	System capacity exceeded	Refer to the maximum system capacities on page 1-8 in OVERVIEW.
	Defective station instrument	Replace the station instrument and/or perform the keyset self-test as described in INSTALLATION, pages 3-107, 3-116, or 3-128.
	Defective station card	Replace the associated station card.
	Defective MXC or EXP Card	Refer to page 3-103 to test the system voltages. Replace the card(s) if faulty.

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
Last Number Redial feature inoperative	User error	Refer to FEATURES, page 4-93, for procedures. Keyset may be programmed for Last Number Saved.
	System speed-dial number identified as non-display	A system speed-dial number identified as non-display cannot be redialed.
	Defective station instrument	Replace the station instrument and/or perform the keyset self-test as described in INSTALLATION, pages 3-107, 3-116, or 3-128.
	Defective MXC or EXP Card	Refer to page 3-103 to test the system voltages. Replace the card(s) if faulty.

FIGURE 6-4. FEATURE TROUBLESHOOTING CHART (CONT'D)

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
Cannot initiate an internal page	User error	Refer to FEATURES, page 4-94, for correct procedures.
	All stations in the paging zone are busy, or a voice channel is not available	Reorder tone is heard. Wait several seconds and then attempt to place the page again. Paging requires a voice channel.
	All stations in the paging zone are in do-not-disturb	Reorder tone is heard if all stations in the zone are in do-not-disturb and if external paging for the zone is disabled.
	No stations are programmed to receive pages	Reorder tone is heard. Check paging assignment. Refer to page 5-70 in PROGRAMMING.
	Defective station instrument	Replace the station instrument and/or perform the keyset self-test as described in INSTALLATION, pages 3-107, 3-116, or 3-128.
	Defective MXC or EXP Card	Refer to page 3-103 to test the system voltages. Replace the card(s) if faulty.

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
Cannot initiate an external page	User error	Refer to FEATURES, page 4-94, for correct procedures.
	Another external zone page is being made or a voice channel is not available	Reorder tone is heard. Wait several seconds and then attempt to place the page again. Only one external zone page can be made at a time. Paging requires a voice channel.
	Defective station instrument	Replace the station instrument and/or perform the keyset self-test as described in INSTALLATION, pages 3-107, 3-116, or 3-128.
	Defective MXC or EXP Card	Refer to page 3-103 to test the system voltages. Replace the card(s) if faulty.

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
House phone is not working properly or is inoperative	User error	Incoming calls take precedence over outgoing calls. Refer to FEATURES, page 4-92.
	Programming error (data-base)	Ensure that the station is designated as a house phone. Refer to page 5-38 in PROGRAMMING. Also, make sure the station has been assigned the proper SCOS and trunk access. See page 5-42 in PROGRAMMING.
	Programming error (data-base or speed-dial)	Ensure that the correct numbers are in appropriate day number and night number (speed-dial) locations. Refer to page 4-92 in FEATURES.

FIGURE 6-4. FEATURE TROUBLESHOOTING CHART (CONT'D)

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
Cannot initiate a call forward	User error	Refer to FEATURES, page 4-82, for correct procedures.
	User attempting illegal forward	Stations are not allowed to set call forward if it forms an unconditional loop, the receiving station is in do-not-disturb, or an invalid intercom number is dialed. SCOS and outgoing access are checked when a call is forwarded to an outside telephone number. Also, LCR cannot be used to forward to an outside number.
	Defective station instrument	Replace the station instrument and/or perform the keyset self-test as described in INSTALLATION, pages 3-107, 3-116, or 3-128.
	Defective MXC or EXP Card	Refer to page 3-103 to test the system voltages. Replace the card if faulty.

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
Calls will not forward	User error	Refer to FEATURES, page 4-82, for procedures.
	Illegal forward	Conditional forwards (i.e., if busy, if unanswered) may form an undetected loop. If a call forward request forms a conditional loop, the call returns to the first station.
	Defective station card	Replace the associated station card.
	Defective MXC or EXP Card	Refer to page 3-103 to test the system voltages. Replace the card(s) if faulty.

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
Station not receiving hunt group calls	User error	Hunt group calls may have been halted using the Hunt Group Remove feature code (see page 4-19 in FEATURES). Or, the station may be in do-not-disturb.
	Programming error	Check hunt group programming. Refer to page 5-61 in PROGRAMMING.

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
Station is not receiving pages	User error	Pages may have been halted using the Page Remove feature code (see page 4-94 in FEATURES). Or, the station may be in do-not-disturb.
	Programming error	Check page zone programming for the station. See PROGRAMMING, page 5-70.

FIGURE 6-4. FEATURE TROUBLESHOOTING CHART (CONT'D)

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
Call privacy release inoperative	User error	Keypad user must lift the handset or press the SPKR key before pressing the busy trunk key.
	Call is forced private	Refer to page 4-74 in FEATURES for information on call privacy and privacy release.
	Programming error	Verify that system-wide CO privacy release option is enabled. See PROGRAMMING, page 5-67.

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
Station cannot be placed in do-not-disturb	User error	Refer to page 4-95 in FEATURES for correct procedures.
	Programming error	Station is programmed to disallow do-not-disturb. See PROGRAMMING, page 5-30.
	Defective keypad	Perform the keypad self-test as described in INSTALLATION, pages 3-107, 3-116, or 3-128, and replace the keypad if faulty.

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
Automated attendant inoperative	User error	The caller must be using a DTMF phone to enter digits. Refer to FEATURES, page 4-12.
	DTMF tones not being interpreted correctly (see NOTE below)	If numbers appear to be misdialed frequently, due to trunk noise or other problems, use the Digit Translation feature as described on page 5-39 in PROGRAMMING and page 4-14 in FEATURES.
	DTMF decoder unavailable	If a DTMF decoder is not available, the caller is transferred to the automated attendant's attendant.
	Programming error	Automated attendant station(s) must be designated in the database. Refer to PROGRAMMING, page 5-38.
	Defective playback device	Replace the playback device.

NOTE: Due to the natural characteristics of the CO trunk, the volume level of DTMF tones transmitted over the trunk may be substantially reduced before reaching the 416/832 System. This natural degradation in tone volume may adversely affect the reliability of the automated attendant feature. Other factors which can affect automated attendant performance are CO trunk noise, the quality of the playback device, and the quality and strength of the DTMF tones generated by the off-premises phone itself.

FIGURE 6-4. FEATURE TROUBLESHOOTING CHART (CONT'D)

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
SMDA reports not generated automatically and/or they cannot be generated using the Attendant SMDA feature code	Programming error	SMDA report generation must be enabled. Also, the reports can be set to be generated daily, weekly, monthly, or by the attendant only. See PROGRAMMING, page 5-139. Ensure that the correct output port (SERIAL 1 or SERIAL 2) for the printer is selected. See PROGRAMMING, page 5-139.
	User error	For correct procedures on using the attendant feature code for SMDA report generation, refer to page 4-111 in FEATURES.

FIGURE 6-5. KEYSSET TROUBLESHOOTING CHART

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
Keyset inoperative; LED indication present while any key with an LED is held down; reorder tone is heard when key is pressed	Programming error (circuit identified as DSS/BLF; no reorder tone is heard)	Identify the circuit for keyset use, not DSS/BLF. Refer to page 5-136 in PROGRAMMING.
	Programming or installation error (if using 8-line AIM keysets installed two to a circuit)	If using 8-line AIM keysets, the KSC-D circuits must be programmed for dual use. Refer to page 5-173 in PROGRAMMING. The individual 8-line AIM keysets must also be programmed for station features (see page 5-25 in PROGRAMMING) and their internal switches must be set correctly (see page 3-116 in INSTALLATION).
	System lockout caused by excessive data errors (displays SYSTEM LOCKOUT)	Remove and replace the line cord to reset the keyset.
	Defective cabling or connections	Ensure that all cables are correctly connected to the modular jack as shown in Figure 3-2 on page 3-9 in INSTALLATION. Check for loose or open connections in the station cabling and the line cord.
	Defective keyset	Perform the keyset self-test as described in INSTALLATION, pages 3-107, 3-116, or 3-128, and replace the keyset if faulty.
	Defective DKSC/KSC	Replace the associated DKSC/KSC.
	Defective MXC or EXP Card	Refer to page 3-103 to test the system voltages. Replace the card(s) if faulty.

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
Keyset inoperative; no LED indication when any key is pressed; no audio is present	Defective fuse or open thermistor on the associated DKSC/KSC	If the DKSC/KSC is equipped with a fuse, remove the fuse and check it with an ohmmeter; replace if faulty.
	Defective keyset	Perform the keyset self-test as described in INSTALLATION, pages 3-107, 3-116, or 3-128, and replace the keyset if faulty.
	Defective cabling or connections	Ensure that 30VDC is present at the modular jack and polarity is correct. Check for loose or open connections in the station cabling and the line cord. Refer to Figure 3-2 on page 3-9 in INSTALLATION.
	Defective DKSC/KSC	Replace the associated DKSC/KSC.

FIGURE 6-5. KEYSSET TROUBLESHOOTING CHART (CONT'D)

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
A group of 8 or 16 keysets inoperative; no LED indication when a trunk key is held down; all affected keysets are located on one DKSC/KSC	Defective fuse or open thermistor on the associated DKSC/KSC	If the DKSC/KSC is equipped with a fuse, remove the fuse and check it with an ohmmeter; replace if faulty.
	Programming or installation error (if using 8-line AIM keysets installed two to a circuit)	If using 8-line AIM keysets, the KSC-D circuits must be programmed for dual use. Refer to page 5-173 in PROGRAMMING. The individual 8-line AIM keysets must also be programmed for station features (see page 5-25 in PROGRAMMING) and their internal switches must be set correctly (see page 3-116 in INSTALLATION).
	Defective DKSC/KSC	Replace the associated DKSC/KSC.
	Defective station amphenol connector or cable attached to the associated DKSC/KSC	Remove the cable from the card. Using an ohmmeter, verify the pinout of the cable. (Refer to the information on pages 3-22 to 3-26 and 3-29 in INSTALLATION.) Ensure that 30VDC is present at the modular jack and polarity is correct. Check for loose or open connections in the station cabling and the line cord.
	Defective receptacle on the Telecom Motherboard	Replace the Telecom Motherboard.

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
LCD inoperative; otherwise, keyset functions normally	Defective LCD Unit or LCD ribbon cable	Replace the LCD Unit or ribbon cable. Refer to page 3-114 in INSTALLATION.
	Improper installation	Refer to INSTALLATION, page 3-114.
	Defective ribbon cable connector	Replace the keyset.

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
Optional headset inoperative	User error	Ensure the Enable Headset feature code (315) was entered. Check feature code programming to see if code was changed. Refer to page 5-58 in PROGRAMMING.
	Incorrect or defective headset	Ensure the headset contains a dynamic microphone, or a carbon microphone and an external AC power source. Replace headset if necessary.
	Defective keyset	Try another keyset.
	Defective MXC or EXP Card	Refer to page 3-103 to test the system voltages. Replace the card(s) if faulty.

FIGURE 6-5. KEYSSET TROUBLESHOOTING CHART (CONT'D)

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
Keyset squeals on outside calls or when receiving a handsfree intercom call from a single-line station (feedback)	Speaker volume is too loud	Reduce feedback by lowering speaker volume using keyset volume controls.
	Poor acoustics	Poor acoustics can cause poor quality on handsfree calls. Try placing a private call.

NOTE: A two- to four-wire converter is used during communication between keysets and single-line stations. Reflection is a normal characteristic of these converters. Feedback on intercom calls is eliminated when the single-line station user places a private intercom call by pressing the pound (#) key before dialing the intercom number or by entering the Ring Intercom Always feature code — 367 (provided the keyset user does not press the SPKR key to respond).

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
Cannot break CO dial tone	Defective keyset	Perform the keyset self-test as described in INSTALLATION, pages 3-107, 3-116, or 3-128, and replace the keyset if faulty.
	Defective trunk card	Replace defective trunk card.
	Defective DKSC/KSC	Replace the associated DKSC/KSC.
	Defective MXC or EXP Card	Refer to page 3-103 to test the system voltages. Replace the card(s) if faulty.

NOTE: See also CO trunk problems on page 6-19.

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
Data device connected to keyset not operating properly	User error	Refer to manufacturer's operating instructions.
	Secondary voice path busy	The keyset will not transmit data calls when the secondary voice path or speakerphone are in use. Refer to page 4-101 in FEATURES.
	Problem with data device	Disconnect data device and check operation according to the manufacturer's instructions.
	Data Port Module not installed properly or defective	Check Data Port Module installation and jumper strap settings. Refer to INSTALLATION, page 3-121. Replace if defective.
	PCDPM, MDPM, and/or transformer not installed properly or defective	Check installation. Refer to INSTALLATION, pages 3-109 to 3-113. Replace if defective.
	Defective keyset	Try another keyset.
	Defective DKSC/KSC	Replace the associated DKSC/KSC.
	Defective MXC or EXP Card	Refer to page 3-103 to test the system voltages. Replace the card(s) if faulty.

FIGURE 6-5. KEYSSET TROUBLESHOOTING CHART (CONT'D)

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
Data noise in any off-hook condition	Defective cabling or connections (e.g., line cord, amphenol connector, bridging clip, etc.)	Check for loose or open connections, or crossed wires.
	Wrong type of line cord for 8-line AIM keysets installed two to a circuit.	Replace the flat line cord with a twisted-pair line cord as described in SPECIFICATIONS on page 2-28.
	Defective keyset	Try another keyset.
	Defective DKSC/KSC	Replace the associated DKSC/KSC.

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
Cannot obtain intercom dial tone; no tone heard; CO trunk works	Defective keyset	Perform the keyset self-test as described in INSTALLATION, pages 3-107, 3-116, or 3-128, and replace the keyset if faulty.
	Defective DKSC/KSC	Replace the associated DKSC/KSC.
	Defective MXC or EXP Card	Refer to page 3-103 to test the system voltages. Replace the card(s) if faulty.

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
Cannot break intercom dial tone	Defective keyset	Perform the keyset self-test as described in INSTALLATION, pages 3-107, 3-116, or 3-128, and replace the keyset if faulty.
	Defective DKSC/KSC	Replace the associated DKSC/KSC.
	Defective MXC or EXP Card	Refer to page 3-103 to test the system voltages. Replace the card(s) if faulty.

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
Cannot place intercom call; intercom dial tone is present, but reorder tone is heard when call is attempted	User error (or station is in a different tenant group and cross-tenant traffic is denied)	Invalid intercom number or improper dialing procedure. See FEATURES, page 4-55, for procedures. (Or, ensure the stations are in the same tenant group or allow cross-tenant traffic.)
	Defective keyset	Perform the keyset self-test as described in INSTALLATION, pages 3-107, 3-116, or 3-128, and replace the keyset if faulty.
	Defective DKSC/KSC	Replace the associated DKSC/KSC.
	Defective MXC or EXP Card	Refer to page 3-103 to test the system voltages. Replace the card(s) if faulty.

FIGURE 6-5. KEYSSET TROUBLESHOOTING CHART (CONT'D)

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
Cannot place call using the speakerphone on a digital keyset (reorder tone is heard)	DSP resources not available (display shows NO SPKRPHN AVAIL STAY OFF HOOK)	Try again later. See FEATURES, page 4-40, for more information.
	Defective DSP or DKSC	Replace the associated DSP or DKSC.

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
LRA device connected to keyset not operating properly	Problem with LRA device	Disconnect LRA device and check operation according to the manufacturer's instructions.
	Data Port Module not installed properly or defective	Check Data Port Module installation and jumper strap settings. Refer to INSTALLATION, page 3-121. Replace if defective.
	Defective keyset	Try another keyset.
	Defective MXC or EXP Card	Refer to page 3-103 to test the system voltages. Replace the card(s) if faulty.

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
Cannot receive off-hook voice announce calls	Programming error	Ensure that the system option for off-hook voice announce is enabled (PROGRAMMING, page 5-67), that the called keyset is programmed to receive OHVA calls, and that the calling keyset is programmed to transmit OHVA calls (PROGRAMMING, page 5-30).
	User error	The called station is a single-line set, 8-line keyset, 8-line AIM keyset, GMX 12-line keyset, GX 24-line keyset (these station instruments cannot receive OHVA calls) or a keyset that is programmed not to receive OHVA calls. Or, the called keyset user may have blocked the OHVA call. See FEATURES, page 4-61, for details.
	Secondary voice path busy	The keyset will not receive off-hook voice announce calls when the secondary voice path or speakerphone are in use. Refer to FEATURES, page 4-61.
	Defective keyset	Perform the keyset self-test as described in INSTALLATION, pages 3-107, 3-116, or 3-128, and replace the keyset if faulty.
	PCDPM not installed properly or defective	Check installation. Refer to INSTALLATION, page 3-109. Replace if defective.
	Defective DKSC/KSC	Replace the associated DKSC/KSC.
	Defective MXC or EXP Card	Refer to page 3-103 to test the system voltages. Replace the card(s) if faulty.

FIGURE 6-5. KEYSSET TROUBLESHOOTING CHART (CONT'D)

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
Cannot place off-hook voice announce calls	Programming error	Ensure that the system option for off-hook voice announce is enabled (PROGRAMMING, page 5-67), that the called keyset is programmed to receive OHVA calls, and that the calling keyset is programmed to transmit OHVA calls (PROGRAMMING, page 5-30).
	User error	The called station is a single-line set, 8-line keyset, 8-line AIM keyset, GMX 12-line keyset, GX 24-line keyset (these station instruments cannot receive OHVA calls) or a keyset that is programmed not to receive OHVA calls. Or, the called keyset user may have blocked the OHVA call. Refer to page 4-61 in FEATURES for more information.
	Secondary voice path busy	The called keyset cannot receive off-hook voice announce calls when its secondary voice path or speakerphone are in use. Refer to FEATURES, page 4-61.
	Defective keyset	Perform the keyset self-test as described in INSTALLATION, pages 3-107, 3-116, or 3-128, and replace the keyset if faulty.
	Defective DKSC/KSC	Replace the associated DKSC/KSC.
	Defective MXC or EXP Card	Refer to page 3-103 to test the system voltages. Replace the card(s) if faulty.

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
Erratic keyset operation (lamp status incorrect)	Station cable exposed to interference	Ensure proper station cable runs. Refer to INSTALLATION, page 3-7.
	Station loop limits exceeded	Perform the station loop resistance test as outlined on page 3-30 in INSTALLATION.
	Defective cabling or connections	Ensure that 30VDC is present at the modular jack and polarity is correct. Check for loose or open connections in the station cabling and the line cord. Refer to Figure 3-2 on page 3-9 in INSTALLATION.
	Defective keyset	Perform the keyset self-test as described in INSTALLATION, pages 3-107, 3-116, or 3-128, and replace the keyset if faulty.
	Programming error	Ensure that the proper key map has been assigned to the keyset. See PROGRAMMING, page 5-35.
	Defective DKSC/KSC	Replace the associated DKSC/KSC.
	Defective MXC or EXP Card	Refer to page 3-103 to test the system voltages. Replace the card(s) if faulty.

FIGURE 6-6. SINGLE-LINE SET TROUBLESHOOTING CHART

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
Single-line set completely inoperative	Defective set	Replace the single-line set.
	Defective cabling	Check amphenol connector and station cabling. Refer to INSTALLATION, pages 3-22 and 3-27 to 3-29.
	Defective SLC or IDC	Replace the associated SLC or IDC.
	Defective MXC or EXP Card	Refer to page 3-103 to test the system voltages. Replace the card(s) if faulty.

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
Single-line set inoperative; talk battery present	Defective set	Replace the single-line set.
	Defective SLC or IDC	Replace the associated SLC or IDC.
	Defective MXC or EXP Card	Refer to page 3-103 to test the system voltages. Replace the card(s) if faulty.

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
Single-line set inoperative; calls ring in; talk battery is present	Defective set	Replace the single-line set.
	Defective SLC or IDC	Replace the associated SLC or IDC.
	Defective MXC or EXP Card	Refer to page 3-103 to test the system voltages. Replace the card(s) if faulty.

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
A group of 8 or 16 single-line sets inoperative; all are on the same SLC or IDC	Loose amphenol connector	Ensure connector is securely attached to the SLC or IDC.
	Defective SLC or IDC	Replace the associated SLC or IDC.

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
Single-line set will not ring for CO or intercom calls; talk battery is present; calls can be placed	IDC or single-line set ring jumper straps not set for correct ringing	Set the associated jumper strap for the correct ringer (AC or DC). Refer to INSTALLATION, pages 3-91 and 3-138.
	Defective set	Replace the set.
	Defective SLC or IDC	Replace the associated SLC or IDC.
	Defective MXC or EXP Card	Refer to page 3-103 to test the system voltages. Replace the card(s) if faulty.

FIGURE 6-6. SINGLE-LINE SET TROUBLESHOOTING CHART (CONT'D)

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
Ring trip is not provided to a group of eight or 16 single-line sets; outgoing calls are not affected	-48VDC absent from SLC or IDC	Defective connection or incorrect installation of -48VDC on the SLC or IDC. Using a voltmeter, measure the -48VDC at the SLC/IDC block. Refer to installation, pages 3-22 to 3-29.
	Defective cabling	Using a voltmeter, measure the -48VDC input at the amphenol connector. Refer to Figure 3-19 on page 3-29 in INSTALLATION.
	Defective SLC or IDC	Replace the associated SLC or IDC.

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
A group of AC ringer-equipped single-line sets will not ring for CO or intercom calls; talk battery is present; calls can be placed; all stations are on the same SLC or IDC	Defective power supply module(s)	Refer to INSTALLATION, page 3-55, to perform the power supply electrical test. Replace the power supply module(s) if faulty.
	Defective SLC or IDC	Replace the associated SLC or IDC.
	Defective MXC or EXP Card	Refer to page 3-103 to test the system voltages. Replace the card(s) if faulty.

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
No AC ringer-equipped single-line set will ring for CO or intercom calls; talk battery present; calls can be placed	Defective power supply module(s)	Refer to INSTALLATION, page 3-55, to perform the power supply electrical test. Replace the power supply module(s) if faulty.
	Defective SLC or IDC	Replace the associated SLC or IDC.
	Defective MXC or EXP Card	Refer to page 3-103 to test the system voltages. Replace the card(s) if faulty.

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
Cannot obtain intercom dial tone; no sound is heard	Either a DTMF decoder, voice channel, or tone generator is not available	Single-line station user will hear busy tones when any of the necessary resources are not available. User may camp on.
	Defective set	Replace the single-line set.
	Defective SLC or IDC	Replace the associated SLC or IDC.
	Defective MXC or EXP Card	Refer to page 3-103 to test the system voltages. Replace the card(s) if faulty.

FIGURE 6-6. SINGLE-LINE SET TROUBLESHOOTING CHART (CONT'D)

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
Cannot place intercom call; dial tone present, but reorder tone heard	User error	Try the call again. User may have dialed an invalid number.
	Defective set	Replace the single-line set.
	Called station is in a different tenant group and cross-tenant traffic is denied	To allow such calls (if desired), place the two stations in the same tenant group or allow cross-tenant traffic. See PROGRAMMING, page 5-67.
	Defective MXC or EXP Card	Refer to page 3-103 to test the system voltages. Replace the card(s) if faulty.

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
Cannot break CO dial tone	Defective set	Replace the single-line set.
	Defective SLC or IDC	Replace the associated SLC or IDC.
	Defective MXC or EXP Card	Refer to page 3-103 to test the system voltages. Replace the card(s) if faulty.

NOTE: See also CO trunk problems on page 6-19.

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
Cannot place off-hook voice announce calls	Programming error	Ensure that the system option for off-hook voice announce is enabled (PROGRAMMING, page 5-67) and that the station is programmed to transmit (page 5-30).
	User error	Called station is a single-line set or a keyset that is not equipped with a secondary voice path.
	Defective MXC or EXP Card	Refer to page 3-103 to test the system voltages. Replace the card(s) if faulty.

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
Single-line sets not receiving message waiting indications and/or message lamps not functioning properly	Programming error	Message waiting indication option must be enabled in the database. Refer to page 5-30 in PROGRAMMING.
	Single-line set installed on an IDC	In order for single-line set message waiting lamps to function, the set must be installed on premises on an SLC (IDCs do not support message waiting applications), and the associated power supply chassis must have a functioning -48V Module.
	Defective or missing power supply module, or defective SLC	While leaving a message, check for -108VDC across tip and ring. Replace the defective power supply module or SLC.

FIGURE 6-7. DSS/BLF UNIT TROUBLESHOOTING CHART

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
DSS/BLF Unit inoperative; no LED indication present while key is pressed	Defective fuse on the associated DKSC/KSC	If the DKSC/KSC is equipped with a fuse, remove the fuse and check it with an ohmmeter; replace if faulty.
	Defective cabling	Ensure 30VDC present at the DSS/BLF modular jack and polarity is correct. Check for loose or open connections. Refer to Figure 3-2 on page 3-9 in INSTALLATION.
	PCDPM and/or transformer not installed properly or defective	Check installation. Refer to INSTALLATION, page 3-109. Replace if defective.
	Defective DSS/BLF Unit	Replace the DSS/BLF Unit.
	Defective DKSC/KSC	Replace the associated DKSC/KSC.

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
DSS/BLF Unit inoperative; LED indication present while key is pressed	Programming error	Circuit is identified for keyset use. Refer to page 5-136 in PROGRAMMING. Circuit must be equipped for DSS/BLF Unit use. Also, check DSS/BLF key assignments in PROGRAMMING, page 5-44.
	Defective DSS/BLF Unit	Replace the DSS/BLF Unit.
	Defective DKSC/KSC	Replace the associated DKSC/KSC.
	Defective MXC or EXP Card	Refer to page 3-103 to test the system voltages. Replace the card(s) if faulty.

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
DSS/BLF Unit LED indications incorrect	Cable exposed to interference	Refer to INSTALLATION, page 3-7, for correct cabling procedures.
	Programming error	Check DSS/BLF key assignments in PROGRAMMING, page 5-44.
	Defective DSS/BLF Unit	Replace the DSS/BLF Unit.
	Defective MXC or EXP Card	Refer to page 3-103 to test the system voltages. Replace the card(s) if faulty.

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
Calls are transferred to the wrong station	User error	Refer to FEATURES, page 4-103, for procedures.
	Programming error	Check DSS/BLF key assignments. Refer to PROGRAMMING, page 5-44.

FIGURE 6-7. DSS/BLF UNIT TROUBLESHOOTING CHART (CONT'D)

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
Cannot place immediate off-hook voice announce calls (using the DSS/BLF key)	Programming error	Ensure that the system option for off-hook voice announce is enabled, that the immediate off-hook voice announce option is enabled, that the DSS/BLF station is programmed to transmit, and that the called keyset is programmed to receive. Refer to pages 5-67 and 5-30 in PROGRAMMING.
	User error	The called station is a single-line set, 8-line keyset, 8-line AIM keyset, GMX 12-line keyset, GX 24-line keyset (these sets cannot receive OHVA calls), or a keyset that is programmed not to receive OHVA calls. Or, the called keyset user may have blocked the OHVA call. Refer to page 4-61 in FEATURES for more information.
	Defective DSS/BLF Unit	Perform the DSS/BLF Unit self-test as described in INSTALLATION, pages 3-133 and 3-135, and replace the DSS/BLF Unit if faulty.
	Defective keyset	Perform the keyset self-test as described in INSTALLATION, pages 3-107, 3-116, or 3-128, and replace the keyset if faulty.
	Defective DKSC/KSC	Replace the associated DKSC/KSC.
	Defective MXC or EXP Card	Refer to page 3-103 to test the system voltages. Replace the card(s) if faulty.

6. CUSTOMER SUPPORT

A. TECHNICAL SUPPORT

6.1 If problems persist when installing or servicing Inter-Tel equipment: While *on site* and *with the proper troubleshooting tools* available, *certified technicians* may contact Inter-Tel's Customer Support Department for assistance. They can be reached from 7:00A.M. to 5:00P.M. Mountain Standard Time at 602-961-9000 or 1-800-669-5858.

B. EMERGENCY ASSISTANCE

6.2 After office hours and on weekends, call 602-961-0277 and leave your message with the voice mail service. A Customer Support Product Specialist will return your call as soon as possible, usually within an hour. Please remember that this is an emergency number for *critical system problems only*. Sales questions, equipment orders, etc., can only be handled during normal business hours.

C. INTER-TEL SERVICES

6.3 When the system is installed with one of the *Extended* software packages, the customer has the option of having the Weekly Toll Limit feature enabled, as explained below. To do so, the dealer must contact Inter-Tel Services. There is an additional charge for the Weekly Toll Limit feature. Contact Inter-Tel Services at 800-669-5858 for details.

6.4 The *Extended* software database contains a prompt that indicates the remaining days that the weekly toll limits will be in effect. This value automatically decreases by one each day. When the "Remaining Days" value reaches 0, the Weekly Toll Limit feature is disabled and calls are no longer monitored. A system alarm indicates TOLL SECURITY FEATURE EXPIRED. To enable the feature again, Inter-Tel Services personnel must reset the "Remaining Days" value. A system modem is needed for remote access.

7. DEFECTIVE UNIT RETURN POLICY

IMPORTANT

For complete information on returning equipment, refer to the *current* Inter-Tel Material Return Policy (document part number 835.1065). This document includes specific information on the following subjects: warranty, procedures to follow when returning equipment, equipment damaged in shipment, insurance, repair policy, and advance replacement policy.

7.1 TO RETURN A DEFECTIVE UNIT FOR REPAIR:

- (1) Obtain an MRA number from Inter-Tel's Order Processing Department. Write the MRA number and ATTN: MRA on the outside of each carton being returned. **INTER-TEL DOES NOT ACCEPT EQUIPMENT IF THE MRA NUMBER IS NOT ON THE CARTON.**
- (2) On the repair tag, identify the unit by the equipment name, part number, and serial number. (Repair tags are available from Inter-Tel.)
- (3) Describe the defect in detail and, if applicable, the circuit number related to the defect. Include applicable alarm messages and/or field service diagnostics, if possible. Document the estimated length of time the part had been in service prior to the failure. **ALL EQUIPMENT RETURNED FOR REPAIR MUST BE TAGGED WITH COMPLETE DETAILED INFORMATION REGARDING THE DEFECT OR IDENTIFICATION OF THE PROBLEM.**
- (4) Attach the upper portion of the repair tag to the defective equipment. Retain the bottom portion for your files.
- (5) Properly package the equipment for shipping (i.e., return in original package or equivalent). **WARRANTY MAY BE VOIDED IF EQUIPMENT IS IMPROPERLY PACKAGED.**

REPLACEMENT PARTS

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2. Ordering Procedure	7-1
3. Replacement Parts List	7-1
4. Recommended Spare Parts	7-1

1. INTRODUCTION

1.1 This section provides the information necessary to order and stock replacement parts for the 416/832 System.

2. ORDERING PROCEDURE

2.1 When ordering equipment for the 416/832 System, provide the following information to the order processing clerk:

- Company name
- Purchase order number
- Required date of shipment
- Part number(s) of equipment ordered
- Quantity required

3. REPLACEMENT PARTS LIST

3.1 Figure 7-1 lists authorized parts available for replacement on the 416/832 System.

NOTE: For information on the GX and GMX station instruments, refer to appendixes A and B in the back of this manual.

4. RECOMMENDED SPARE PARTS

4.1 *It is mandatory that spare parts be kept on hand to ensure the best possible customer service.*

4.2 Figure 7-2 on page 7-6 lists the quantities of spare parts recommended to adequately maintain and service ten 416/832 Systems.

FIGURE 7-1. REPLACEMENT PARTS

DESCRIPTION	PART NUMBER
IMX 416/832 Digital Station Instruments	
Standard Digital Keypad (or Terminal) — non-display	550.4300
Standard Digital Keypad (or Terminal) — display	550.4000
Executive Digital Keypad (or Terminal) — display	550.4100
Digital DSS/BLF Unit	550.4200
IMX 416/832 Charcoal Station Instruments — Equipped with Dynamic Microphones	
24-Line Standard Keypad	660.5000
24-Line Display Keypad	660.5200
24-Line AIM Keypad (display only)	660.6100
12-Line Standard Keypad	660.5700
12-Line Display Keypad	660.5600
12-Line AIM Keypad (display only)	660.6300
8-Line Keypad (non-display only)	660.5900
8-Line AIM Keypad (display only)	660.6400
Enhanced Single-Line Set (ESLS)	660.5300

FIGURE 7-1. REPLACEMENT PARTS (CONT'D)

DESCRIPTION	PART NUMBER
IMX 416/832 Charcoal Station Instruments — Equipped with Electret Microphones	
24-Line Standard Keyset	660.7700
24-Line Display Keyset	660.7600
24-Line AIM Keyset (display only)	660.7000
12-Line Standard Keyset	660.7900
12-Line Display Keyset	660.7800
12-Line AIM Keyset (display only)	660.7200
8-Line Keyset (non-display only)	660.7500
8-Line AIM Keyset (display only)	660.7400
Enhanced Single-Line Set (ESLS)	660.6900
Other IMX 416/832 Charcoal Station Instruments	
DSS/BLF Unit	660.5100
IMX 416/832 Grey Station Instruments — Equipped with Dynamic Microphones	
24-Line Standard Keyset	661.5000
24-Line Display Keyset	661.5200
24-Line AIM Keyset (display only)	661.6100
12-Line Standard Keyset	661.5700
12-Line Display Keyset	661.5600
12-Line AIM Keyset (display only)	661.6300
8-Line Keyset (non-display only)	661.5900
8-Line AIM Keyset (display only)	661.6400
Enhanced Single-Line Set (ESLS)	661.5300
IMX 416/832 Grey Station Instruments — Equipped with Electret Microphones	
24-Line Standard Keyset	661.7700
24-Line Display Keyset	661.7600
24-Line AIM Keyset (display only)	661.7000
12-Line Standard Keyset	661.7900
12-Line Display Keyset	661.7800
12-Line AIM Keyset (display only)	661.7200
8-Line Keyset (non-display only)	661.7500
8-Line AIM Keyset (display only)	661.7400
Enhanced Single-Line Set (ESLS)	661.6900
Other IMX 416/832 Grey Station Instruments	
DSS/BLF Unit	661.5100
GMX-416/832 Station Instruments	
Inter-Tel/DVK 24-Line Standard Keyset	662.3800
Inter-Tel/DVK 24-Line Display Keyset	662.3400
Inter-Tel/DVK 12-Line Standard Keyset	662.4000
Inter-Tel/DVK 12-Line Display Keyset	662.3900
Inter-Tel/DVK 8-Line Standard Keyset	662.3500
Inter-Tel/DVK 8-Line Display Keyset	662.3600
Inter-Tel/DVK DSS/BLF Unit	662.3700

FIGURE 7-1. REPLACEMENT PARTS (CONT'D)

DESCRIPTION	PART NUMBER
Main Equipment Cabinet Parts and Cables	
Main Equipment Cabinet	440.1000
MFM-Type Hard Disk Drive	440.4060
IDE-Type Hard Disk Drive	691.3009
Floppy Disk Drive	440.4070
Telecom Motherboard Power Cable	813.1098
PC Motherboard Power Cable	813.1132
Disk Drive Power Cable	813.1097
System Status Panel (Display) Cable	813.1092
Keyboard Interface Cable	813.1093
Serial Port 1 Interface Cable	813.1091
Serial Port 2 Interface Cable	813.1109
Monitor Interface Cable	813.1100
Floppy Disk-To-Controller Interface Cable	813.1105
MFM-Type Hard 20-Conductor (A) Disk-To-Controller Interface Cable	813.1106
MFM-Type Hard 34-Conductor (B) Disk-To-Controller Interface Cable	813.1107
IDE-Type Hard Disk-To-Controller Interface Cable	813.1557
Pro68-To-HDLC Interface Cable	813.1108
Pro68E-To-HDLC Interface Cable	813.1148
HDLC-To-MXC Interface Cable (flat, ribbon-type)	813.1094
HDLC-To-MXC Interface Cable (round, twisted-pair)	813.1558
Cable Kit (unattached; see page 7-6)	828.1123
Expansion Cabinet Parts and Cables	
Expansion Cabinet (includes cabinet, handles, Telecom Motherboard, and expansion power cable)	440.1100
Expansion Power Cable	813.1138
EXP-To-MXC Data Cable	813.1136
V-Ring Power Cable	813.1139
MXC Expansion Chips Kit	828.1153
Power Supply Parts	
Main Power Supply Chassis (for Version A & B modules only)	440.0100
Expansion Power Supply Chassis (for Version A and B modules only)	440.0101
Quad Module — Version A	440.0102
+30V Master Module — Version A	440.0104
+30V Slave Module — Version A	440.0106
-48V Module — Version A	440.0103
90VAC Ring Generator — Version A	440.0105
Quad Module — Version B	440.0122
+30V Master Module — Version B	440.0118
+30V Slave Module — Version B	440.0120
-48V Module — Version B	440.0119
90VAC Ring Generator — Version B	440.0121
Main Power Supply Chassis (for Version C modules only)	440.0111
Expansion Power Supply Chassis (for Version C modules only)	440.0117

FIGURE 7-1. REPLACEMENT PARTS (CONT'D)

DESCRIPTION	PART NUMBER
Power Supply Parts (continued)	
Quad Module — Version C	440.0112
+30V Module — Version C (used as master or slave)	440.0114
-48V Module — Version C	440.0113
90VAC Ring Generator — Version C	440.0115
Surge/Spike Protector	828.1105
Extractor Tool (for removing version B and C modules from the power supply chassis)	440.0123
Cards	
Telecom Motherboard (same for both cabinets)	440.1001
PC Motherboard — PCC	440.4015
PC Motherboard — SUNTAC	440.4015
PC Motherboard — VLSI	440.4017
PC Motherboard — MXIC	440.4018
PC Motherboard — M396F	440.4019
HDLC Card	440.2700
Monitor Card	440.4040
68000 Co-Processor (Pro68) Card	440.4010
Pro68 512k Memory Card	440.4014
Pro68 3MB Memory Card	440.4011
Pro68E Card	440.4012
Modem Card (2400-baud)	440.2820
MFM-Type Disk Controller Card	440.4030
IDE-Type Disk Controller Card	691.3005
Matrix Card	440.2500
Expansion Card	440.2900
Digital Keypad Card	440.2002
Keypad Card	440.2000
Keypad Card-D	440.2001
Single-Line Card (with message waiting)	440.2100
Inward Dialing Card	440.2300
Loop/Ground Start Card	440.2200
Loop Start Card	440.2210
T1 Card	440.3000
E&M Card	440.2400
IMX 416/832 Software	
MF-Rated, Basic	827.8218
MF-Rated, Extended	827.8219
MF-Rated, Extended plus T1 and E&M	827.8220
KF-Rated, Extended plus T1 and E&M	827.8221
MF-Rated, Extended plus T1, E&M, and GX	827.8222
Expanded	827.8223
GMX-416/832 Software	
MF-Rated, Basic	827.8164
MF-Rated, Extended	827.8165
MF-Rated, Extended plus T1 and E&M	827.8166
KF-Rated, Extended plus T1 and E&M	827.8167
Expanded	827.8168

FIGURE 7-1. REPLACEMENT PARTS (CONT'D)

<u>DESCRIPTION</u>	<u>PART NUMBER</u>
Miscellaneous Equipment	
On-Board CSU (for T1 Cards)	440.3004
Digital Signal Processor (DSP) Chip	834.2328
Pro68E Memory Expansion Kit (two 1MB SIMMs)	828.1179
DTMF Expansion Kit	828.1217
Digital Keypad PC Data Port Module (PCDPM)	550.3014
Digital Keypad Modem Data Port Module (MDPM)	550.3015
PCDPM-To-Keypad Interface Cable	813.1567
PCDPM-To-MDPM Interface Cable	813.1566
PCDPM-To-RS232C Interface Cable	813.1565
PCDPM-To-DSS Interface Cable	813.1595
DSS-To-DSS Interface Cable	813.1519
Digital Keypad LCD Kit (for non-display Standard Keypads) ...	828.1211
AC Transformer — 24VAC, 450mA (for PCDPMs, MDPMs, and DSS/BLF Units)	806.1045
IMX 24/12-Line Keypad Data Port Module Kit	828.1094
IMX 24/12-Line Keypad LCD Kit	828.1072
IMX 24/12/8-Line Keypad Blank Keypad Kit (100)	812.1041
IMX DSS/BLF Unit Blank Keypad Kit (100)	812.1050
Inter-Tel/DVK Keypad Data Port Module Kit	828.1094
Inter-Tel/DVK 24-Line Keypad LCD Kit (Large)	828.1166
Inter-Tel/DVK 12/8-Line Keypad LCD Kit (Small)	828.1165
Optional Utility Shelf	440.1011
Digital Attendant	828.1235
Multi-Port Voice Mail Unit (contact order processing for a list of models available)	
Inside Track (customized call mgmt. & accounting) Package ...	828.1275
IMX/GMX Combination Manuals	
Installation & Field Maintenance Manual	440.8075
Attendant Computer Console Manual	440.8076
IMX 256 User Documentation	
Owner's Guide	440.8044
Keypad User Guide	440.8052
Single-Line Set User Guide	440.8053
Keypad Quick Reference Guide	440.8048
ESLS Quick Reference Guide	440.8049
SLI Quick Reference Guide	440.8050
DSS/BLF Quick Reference Guide	440.8051
Attendant Computer Console Owner's Guide	440.8055
Attendant Computer Console Quick Reference Guide	440.8056
GMX-256 User Documentation	
Owner's Guide	440.8033
Keypad User Guide	440.8034
Single-Line Set User Guide	440.8035
Keypad Quick Reference Guide	440.8036
SLI Quick Reference Guide	440.8038
DSS/BLF Unit Quick Reference Guide	440.8039
Attendant Computer Console Owner's Guide	440.8041
Attendant Computer Console Quick Reference Guide	440.8042

FIGURE 7-2. RECOMMENDED SPARE PARTS

DESCRIPTION	QUANTITY	PART NO.
MFM-Type Hard Disk Drive	1-2*	440.4060
IDE-Type Hard Disk Drive	1-2*	691.3006
Floppy Disk Drive	1	440.4070
PC Motherboard — PCC	1*	440.4015
PC Motherboard — SUNTAC	1*	440.4015
PC Motherboard — VLSI	1*	440.4017
PC Motherboard — MXIC	1*	440.4018
PC Motherboard — M396F	1*	440.4019
HDLC Card	2	440.2700
Monitor Card	1	440.4040
68000 Co-Processor (Pro68) Card	1-2*	440.4010
Pro68E Card	1-2*	440.4012
Modem Card	1	440.4050
MFM-Type Disk Controller Card	1*	440.4030
IDE-Type Disk Controller Card	1*	691.3005
Matrix Card	2	440.2500
Expansion Card	1	440.2900
Digital Keypad Card	2	440.2002
Keypad Card	1-2*	440.2000
Keypad Card-D	1-2*	440.2001
Single-Line Card	2	440.2100
Inward Dialing Card	2	440.2300
Loop/Ground Start Card	1-2*	440.2200
Loop Start Card	1-2*	440.2210
T1 Card	2	440.3000
E&M Card	1	440.2400
Pro68 512k Memory Card	1	440.4014
Pro68 3MB Memory Card	1	440.4011
Pro68E Memory Expansion Kit (2 1MB SIMMs)	1	828.1179
Quad Module — Version A	1-2*	440.0102
+30V Master Module — Version A	1-2*	440.0104
+30V Slave Module — Version A	1*	440.0106
-48V Module — Version A	1*	440.0103
90VAC Ring Generator — Version A	1*	440.0105
Quad Module — Version B	1-2*	440.0122
+30V Master Module — Version B	1-2*	440.0118
+30V Slave Module — Version B	1*	440.0120
-48V Module — Version B	1*	440.0119
90VAC Ring Generator — Version B	1*	440.0121
Quad Module — Version C	1-2*	440.0112
+30V Module — Version C (used as master or slave)	1-2*	440.0114
-48V Module — Version C	1*	440.0113
90VAC Ring Generator — Version C	1*	440.0115
Surge/Spike Protector	1	828.1105
Digital Signal Processor (DSP) Chip	5	834.2328
Standard Digital Keypad (or Terminal)	5-10**	550.4300
Executive Digital Keypad (or Terminal)	5-10**	550.4100
Digital DSS/BLF Unit	2**	550.4200

* Quantities should be based on the types and versions of equipment that the majority of customers are using.

** Quantities should be based on the types and colors of station instruments that the majority of customers are using.

FIGURE 7-2. RECOMMENDED SPARE PARTS (CONT'D)

DESCRIPTION	QUANTITY	PART NO.
Digital Keypad PC Data Port Module	2	550.3014
Digital Keypad Modem Data Port Module	2	550.3015
Digital Keypad LCD Kit (for non-display Standard Keypads)	5	828.1211
AC Transformer (for PCDPMs, MDPMs, & DSS/BLF Units) ...	3	806.1045
IMX 24-Line Standard Keypad	1-10** ...	see pp. 7-1 & 7-2
IMX 24-Line AIM Keypad	1-10** ...	"
IMX 12-Line Standard Keypad	1-10** ...	"
IMX 12-Line AIM Keypad	1-10** ...	"
IMX 8-Line Keypad	1-10** ...	see pp. 7-1 & 7-2
IMX 8-Line AIM Keypad	1-10** ...	"
IMX 24/12-Line Keypad LCD Kit	5	828.1072
IMX DSS/BLF Unit	1**	"
Enhanced Single-Line Set (ESLS)	1-4**	"
Inter-Tel/DVK 24-Line Standard Keypad	1-10*	662.3800
Inter-Tel/DVK 12-Line Standard Keypad	1-10*	662.4000
Inter-Tel/DVK 8-Line Standard Keypad	1-10*	662.3500
Inter-Tel/DVK 8-Line Dual-Circuit Standard Keypad	1-10*	662.4500
Inter-Tel/DVK DSS/BLF Unit	1*	662.3700
Inter-Tel/DVK Keypad LCD Kit (Large)	5	828.1166
Inter-Tel/DVK Keypad LCD Kit (Small)	5	828.1165
Cable Kit (unattached)	1***	828.1123

** Quantities should be based on the types and colors of station instruments that the majority of customers are using.

*** Each kit contains the following cables: PC Motherboard Power Cable (1), Disk Drive Power Cable (2), Floppy Disk-To-Controller Interface Cable (1), IDE-Type (40-conductor) Hard Disk-To-Controller Interface Cable (1), Pro68-To-HDLC Interface Cable (1), and HDLC-To-MXC Interface Cable (1).

APPENDIX A — GX STATION INSTRUMENTS

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1. OVERVIEW

Except for the differences noted in this appendix, the Inter-Tel GX station instruments install and operate the same as those previously outlined in this manual.

Height 3.5 in. (8.9 cm.)
 Width 8.8 in. (22.3 cm.)
 Length 9.0 in. (22.9 cm.)
 Weight 2.8 lb. (1.3 kg.)

1.1 The Inter-Tel GX station instruments may be used on any GMX-416/832 System.

1.2 To use the GX station instruments on the IMX 416/832 System, there is a special software package called *Extended plus T1, E&M, and GX* (part no. 827.8222).

1.3 GX station instruments include:

- 24-Line Standard Keysets — part no. 690.3700
- 24-Line Display Keysets — part no. 690.3800
- Direct Station Selection/Busy Lamp Field (DSS/BLF) Units (may be single or tandem units) — part no. 690.3100
- Single-Line Instruments (SLIs)—part no. 690.3300

2. SPECIFICATIONS

A. KEYSETS

2.1 For a drawing of the GX 24-line keypad, refer to Figure A-1 on page A-3. The keypad dimensions are:

2.2 Since GX keysets do not have secondary voice path circuitry, they *cannot* be equipped with Data Port Modules and they *cannot* receive off-hook voice announce (OHVA) calls. GX keysets can place OHVA calls (see page A-10 for more information).

Optional Liquid Crystal Display (LCD) Unit

2.3 If desired, standard GX keysets can be converted to display keysets by installing an LCD Unit (part no. 828.1052). The messages shown on the display help the user to process calls more efficiently and professionally.

Optional Loud Ringing Adapter (LRA)

2.4 GX keysets can have optional LRAs installed (part no. 828.1051); contact Inter-Tel Customer Support for details. The LRA provides dry contacts used in controlling an external signaling device. The dry contacts follow the ring cycle of the piezoelectric ringer of the keypad. The LRA is not affected by the ring pitch DIP switches on the bottom of the keypad or the ringer volume control. The LRA contact ratings are as follows:

LRA CONTACT RATINGS

500mA (DC) maximum
 100mA (AC) maximum
 30VDC maximum
 110VAC maximum

NOTE: Do not connect an external signaling device directly to the keyset without using an LRA.

Optional Speakerphone Module or External Desk Speaker

2.5 GX keysets have a built-in speaker and microphone that allow the user to answer intercom calls "handsfree," dial while on hook, monitor calls, and listen to background music. For handsfree conversation on outside calls, GX keysets can be equipped with optional Speakerphone Modules (part no. 828.1077) or external 8-ohm desk speakers.

2.6 If the Speakerphone Module is installed, complete information and installation instructions are included with the kit.

2.7 If an external desk speaker is installed, the speaker is connected to the keyset by a mod-to-mod line cord and is turned on and off using the SPKR key. A strap on the bottom of the keyset must also be set to enable the handsfree microphone for outside calls.

Changing Ring Pitch

2.8 The pitch of the ring signals can be changed by the user to create distinctive ringing. If stations are placed

close together, changing the pitch makes each station's ring easier to recognize. The pitch is changed by setting DIP switches on the bottom of the keyset (refer to page A-4).

B. DIRECT STATION SELECTION/BUSY LAMP FIELD (DSS/BLF) UNITS

2.9 GX DSS/BLF Units can be single units or tandem units (two units connected together to form one large unit). Single units provide one-key access to 60 extension numbers; tandem units provide access to 120 extension numbers.

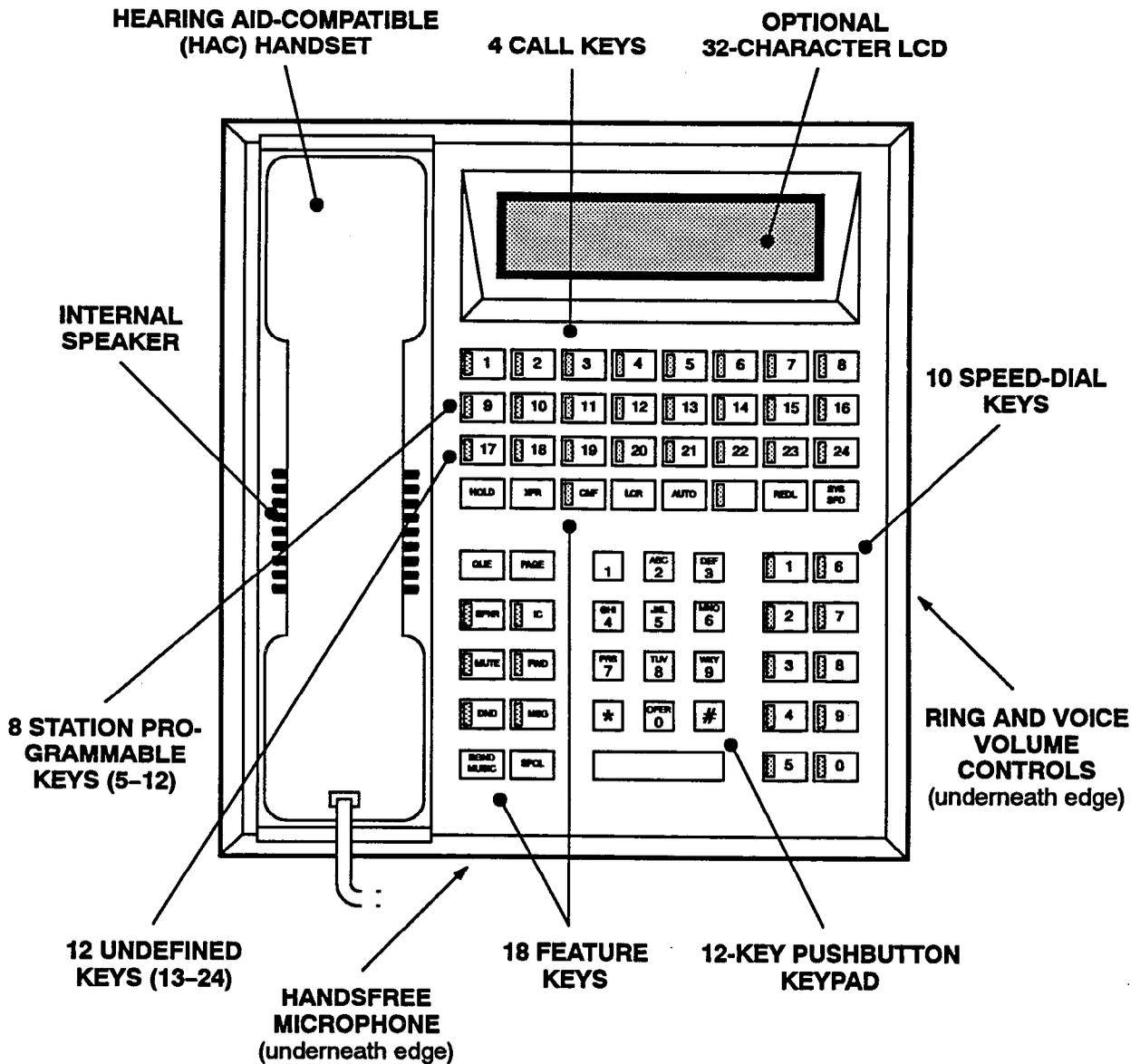
2.10 GX DSS/BLF Unit dimensions are:

Height	3.5 in. (8.9 cm.)
Width	8.8 in. (22.3 cm.)
Length	9.0 in. (22.9 cm.)
Weight	2.0 lb. (0.9 kg.)

C. SINGLE-LINE INSTRUMENTS (SLIs)

2.11 GX Single-Line Instruments (SLIs) are identical in design and function to the SLIs described in the main part of the manual.

FIGURE A-1. GX 24-LINE KEYS



NOTE: The keys are shown as they appear in the default key map configuration.

3. INSTALLATION

3.1 The installation instructions in this appendix contain information that differs from or is not covered in the rest of the manual. For complete installation information, use this appendix in conjunction with the INSTALLATION section of the manual.

3.2 When performing the loop resistance test (see page 3-30), use the following loop limit values for GX station instruments:

GX 24-Line Keysets (standard or display)	80 ohms/1550 ft. (472 m.)
GX 24-Line Keysets with Speakerphone Modules	65 ohms/1260 ft. (384 m.)
GX DSS/BLF Units (single or tandem)	80 ohms/1550 ft. (472 m.)
GX SLIs (AC or DC)	800 ohms/15560 ft. (4742 m.)

3.3 Be sure to install the Matrix Peripheral Processor Chip on the Matrix Card (see page 3-84). This component determines the particular software package that will be used by the system. Also, to fully enable the GX version software, perform the programming procedure described in paragraph 5.1 on page A-10.

A. KEYSSET INSTALLATION

3.4 Before performing the installation instructions outlined in this section, refer to the information beginning on page 3-114.

Keyset Set-Up

3.5 The GX keyset has speakerphone control straps, ring pitch selection DIP switches, and a microphone gain adjustment thumbwheel — all located on the bottom of the keyset. To ensure that these items are set for proper operation, follow these steps:

- (1) With the baseplate removed, check that the straps on the keyset bottom are connected as shown in Figure A-2 on the next page. The keyset will not operate properly if the straps are not positioned as shown.
- (2) *If desired*, change the pitch of the keyset's ring signal by setting the DIP switches on the keyset

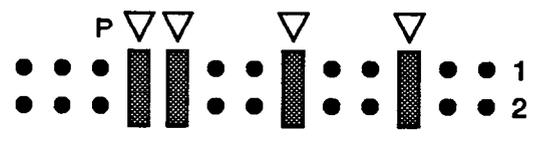
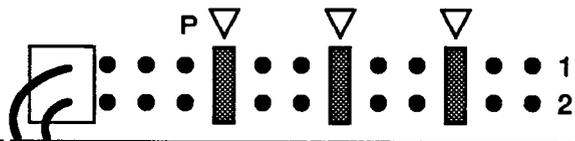
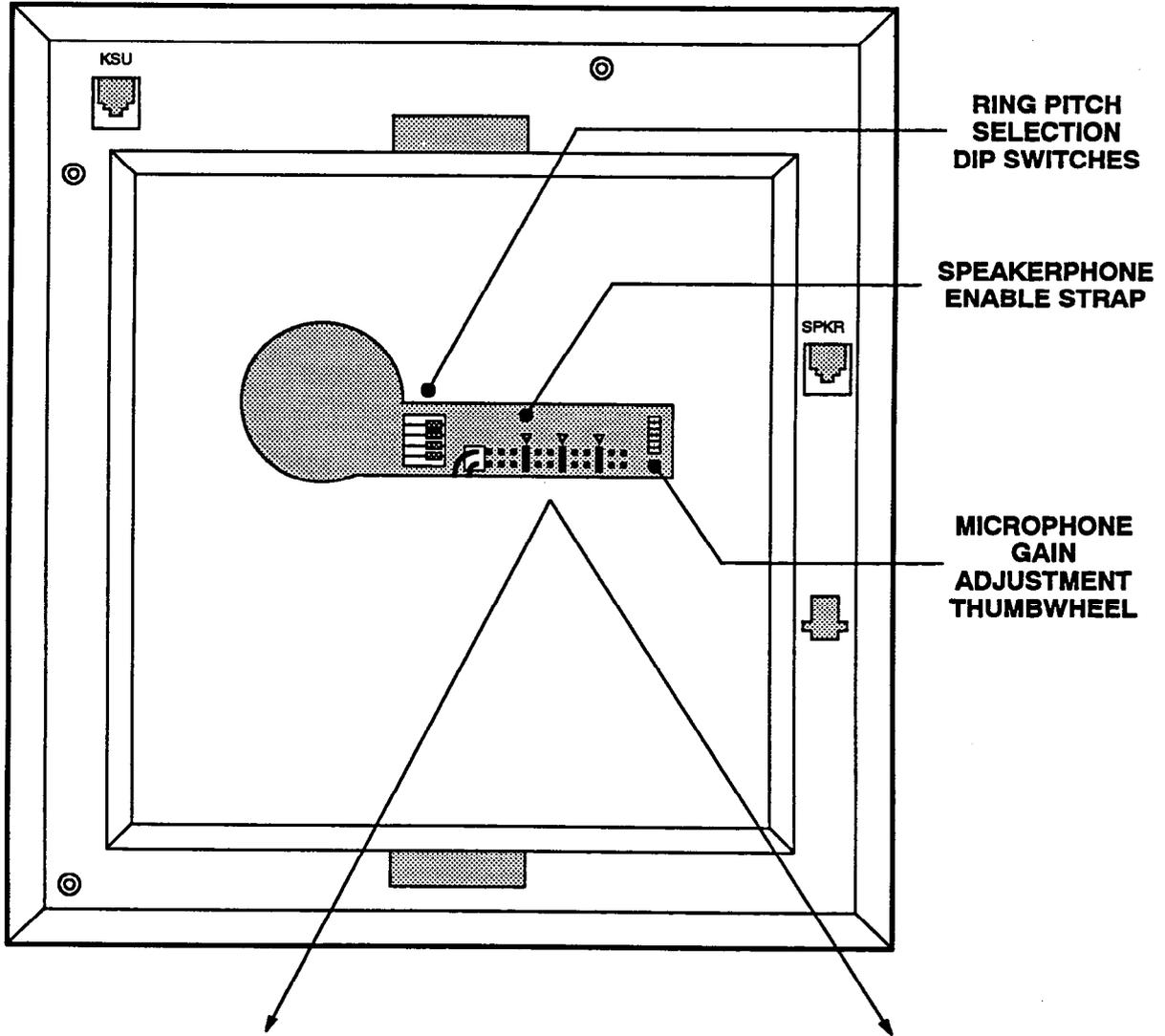
bottom. (Volume level may change with pitch.) The possible settings are shown in the following chart (O = open, CL = closed).

RING PITCH		SWITCH POSITION			
		1	2	3	4
High	1	CL	O	O	O
	2	O	CL	O	O
	3	O	O	CL	O
Low	4	O	O	O	CL
	Off	O	O	O	O

NOTE: Combine two settings (close two or more switches) for additional pitch settings, if desired. It is easiest to select the ring pitch after the keyset is installed and while the keyset is ringing.

- (3) Test the keyset internal speaker and handsfree microphone by receiving a handsfree intercom call. If problems such as feedback, hollow sound, or weak transmission develop, use the following methods to correct them.
 - a. *If feedback occurs:*
 - 1 Lower the keyset speaker volume by turning the thumbwheel control on the right side of the keyset.
 - 2 Locate the microphone gain adjustment thumbwheel next to the DIP switches on the bottom of the keyset. Begin making adjustments with the arrow on the side of the thumbwheel pointing away from the keyset or slightly toward the top of the keyset. With the handset side of the keyset facing you, decrease the microphone gain by turning the thumbwheel *counterclockwise*.
 - b. *If the other party hears hollow sound:* Decrease the microphone gain by turning the thumbwheel (described above) *counterclockwise*.
 - c. *If the other party cannot hear the conversation:* Increase the microphone gain slightly by turning the thumbwheel (described above) *clockwise*.
- (4) Replace the baseplate.

FIGURE A-2. GX KEYSET BOTTOM



NOTE: There are two possible types of strap arrangements. Depending on the pin configuration of the keyset, use one of the strap settings shown above.

Liquid Crystal Display (LCD) Installation

3.6 To convert a standard GX keyset to a display keyset, install an LCD Kit (part no. 828.1052) as follows:

- (1) Unpack the LCD Kit. There should be a clear plastic display window, an LCD unit, a ribbon cable, and two small Phillips-head screws.
- (2) Remove the keyset baseplate by pressing on the top edge of the baseplate to release the tab and by pulling the plate off.
- (3) Remove the line cord and handset cord from the keyset. Then loosen the four screws on the bottom of the keyset (enough so that the keyset can be opened).
- (4) Carefully open the keyset to expose the back of the keyboard that has the LCD connector. (Refer to Figure 3-66 on page 3-115.)
- (5) Remove the cover from the display opening in the top housing of the keyset by releasing the tabs from the inside of the housing and pushing out the cover.
- (6) From the front of the keyset, insert one end of the clear plastic window in the display opening, with the painted side of the brown edging facing the inside of the keyset. Then slightly bend the window, insert the other end into the opening, and ease the window into place.
- (7) Remove the covering from the LCD and install as follows:
 - a. Insert one end of the ribbon cable into the black connector on the LCD unit. Ensure that the metal strips on the ribbon cable make contact with the metal tabs in the black connector.
 - b. With the LCD facing up, insert the other end of the ribbon cable into the black connector on the back of the keyboard.
 - c. Position the LCD on the plastic window so that the screw holes in the LCD unit and in the keyset housing are aligned. Install the screws to hold the LCD in place.
- (8) Reassemble the keyset.
- (9) *If there is a potentiometer located underneath the extension number plate on the face of the key-*

set, the LCD contrast can be adjusted. Turn the potentiometer to lighten or darken the display.

Keyset Self-Test

3.7 To perform the GX keyset self-test, follow these instructions:

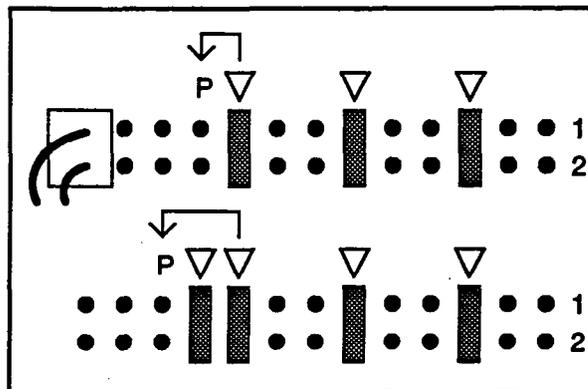
- (1) While pressing the asterisk (*) and pound (#) keys, unplug and replace the keyset line cord.
- (2) Release the keys. The keyset rings momentarily. (Display keysets show KTS SELF TEST HOOK-SWITCH.)
- (3) Lift and replace the handset to test the hook-switch. The LED-equipped keys light and the keyset rings momentarily. (Display keysets show KTS SELF TEST LED MATRIX.) *If any of the LEDs do not light*, return the keyset for repair.
- (4) Lift and replace the handset. The keyset rings momentarily and all of the LEDs go out. (Display keysets show KTS SELF TEST KEY MATRIX.)
- (5) Press keys in the following order. A progress tone is heard and the keyset rings momentarily if the key is functioning properly. *If the signals are not heard*, the key was either pressed out of order or is faulty. Return the keyset for repair if any key is faulty.
 - a. The call keys, station programmable keys, and undefined keys in order: 1-24.
 - b. Feature keys in this order: HOLD, XFR, CNF, LCR, AUTO, DATA (POOL), REDL, SYS SPD, QUE, PAGE, SPKR, IC, MUTE, FWD, DND, MSG, BGND MUSIC, and SPCL.
 - c. Keypad keys in the following order: 1-9, *, 0, and #.
 - d. Speed-dial keys in this order: 1, 6, 2, 7, 3, 8, 4, 9, 5, and 0.
- (6) After all the keys have been tested, it takes about ten seconds for the keyset to return to normal operation. (Display keysets show KTS SELF TEST COMPLETED! for about five seconds. Then the keyset's identification displays for about five seconds.)
- (7) Replace the keyset if faulty.

External Desk Speaker Installation

3.8 To attach an external 8-ohm desk speaker to a GX keyset for handsfree operation on outside calls, perform these steps:

- (1) Remove the baseplate and disconnect the keyset line cord.
- (2) Remove the modular shorting plug from the SPKR jack on the base of the keyset.
- (3) Connect the modular plug on the end of the external speaker cord to the SPKR jack on the base of the keyset.
- (4) Move the speakerphone enable strap to the pins labeled P as shown in the diagram at the right.

NOTE: There are two possible types of strap arrangements. Depending on the pin configuration of the keyset, use one of the strap settings shown above.



- (5) Replace the baseplate and reconnect the keyset line cord.
- (6) Test the speaker as described in step 3 of paragraph 3.5 on page A-4.

B. DSS/BLF UNIT INSTALLATION

3.9 Before performing the installation instructions outlined in this section, refer to the information beginning on page 3-135.

Tandem DSS/BLF Units

3.10 To connect two GX DSS/BLF Units together to create one tandem unit, perform these steps:

- (1) With the baseplate removed, locate the four DIP switches on the bottom of each unit (see Figure A-3 on the next page).

NOTE: Most DSS/BLF Units have a cutout in the bottom cover so that the DIP switches can be reached without having to take the unit apart. With other units, the four screws on the bottom must be removed and the bottom cover must be opened.

- (2) *If the unit will be using the key map for Part 1* (see paragraph 5.4 on page A-10), set DIP switch 2 to the DSS1 (open) position. *If the unit will be using the key map for Part 2*, set DIP switch 2 to the DSS2 (closed) position.

NOTE: Tandem units should have one unit set for DSS1 and one unit set for DSS2. If tandem units have the same DIP switch settings, there will be erroneous indications on the DSS/BLF Units and keyset, and there may be errors throughout the system.

- (3) Reassemble the DSS/BLF Units.
- (4) Insert one end of the two-foot cord into the DSS jack on the base of DSS/BLF Unit 1.
- (5) Insert the other end of the two-foot cord into the KSU jack on the base of DSS/BLF Unit 2. (The DSS jack on DSS/BLF Unit 2 will not be used.)
- (6) Insert one end of the seven-foot line cord into the KSU jack on the base of DSS/BLF Unit 1.
- (7) Insert the other end of the seven-foot line cord into the wall-mounted modular jack assembly.

DSS/BLF Unit Self-Test

3.11 To perform the GX DSS/BLF Unit self-test, follow these instructions:

- (1) With the baseplate removed, locate the four DIP switches on the bottom of the unit (see Figure A-3 on the next page).

NOTE: Most DSS/BLF Units have a cutout in the bottom cover so that the DIP switches can be reached without having to take the unit apart. With other units, the four screws on the bottom must be removed and the bottom cover must be opened.

- (2) Set DIP switch 1 to the TEST (closed) position. (If the bottom cover was previously opened, reassemble the unit without replacing the screws.)
- (3) Plug one end of the line cord into the modular jack assembly and plug the other end into the KSU jack on the bottom of the DSS/BLF Unit. The system automatically tests the unit's processor.

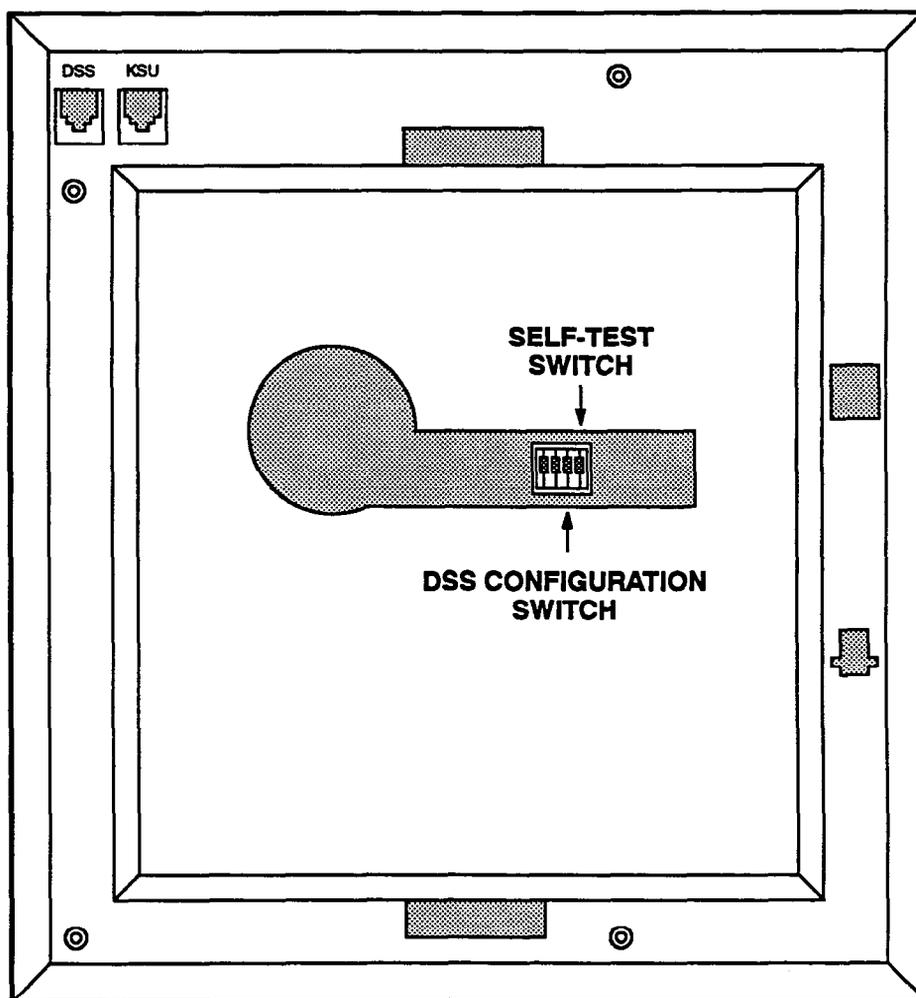
NOTE: If the test fails, you will not be able to continue to the next step; the unit will ignore all input. Remove and replace the line cord. If the test fails again, replace the DSS/BLF Unit.

- (4) Test the keys by pressing them one at a time, starting with the key in the upper-left corner and continuing from the top to the bottom of each column. As each key is pressed, the LED lights and remains lit. If an LED does not light, either the key was pressed out of order, the key is faulty, or the LED is faulty; the DSS/BLF Unit must be replaced.
- (5) Return DIP switch 1 to the RUN (open) position.
NOTE: DIP switches 3 and 4 are not used.
- (6) Reassemble the DSS/BLF Unit.
- (7) To test the second unit (if used), unplug the first unit and repeat this test procedure for the second unit.

C. SLI INSTALLATION

3.12 The GX SLI installs and operates the same as the SLI described in the main part of the manual. Refer to the information beginning on page 3-138.

FIGURE A-3. GX DSS/BLF UNIT BOTTOM



NOTE: On most DSS/BLF Units, the DIP switches can be reached through the cutout in the bottom cover (as shown above). With other units, the four screws on the bottom must be removed and the bottom cover must be opened to access the switches.

4. FEATURES

4.1 GX keysets and SLIs have feature keys that allow one-key dialing of feature codes. Information is programmed in the database to determine the arrangement of the feature keys and their default values. If desired, some of the keyset feature keys can be designated as user-programmable keys. All SLI feature keys are user-programmable.

4.2 Although their function is the same, some of the feature keys on the GX keyset have labels that are different than those described on page 4-46. For example, the LCR key on GX keysets is the same as the OUTGOING key on the other keysets. Likewise, the AUTO key on GX keysets is the same as the ANSWER key on the other keysets.

4.3 The POOL key on GX keysets actually defaults to "data" when the system is in the default configuration. However, since GX keysets cannot have Data Port Modules installed, the key is non-functional. If desired, the key can be reprogrammed in the database or by the user to access another feature code.

4.4 If the off-hook voice announce (OHVA) feature is enabled system-wide, each GX keyset can be allowed or disallowed from *placing* OHVA calls. However, since GX keysets do not have secondary voice path circuitry, they cannot *receive* off-hook voice announce (OHVA) calls.

4.5 Each SLI can be programmed for *placing* OHVA calls, as desired. (SLIs cannot receive OHVA calls since they do not have secondary voice path circuitry.)

5. PROGRAMMING

5.1 To fully enable the GX version software on an IMX 416/832 System, access the Key Assignments window (see page 5-44) and then press the CTRL, SHIFT, and G keys all at the same time. The words "GX 24-Line Keyset" should appear in the Keyset Map View Type box. Then exit and perform the update.

5.2 The database contains up to 20 keys maps (30 in expanded systems) of default values for the database-programmable feature keys. Each GX keyset can be assigned to one of the key maps using either the Station Programmable Key Programming window (see page 5-35) or the Key Assignments window (see page 5-44).

5.3 To help determine the layout of the keys on GX keysets, a program planning sheet is provided in Figure A-4 on the following page. (Also refer to the program planning sheets beginning on page 5-178.)

5.4 The key maps and key values for GX DSS/BLF Units are assigned using the procedures similar to those outlined in the manual (refer to pages 5-47 and 5-181). For *single* units, select only the "1st Half" command button to program Part 1 of the key map. For *tandem* units, also select the "2nd Half" command button to program Part 2 of the key map.

5.5 The key maps and key values for GX SLIs are assigned using the same procedures as those outlined for the SLI described in the main part of the manual (refer to pages 5-48 and 5-182).

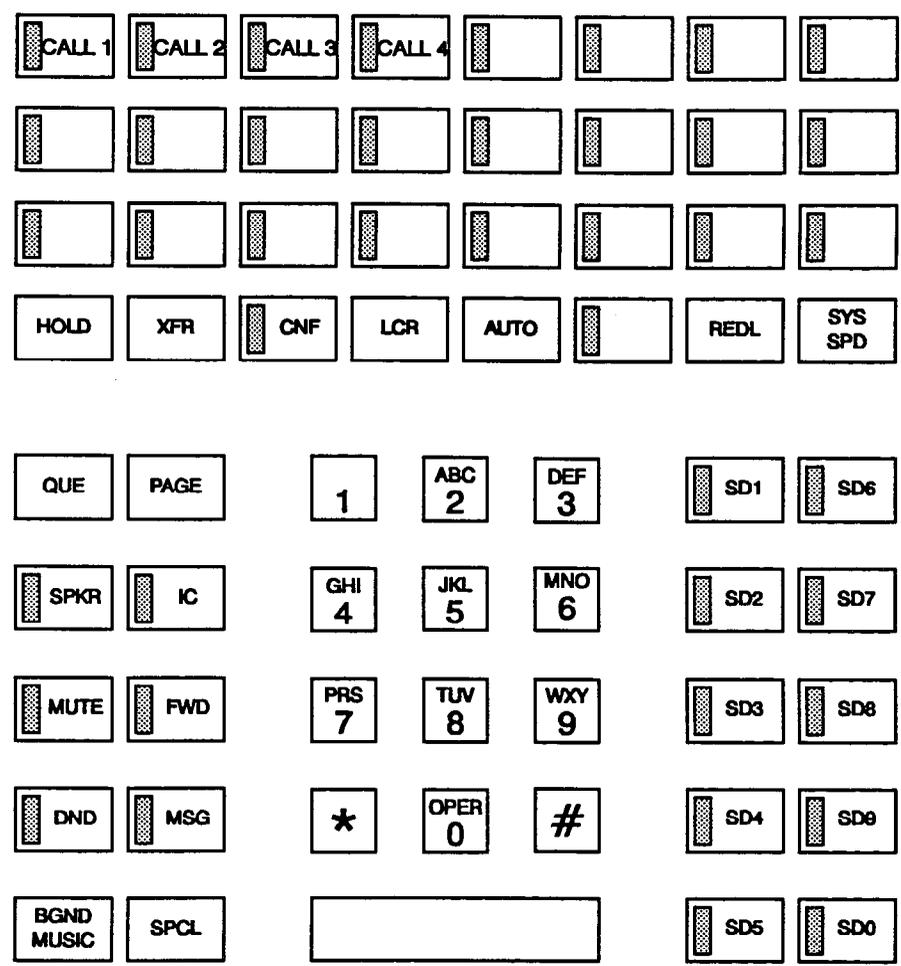
FIGURE A-4. KEY ASSIGNMENTS (KEY)

TO USE: This page shows the key numbering scheme and the default values of the keys on the GX 24-line keyset. Copy the diagram, identify the key maps, and change the names of the appropriate keys to reflect their assignments in each keymap.

KEYSET KEY MAP NUMBER: _____ DESCRIPTION: _____

STATIONS: _____

GMX 24-LINE KEYSSET



APPENDIX B — GMX STATION INSTRUMENTS

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1. OVERVIEW

Except for the differences noted in this appendix, the Inter-Tel GMX station instruments install and operate the same as those previously outlined in this manual.

1.1 The Inter-Tel GMX station instruments may be used on any GMX-416/832 System. They cannot be installed on IMX 416/832 Systems.

1.2 GMX station instruments include:

- 24-Line Standard Keysets — part no. 662.3000
- 24-Line Display Keysets — part no. 662.3100
- 12-Line Keysets (non-display only) — part no. 662.3200
- Direct Station Selection/Busy Lamp Field (DSS/BLF) Units (single only) — part no. 662.3300
- Single-Line Instruments (SLIs) — part no. 662.4100

2. SPECIFICATIONS

A. KEYSETS

2.1 For drawings of the GMX 24-line and 12-line keysets, refer to Figures B-1 and B-2 on pages B-3 and B-4. The keyset dimensions are:

GMX 24-LINE KTS

Height 3.5 in. (8.9 cm.)
 Width 8.8 in. (22.3 cm.)
 Length 9.0 in. (22.9 cm.)
 Weight 2.8 lb. (1.3 kg.)

GMX 12-LINE KTS

Height 3.5 in. (8.9 cm.)
 Width 7.5 in. (19.1 cm.)
 Length 9.0 in. (22.9 cm.)
 Weight 2.5 lb. (1.1 kg.)

2.2 Since GMX 12-line keysets do not have secondary voice path circuitry, they *cannot* be equipped with Data Port Modules and they *cannot* receive off-hook voice announce (OHVA) calls. GMX 12-line keysets can place OHVA calls (see page B-10 for more information).

Optional Liquid Crystal Display (LCD) Unit

2.3 If desired, standard GMX 24-line keysets can be converted to display keysets by installing an LCD Unit (part no. 828.1052). The messages shown on the display help the user to process calls more efficiently and professionally. (GMX 12-line keysets cannot be equipped with LCDs.)

Optional Data Port Module

2.4 GMX 24-line keysets may be equipped with optional Data Port Modules (part number 828.1094). The module board contains a four-conductor, RJ11 modular jack that can be used to connect *either* a data device (such as a personal computer equipped with a modem) *or* a loud ringing adapter (LRA) and an external signaling device (such as a loud bell, horn, flashing light, etc.) to the keyset. GMX 12-line keysets cannot be equipped with Data Port Modules.

**B. DIRECT STATION SELECTION/BUSY
LAMP FIELD (DSS/BLF) UNITS**

2.5 GMX DSS/BLF Units are single units only; they *cannot* be connected together to form tandem units. Each unit provides one-key access to 60 extension numbers.

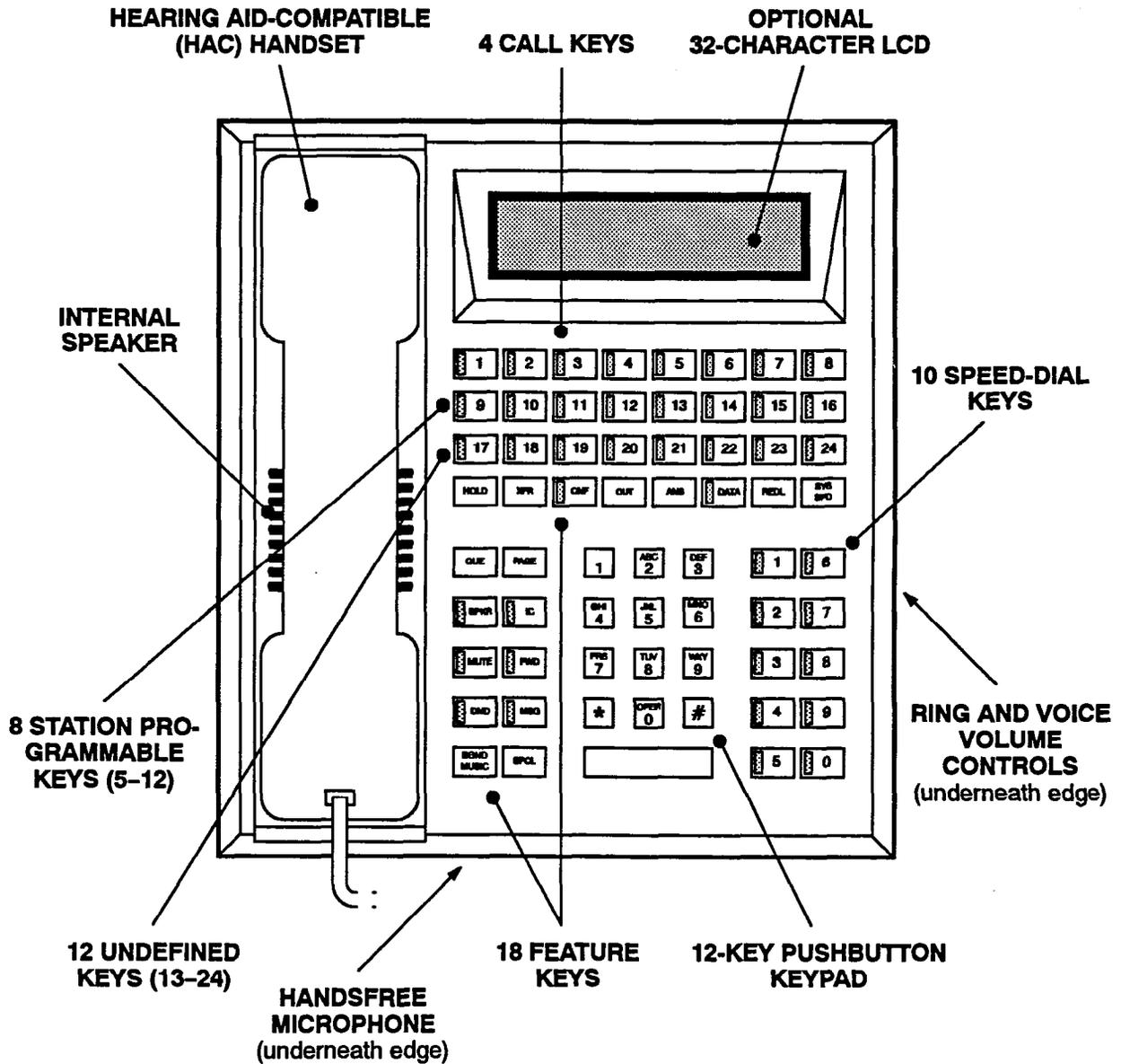
2.6 GMX DSS/BLF Unit dimensions are:

Height	3.5 in. (8.9 cm.)
Width	8.8 in. (22.3 cm.)
Length	9.0 in. (22.9 cm.)
Weight	2.0 lb. (0.9 kg.)

C. SINGLE-LINE INSTRUMENTS (SLIs)

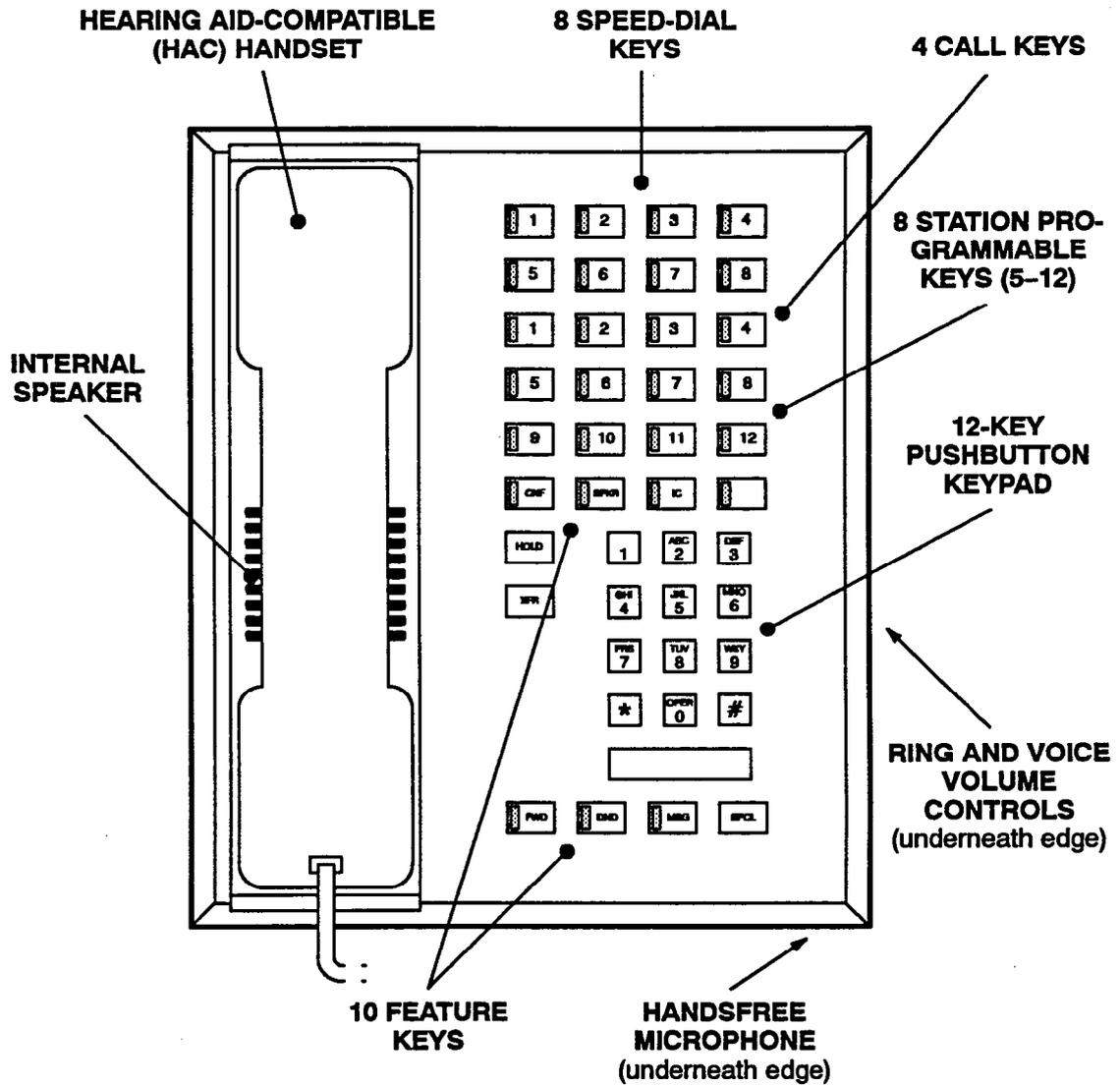
2.7 GMX Single-Line Instruments (SLIs) are identical in design and function to the SLIs described in the main part of the manual.

FIGURE B-1. GMX 24-LINE KEYS



NOTE: The keys are shown as they appear in the default key map configuration.

FIGURE B-2. GMX 12-LINE KEYS



NOTE: The keys are shown as they appear in the default key map configuration.

3. INSTALLATION

3.1 The installation instructions in this appendix contain information that differs from or is not covered in the rest of the manual. For complete installation information, use this appendix in conjunction with the INSTALLATION section of the manual.

3.2 When performing the loop resistance test (see page 3-30), use the following loop limit values for GMX station instruments:

GMX 24-Line Keysets (standard or display)	65 ohms/1260 ft. (384 m.)
GMX 24-Line Keysets with Data Port Modules	50 ohms/970 ft. (295 m.)
GMX 12-Line Keysets	65 ohms/1260 ft. (384 m.)
GMX DSS/BLF Units	65 ohms/1260 ft. (384 m.)

A. KEYSSET INSTALLATION

3.3 Before performing the installation instructions outlined in this section, refer to the information beginning on page 3-114.

Liquid Crystal Display (LCD) Installation

3.4 To convert a standard GMX keyset to a display keyset, install an LCD Kit (part no. 828.1052) as follows:

- (1) Unpack the LCD Kit. There should be a clear plastic display window, an LCD unit, a ribbon cable, and two small Phillips-head screws.
- (2) Remove the keyset baseplate by pressing on the top edge of the baseplate to release the tab and by pulling the plate off.
- (3) Remove the line cord and handset cord from the keyset. Then loosen the four screws on the bottom of the keyset (enough so that the keyset can be opened).
- (4) Carefully open the keyset to expose the back of the keyboard that has the LCD connector. (Refer to Figure 3-66 on page 3-115.)
- (5) Remove the cover from the display opening in the top housing of the keyset by releasing the tabs from the inside of the housing and pushing out the cover.
- (6) From the front of the keyset, insert one end of the clear plastic window in the display opening, with the painted side of the dark edging facing the in-

side of the keyset. Then slightly bend the window, insert the other end into the opening, and ease the window into place.

- (7) Remove the covering from the LCD and install as follows:
 - a. Insert one end of the ribbon cable into the black connector on the LCD unit. Ensure that the metal strips on the ribbon cable make contact with the metal tabs in the black connector.
 - b. With the LCD facing up, insert the other end of the ribbon cable into the black connector on the back of the keyboard.
 - c. Position the LCD on the plastic window so that the screw holes in the LCD unit and in the keyset housing are aligned. Install the screws to hold the LCD in place.
- (8) Reassemble the keyset.
- (9) *If there is a potentiometer located underneath the extension number plate on the face of the keyset, the LCD contrast can be adjusted. Turn the potentiometer to lighten or darken the display.*

Keyset Self-Test

3.5 To perform the GMX keyset self-test, follow these instructions:

- (1) While pressing the asterisk (*) and pound (#) keys, unplug and replace the keyset line cord.
- (2) Release the keys. The keyset rings momentarily. (Display keysets show KTS SELF TEST HOOK-SWITCH.)
- (3) Lift and replace the handset to test the hook-switch. The LED-equipped keys light and the keyset rings momentarily. (Display keysets show KTS SELF TEST LED MATRIX.) *If any of the LEDs do not light, return the keyset for repair.*
- (4) Lift and replace the handset. The keyset rings momentarily and all of the LEDs go out. (Display keysets show KTS SELF TEST KEY MATRIX.)
- (5) Press keys in the following order. A progress tone is heard and the keyset rings momentarily if the key is functioning properly. *If the signals are not heard, the key was either pressed out of order or is faulty. Return the keyset for repair if any key is faulty.*

24-Line Keysets:

- a. The call keys, station programmable keys, and undefined keys in order: 1-24.

- b. Feature keys in this order: HOLD, XFR, CNF, OUT (LCR), ANS (AUTO), DATA, REDL, SYS SPD, QUE, PAGE, SPKR, IC, MUTE, FWD, DND, MSG, BGND MUSIC, and SPCL.
- c. Keypad keys in the following order: 1-9, *, 0, and #.
- d. Speed-dial keys in this order: 1, 6, 2, 7, 3, 8, 4, 9, 5, and 0.

12-Line Keysets:

- a. The speed-dial keys in order: 1-8.
 - b. The call keys and station programmable keys in order: 1-12.
 - c. Feature keys in this order: CNF, SPKR, IC, OVER, HOLD, and XFR.
 - d. Keypad keys in the following order: 1-9, *, 0, and #.
 - e. Feature keys in this order: FWD, DND, MSG, and SPCL.
- (6) After all the keys have been tested, it takes about ten seconds for the keyset to return to normal operation. (Display keysets show KTS SELF TEST COMPLETED! for about five seconds. Then the keyset's identification displays for about five seconds.)
- (7) Replace the keyset if faulty.

Optional Data Port Module

3.6 GMX 24-line keysets may be equipped with optional Data Port Modules (refer to REPLACEMENT PARTS for the part number). The Data Port Module contains a four-conductor modular jack that can be used to

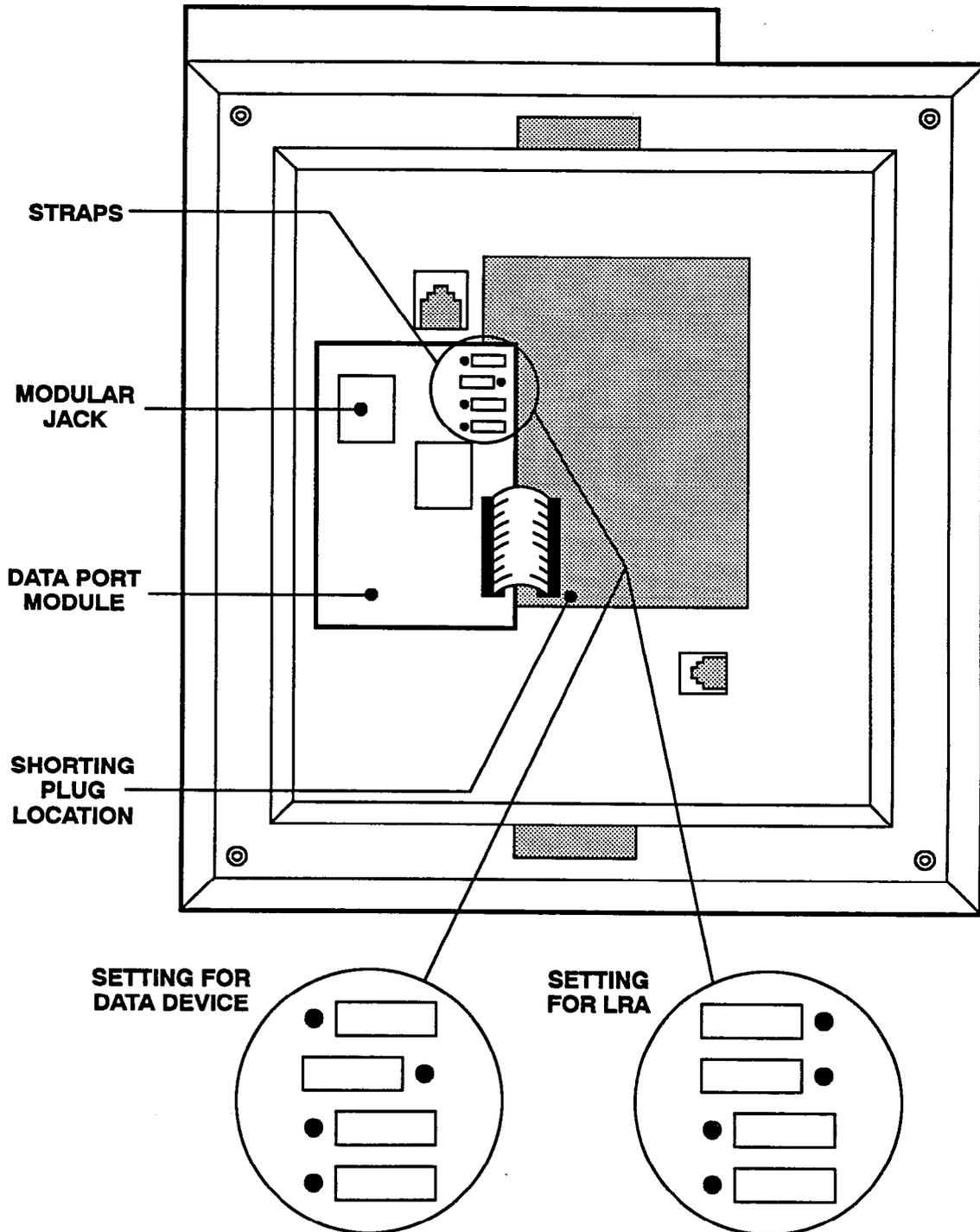
connect *either* a data device (such as a personal computer with a direct-connect modem) *or* an LRA and an external signaling device (such as a loud bell, horn, flashing light, etc.) to the keyset.

3.7 Install the Data Port Module as outlined below. For a diagram, see Figure B-3 on page B-7.

- (1) Remove the keyset baseplate.
- (2) Unplug the line cord from its modular jack.
- (3) Remove the 10-pin shorting plug located on the keyset control board.
- (4) Save the shorting plug by taping it to the bottom cover of the keyset or to the inside of the baseplate. The plug must be replaced if the Data Port Module is later removed.
- (5) Align the Data Port Module over the appropriate screw holes (see Figure B-3) on the back cover of the keyset and insert the screws (do not over tighten).
- (6) Plug the Data Port Module cable into the pins on the keyset control board (where the shorting plug was previously located). Make sure the cable connector is securely seated.
- (7) Place jumper straps SP1, SP2, SP3, and SP4 on the Data Port Module in the appropriate positions. Depending on how the Data Port Module will be used, refer to one of the two possible settings outlined in Figure B-3.
- (8) *If connecting a modem-equipped data device, refer to paragraphs 7.23 through 7.25 on page 3-121.*

If connecting a loud ringing adapter and an external signaling device, refer to paragraphs 7.26 through 7.28 on page 3-123.

FIGURE B-3. GMX 24-LINE KEYSSET DATA PORT MODULE INSTALLATION



B. DSS/BLF UNIT INSTALLATION

3.8 Before performing the installation instructions outlined in this section, refer to the information beginning on page 3-135.

DSS/BLF Unit Self-Test

3.9 To perform the GMX DSS/BLF Unit self-test, follow these instructions:

- (1) Remove the baseplate and locate the four DIP switches on the bottom of the unit (see Figure B-4 on the next page).

NOTE: Most DSS/BLF Units have a cutout in the bottom cover so that the DIP switches can be reached without having to take the unit apart. With other units, the four screws on the bottom must be removed and the bottom cover must be opened.

- (2) Set DIP switch 1 to the TEST (closed) position. (If the bottom cover was previously opened, reassemble the unit without replacing the screws.)
- (3) Plug one end of the line cord into the modular jack assembly and plug the other end into the

KSU jack on the bottom of the DSS/BLF Unit. The system automatically tests the unit's processor.

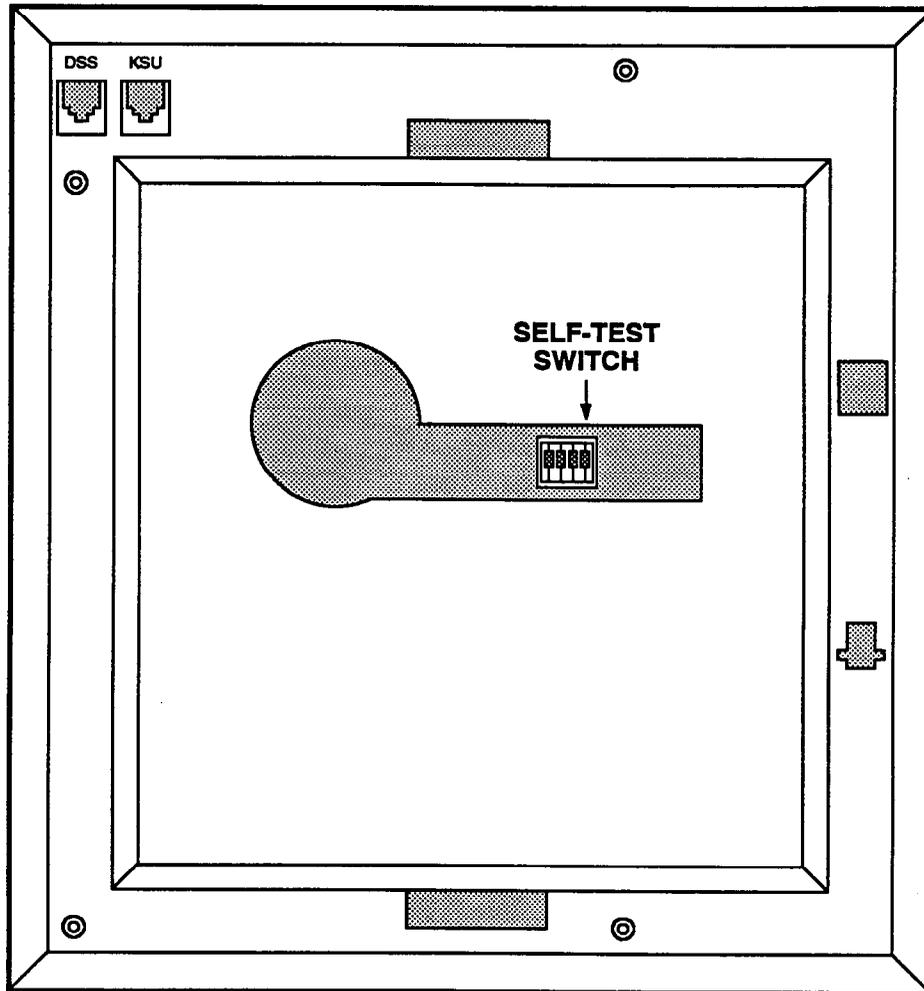
NOTE: If the test fails, you will not be able to continue to the next step; the unit will ignore all input. Remove and replace the line cord. If the test fails again, replace the DSS/BLF Unit.

- (4) Test the keys by pressing them one at a time, starting with the key in the upper-left corner and continuing from the top to the bottom of each column. As each key is pressed, the LED lights and remains lit. If an LED does not light, either the key was pressed out of order, the key is faulty, or the LED is faulty; the DSS/BLF Unit must be replaced.
- (5) Return DIP switch 1 to the RUN (open) position.
NOTE: DIP switches 2-4 are not used.
- (6) Reassemble the DSS/BLF Unit.

C. SLI INSTALLATION

3.10 The GMX SLI installs and operates the same as the SLI described in the main part of the manual. Refer to the information beginning on page 3-138.

FIGURE B-4. GMX DSS/BLF UNIT BOTTOM



NOTE: On most DSS/BLF Units, the DIP switches can be reached through the cutout in the bottom cover (as shown above). With other units, the four screws on the bottom must be removed and the bottom cover must be opened to access the switches.

4. FEATURES

4.1 GMX keysets and SLIs have feature keys that allow one-key dialing of feature codes. Information is programmed in the database to determine the arrangement of the feature keys and their default values. If desired, some of the keyset feature keys can be designated as user-programmable keys. All SLI feature keys are user-programmable.

4.2 Although their function is the same, some of the feature keys on the GMX keyset may have labels that are different than those described on page 4-46. For example, the ANS key on GMX keysets is the same as the OUTGOING key on the other keysets. Likewise, the FLASH key on GMX keysets is the same as the ANSWER key on the other keysets.

4.3 The OVER key on GMX 12-line keysets actually defaults to "data" when the system is in the default configuration. However, since GMX 12-line keysets cannot have Data Port Modules installed, the key is non-functional. If desired, the key can be reprogrammed in the database or by the user to access another feature code.

4.4 If the off-hook voice announce (OHVA) feature is enabled system-wide, each GMX keyset can be allowed or disallowed from *placing* OHVA calls. However, since GMX 12-line keysets do not have secondary voice path circuitry, they cannot *receive* off-hook voice announce (OHVA) calls.

4.5 Each SLI can be programmed for *placing* OHVA calls, as desired. (SLIs cannot receive OHVA calls since they do not have secondary voice path circuitry.)

5. PROGRAMMING

5.1 The database contains up to 20 keys maps (30 in expanded systems) of default values for the database-programmable feature keys. Each GMX keyset can be assigned to one of the key maps using either the Station Programmable Key Programming window (see page 5-35) or the Key Assignments window (see page 5-44).

5.2 To help determine the layout of the keys on GMX keysets, program planning sheets are provided in Figure B-5 on the following pages. (Also refer to the program planning sheets beginning on page 5-178.)

5.3 The key maps and key values for GMX DSS/BLF Units are assigned using the procedures similar to those outlined in the manual (refer to pages 5-47 and 5-181). However, since they cannot be tandem units, select only the "1st Half" command button to program Part 1 of the key map.

5.4 The key maps and key values for GMX SLIs are assigned using the same procedures as those outlined for the SLI described in the main part of the manual (refer to pages 5-48 and 5-182).

FIGURE B-5. KEY ASSIGNMENTS (KEY)

TO USE: The following pages show the key numbering scheme and the default values of the keys on the GMX 24-line and 12-line keysets. Copy the diagrams, identify the key maps, and change the names of the appropriate keys to reflect their assignments in each keymap.

KEYSET KEY MAP NUMBER: _____ DESCRIPTION: _____

STATIONS: _____

GMX 24-LINE KEYS

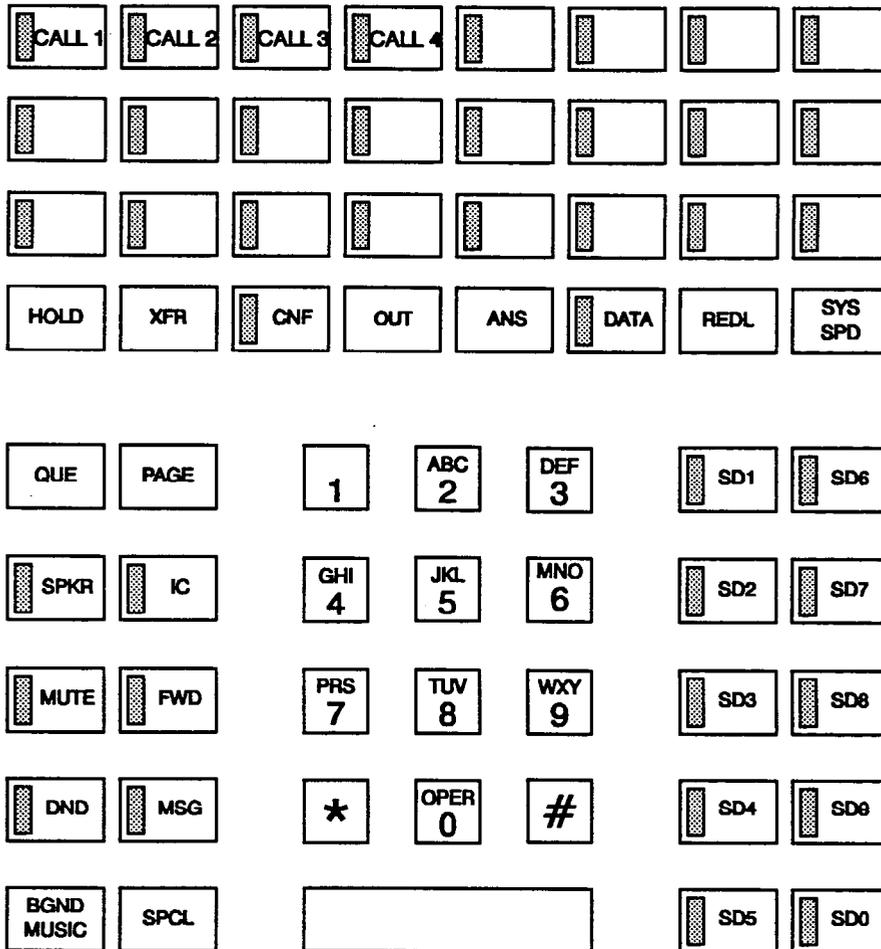
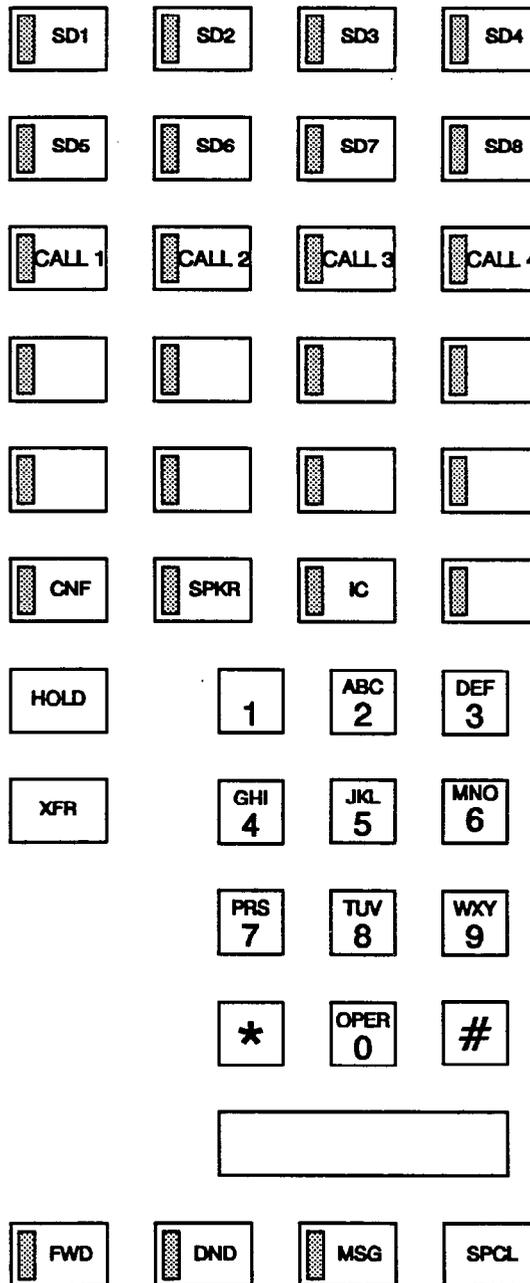


FIGURE B-5. KEY ASSIGNMENTS (KEY) — Continued

KEYSET KEY MAP NUMBER: _____ DESCRIPTION: _____

STATIONS: _____

GMX 12-LINE KEYSET



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Extension Numbers:

Attendant	0
Stations	1000-1223
Hunt Groups	2000-2039
Modem (MXC Port)	2600

Attendant Feature Codes:

Clear System Alarm	019
Database Programming Enable	029
Night Ring On/Off	010
Paging Speaker Music On/Off*	*018
Program Station Data	022
Program System DND Messages	024
Program System Reminder Messages	023
Program System Speed Dial	020
Remote Feature Cancel:	
Group Do-Not-Disturb Cancel	012
Group Call Forward Cancel	013
Group DND/FWD Cancel	014
Hunt Group Replace	032
Hunt Group Remove	033
Individual Do-Not-Disturb Cancel	015
Individual Call Forward Cancel	016
Individual DND/FWD Cancel	017
Set Time of Day	021
SMDA	025
Trunk Maintenance	027
Remove All Trunks From Maintenance	028

*Primary attendant only

Station Feature Codes:

Automatic Intercom Access	362
Automatic Intercom Access Cancel	363
Automatic Intercom Access On/Off	364
Automatic Trunk Access	360
Automatic Trunk Access Cancel	361
Automatic Trunk Access On/Off	374
Automatic Trunk Answer	350
Background Music Channel Selection	318
Background Music On/Off	313
Barge	397
Call Forward — All Calls	355
Call Forward — If Busy	357
Call Forward — If No Answer	356
Call Forward — If No Answer or Busy	358
Call Forward — Cancel Any	359
Call Splitting — Single-Line Set	337
Call Splitting — Keypad	338
Cancel Misc. Operations	395
Conference	5
Data	340

Data Port Monitor	341
Date And Time Display	300
Do-Not-Disturb	370
Do-Not-Disturb Cancel	371
Do-Not-Disturb On/Off	372
Override	373
Feature Key Default (returns all feature keys to default values)	325
Feature Key Display (displays current values)	326
Feature Key Programming	327
Handsfree Enable	311
Handsfree Disable	310
Handsfree On/Off	319
Headset Enable	315
Headset Disable	316
Headset Mode On/Off	317
Hold — Individual	336
Hold — System	335
Hookflash	330
Hunt Group Remove	322
Hunt Group Replace	323
Hunt Group Remove/Replace On/Off	324
Keypad Default Volumes	394
Leave Message	365
Cancel Current Message (at your own phone)	379
Message Cancel (that you left at another phone)	366
Silent Message	378
Microphone Mute On/Off	314
Optional Account Code	390
Page	7
Page Remove	332
Page Replace	333
Page Remove/Replace On/Off	334
Private CO (outside) Call	369
Queue (busy station/trunk callback) Request	6
Queue Request Cancel	376
Redial	380
Redial Mode — Last Number Dialed	320
Redial Mode — Last Number Saved	321
Release	339
Reminder Message	305
Reminder Message Cancel	306
Reverse Transfer (call pick-up)	4
Ring Intercom Always	367
Cancel Ring Intercom Always	368
Ring Intercom Always On/Off	377
Ring Tone Selection	328
Speakerphone On/Off	312
Station Exchange	303
Station Monitoring	396
Station Speed Dial	382
Station Speed Dial Programming	383
System Directory — Intercom	307
System Directory — Outside	308
System Speed Dial	381
Transfer CO (outside) Call	345
Transfer Intercom Call	346
Transfer To Hold	347