

9109-096-000-NA

ISSUE 1

Feb. 1992

**SX-200<sup>®</sup> DIGITAL PABX**

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# Generic 1005 Practices Index

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# 1.

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## GENERAL

This Section contains a list of Practices for the *SX-200*<sup>®</sup> DIGITAL Private Automatic Branch Exchange, with the following software variants: Generic 1001, Generic 1002, Generic 1003, Generic 1004, Generic 1005, Generic 1005 FPKG1, and Generic 1005 LIT96.

### Documentation Index

1.1 The *SX-200* DIGITAL PABX documentation is contained in 2 volumes as follows:

Volume 1 – Features and Services, Hardware (9109-096-001-NA) contains a system description, feature operation information and hardware descriptions of circuit cards and peripheral equipment.

Volume 2 – Installation and Administration (9109-096-002-NA) contains system installation, testing, data entry information, engineering, troubleshooting and maintenance information.

**Table 1-1 Generic 1005 FD1 Practices Index**

<b>VOLUME 1</b>	<b>Features and Services, Hardware</b>	<b>9109-096-001-NA</b>
<b>Practice Number</b>	<b>Title</b>	
9109-096-000-NA	Generic 1005 Practices Index	
9109-096-100-NA	General Description	
9109-096-105-NA	Features Description	
9109-096-220-NA	Automatic Route Selection and Toll Control	
9109-096-221-NA	Station Message Detail Recording	
9109-096-230-NA	Tenanting	
9109-096-450-NA	Traffic Measurement	
9109-096-602-NA	Hotel / Motel Feature Package Description	
9109-096-620-NA	ACD TELEMARKETER® Application Package	
9109-096-625-NA	Automated Attendant Application Package	
9109-096-125-NA	Circuit Card Descriptions	
9109-096-126-NA	Peripheral Devices	
<b>VOLUME 2</b>	<b>Installation and Administration</b>	<b>9109-096-002-NA</b>
<b>Practice Number</b>	<b>Title</b>	
9109-096-000-NA	Generic 1005 Practices Index	
9109-096-203-NA	Safety Instructions	
9109-096-200-NA	Installation Information	
9109-096-210-NA	Customer Data Entry	
9109-096-350-NA	Troubleshooting	
9109-096-351-NA	RS-232 Maintenance Terminal	
9109-096-353-NA	General Maintenance Information	
9109-096-355-NA	Field-Replaceable Units	
9109-096-180-NA	Engineering Information	

9109-096-203-NA

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# Safety Instructions

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## 1.

## IMPORTANT SAFETY INSTRUCTIONS

These instructions are intended as a general guide to provide basic installation information which is necessary for the proper and safe functioning of this equipment.

**WARNING**

**Failure to follow all instructions may result in improper equipment operation and/or risk of electric shock.**

### General

- Read and understand all instructions. Keep these instructions with the equipment.
- Do not attempt to install or service this equipment unless you are skilled in the installation and maintenance of electronic telecommunication equipment and have successfully completed specific training for this equipment.
- This product must be installed and serviced in accordance with this document and the information contained in this set of Technical Practices. Practice 9109-096-000-NA is the Practice Index document.
- Follow all procedures outlined in the practices in the sequence that is given.
- Install all assemblies using the procedures described in Practice 9109-096-200-NA, Installation Information.
- Configure this product with only the assemblies specified and in the locations stated in this set of Technical Practices.
- Replace all guards or barriers. Close and lock doors at the completion of installation or before returning the equipment to service.
- Grounding circuit continuity is vital for safe operation of telecommunication equipment. Never operate telecommunication equipment with the grounding conductor disconnected.
- Ensure grounding conductor is installed before connecting telecommunication cabling to any system.

### Use of Notices

- 1.1 The following information provides an explanation of the notices which appear on the product and in the practices for this product:

<b>DANGER</b>	Danger indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
<b>WARNING</b>	Warning indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
<b>CAUTION</b>	Caution indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury and/or damage to the equipment or property.

## Use of Symbols

1.2 The following information provides an explanation of the symbols which appear on the product:

 DANGEROUS VOLTAGE	The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a significant risk of electric shock to persons.
 INSTRUCTIONS	The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the product.
 PROTECTIVE GROUNDING TERMINAL	The ground symbol within a circle identifies the terminal which is intended for connection to an external protective conductor. This connector must be connected to earth ground prior to making any other connections to the equipment.

## General Installation Summary

<b>Power Source</b>	This product is intended to operate from an electrical branch circuit source rated at 120 volts RMS, 60 Hz, 15 amperes.
<b>Equipment Location</b>	This product shall only be situated in a clean and dry environment in accordance with the environmental and other installation requirements specified in Practice 9109-096-200-NA, Installation Information.
<b>AC Power Cord</b>	Use only the 3 – wire power cord supplied with this product. Replace the power cord only with one having the same number of conductors, electrical rating, and usage rating.

## Fuse and Component Replacement

**WARNING**

Unauthorized repair of this product may result in a fire or shock hazard, and/or defective operation and/or equipment damage. Do not repair or replace components on circuit card assemblies or other parts of this equipment unless there is a specific description of the procedure provided in this set of technical practices. Return all inoperative assemblies to an authorized MITEL agent for repair.

- 1.3 Fuses identified with an electrical rating (voltage, current, type) shall be replaced with only the same type and rating. Never replace fuses with devices having different electrical ratings. Only those fuses installed in fuse-clips or fuse-holders shall be replaced in the field as directed by instructions in this set of Technical Practices. Do not replace or attempt to bypass soldered in fuses on circuit card assemblies.

Refer to the appropriate documents in this document set for information on the proper method of troubleshooting and servicing of this product. Practice 9109-096-000-NA is the Practice Index document.

## Identification and Location of Circuit Card for Installation

### General Description

- 1.4 The mechanical design consists of an enclosure, a card cage, and an interconnecting backplane which define the arrangement and position of circuit card assemblies. Installation of the circuit card assemblies is performed either by sliding it into the appropriate slot in the card cage or by attaching it to the side rails using screws. These two methods are described below:

**Method 1** – The assembly physically interconnects into the system by first positioning it in front of the appropriate slot and then sliding the cards along the card cage guides until the card is firmly seated into the mating connector on the backplane. Most circuit cards are installed in this manner. Refer to Figure 1-1, Figure 1-2 and Figure 1-3 for the specific locations of the assemblies.

**Method 2** – The assembly attaches to the internal side rails of the cabinet using screws. Power Fail Transfer (PFT) cards are installed using this method. Refer to figure Figure 1-4 for the specific location of the assemblies.

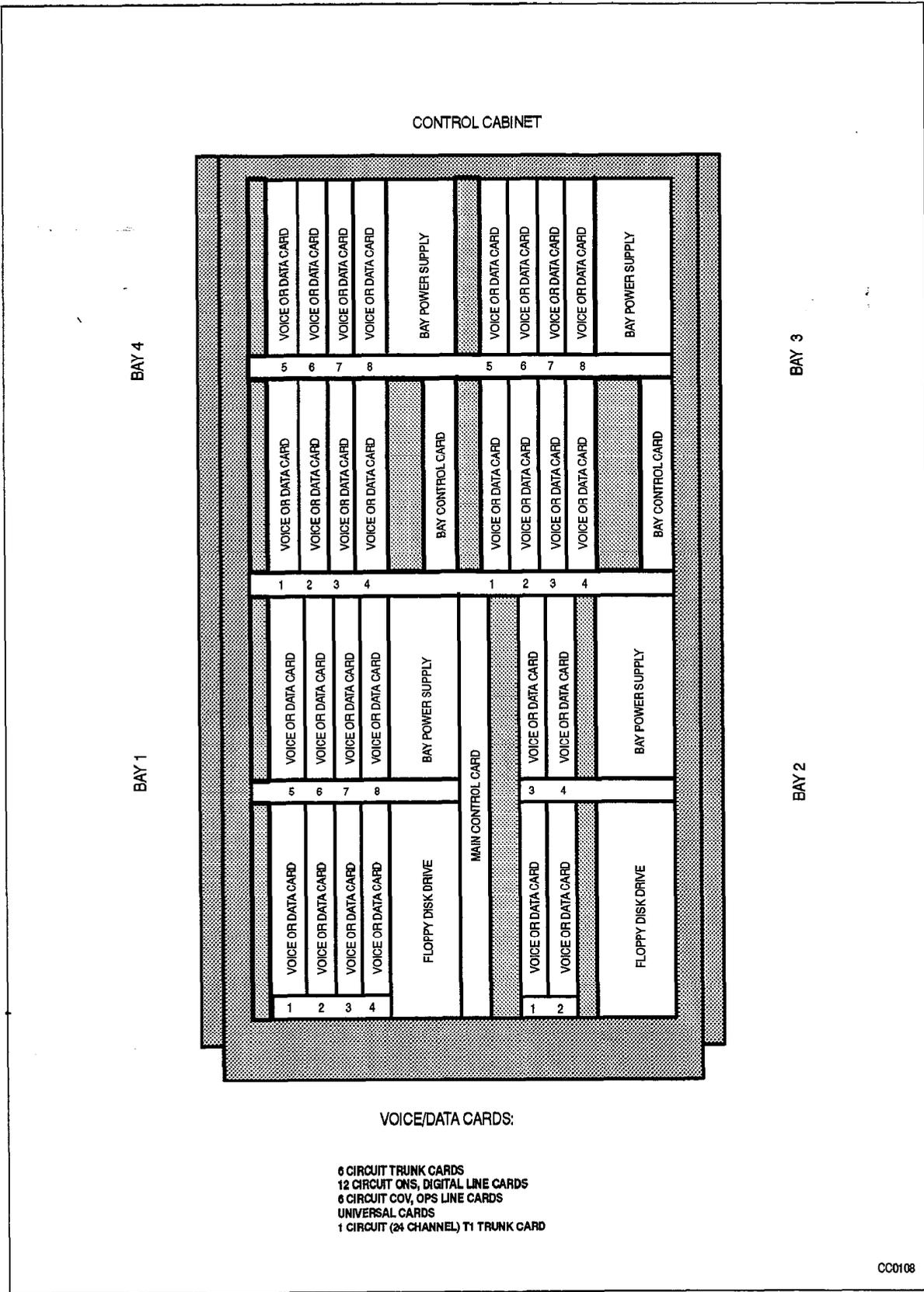


Figure 1-1 336 Port Cabinet Circuit Card Locations

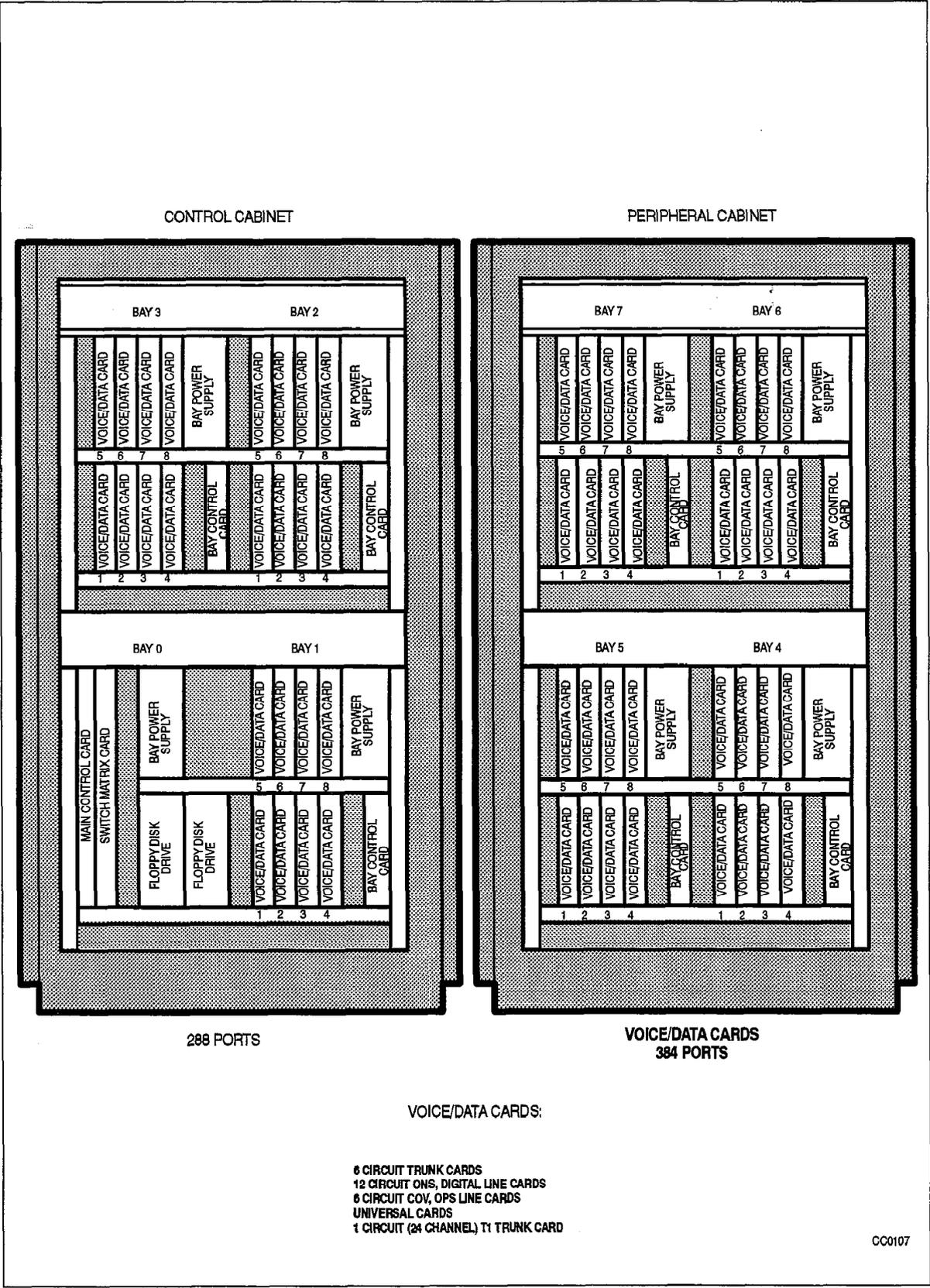
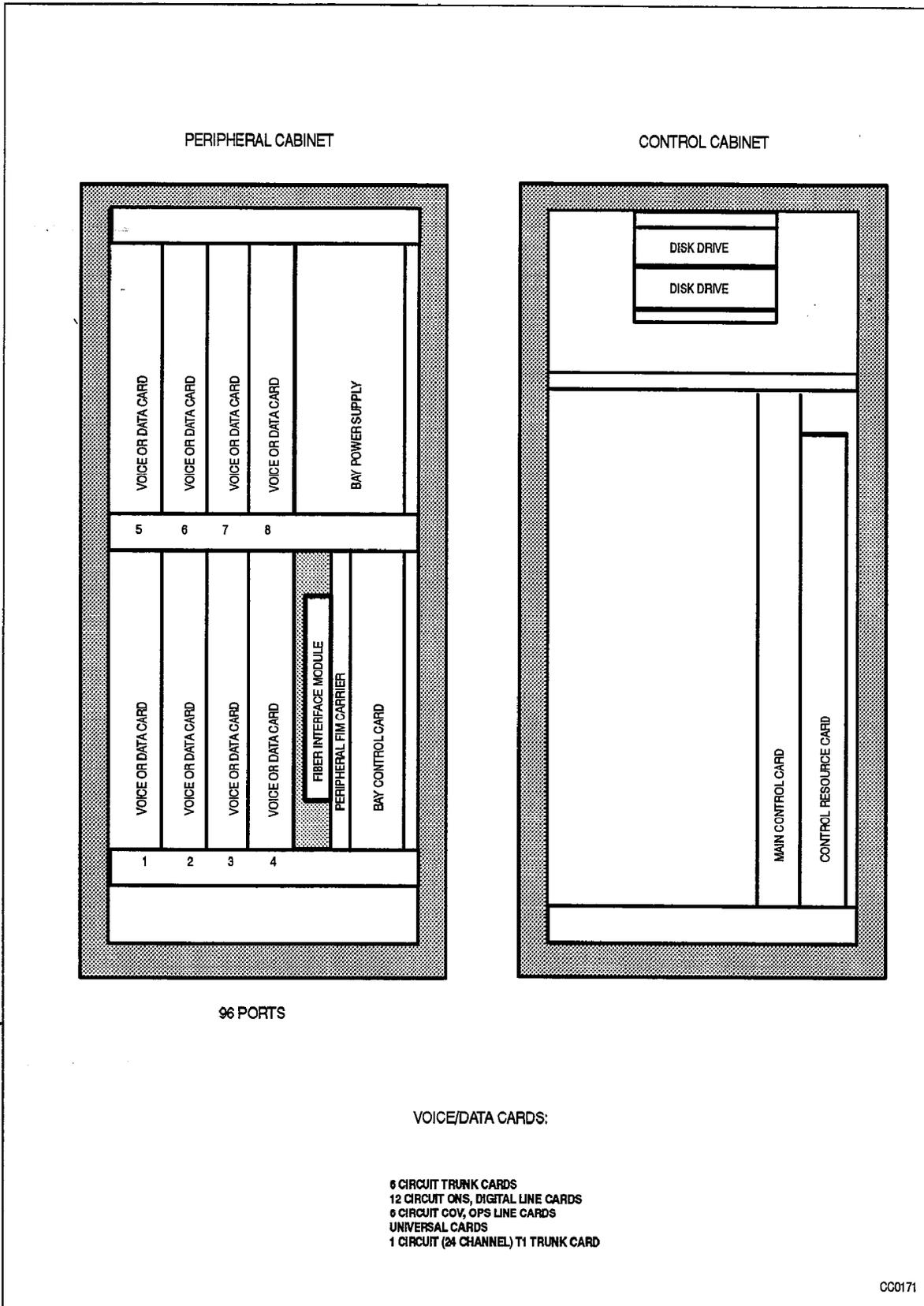
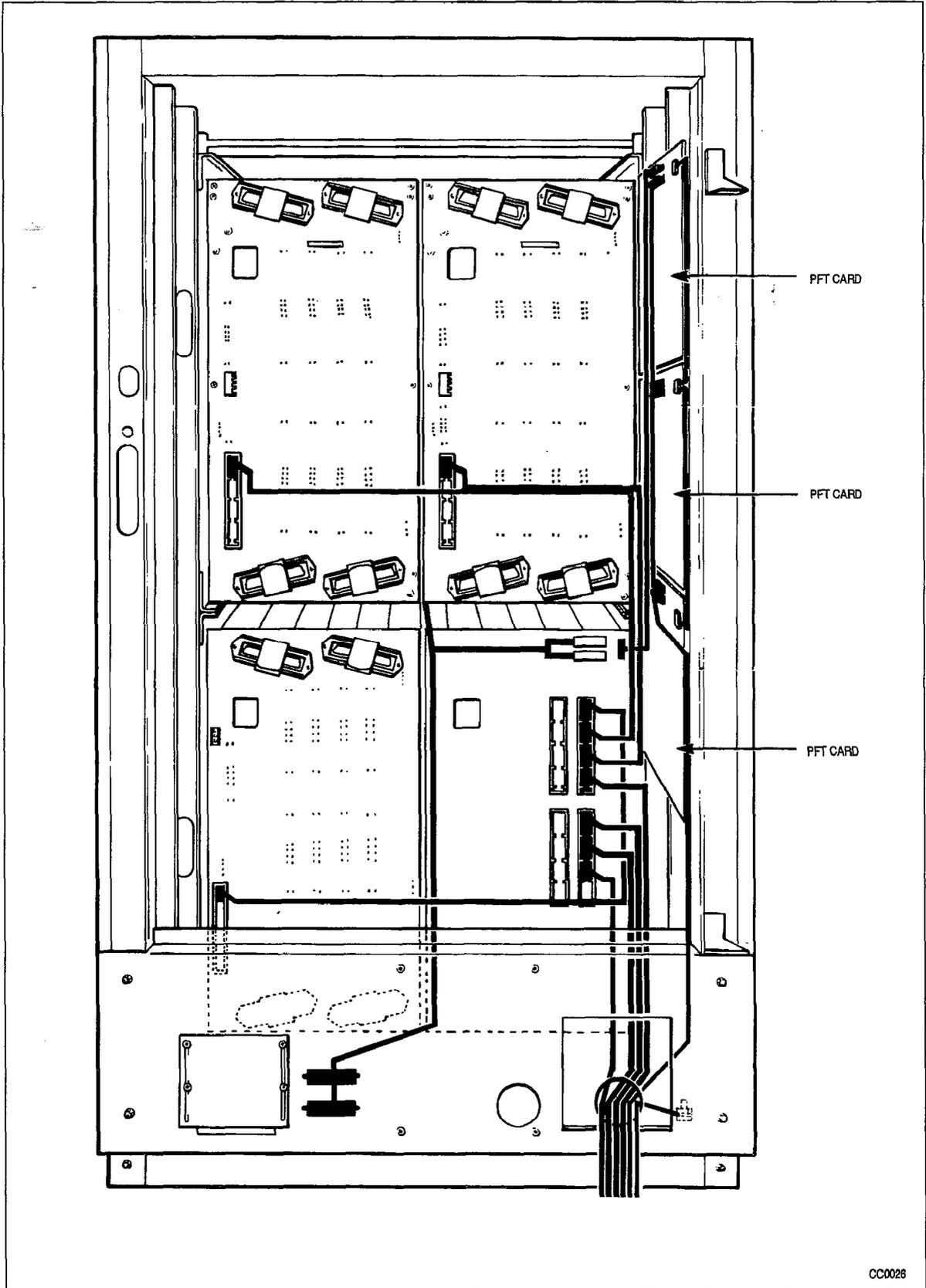


Figure 1-2 672 Port Cabinet Circuit Card Locations



**Figure 1-3 SX-200 FD Circuit Card Locations**



CC0028

Figure 1-4 PFT Circuit Card Locations (All Cabinets except SX-200 FD)

## Equipment Grounding

- 1.5 Redundant and independent equipment grounding conductors (see Note 1) are to be installed between the product and the wiring system ground.

One of the equipment's grounding conductors shall be an insulated grounding conductor (see Note 2) that is not smaller in size and is equivalent in insulation material and thickness to the grounded and ungrounded branch circuit supply conductor, except that it is green, with or without one or more yellow stripes. The grounding conductor is to be installed as part of the circuit that supplies that product or system and is to be connected to ground at the service equipment.

The other conductor (see Note 3) shall comply with the general rules for grounding contained in Article 250 of the National Electrical Code, NFPA 70, or Section 10 of the Canadian Electrical Code, CSA C22.1, but shall not depend on the cord and plug of the product.

- Notes:** 1. There are two grounding conductors required to be installed with this equipment. One ground conductor is provided as part of the three wire 15 A branch circuit from which the product derives AC power. The other ground conductor is the supplementary or telecommunications ground.

The SX-200 FD control cabinet does not require a separate and independent equipment grounding conductor. The supplementary ground is only required if the cabinet contains telecommunications interfaces that connect to exposed or outside plant leads. These generally include LS/GS and DID trunk cards and OPS line cards. Please refer to Figure 1-8.

The power cord for this product should only be replaced with one having the same number of conductors, gauge, insulation and usage ratings.

The telecommunications ground conductor shall be installed before installing other telecommunications wiring to the system. Multi-cabinet system installations may share a common ground conductor. Refer to Practice 9109-096-200-NA, Installation Information, for specific instructions for correct system grounding.

2. This grounding conductor is provided as part of the AC power cord-set provided with the equipment. The size of this conductor is allowed as stated in the National Electrical Code (NEC) in the United States NFPA/ANSI 70 Section 250-95, Exception No. 1 which provides for compliance through Section 240-4, Exception No. 1.
3. This grounding conductor is referred to as the telecommunications ground or supplementary ground as permitted in Section 250-91 (c) of the NEC. This shall be an insulated #6 AWG, green or green and yellow striped wire which is to be connected to the protective grounding stud within the cabinet. The following symbol is located adjacent to the stud to identify the connection point for the grounding conductor:



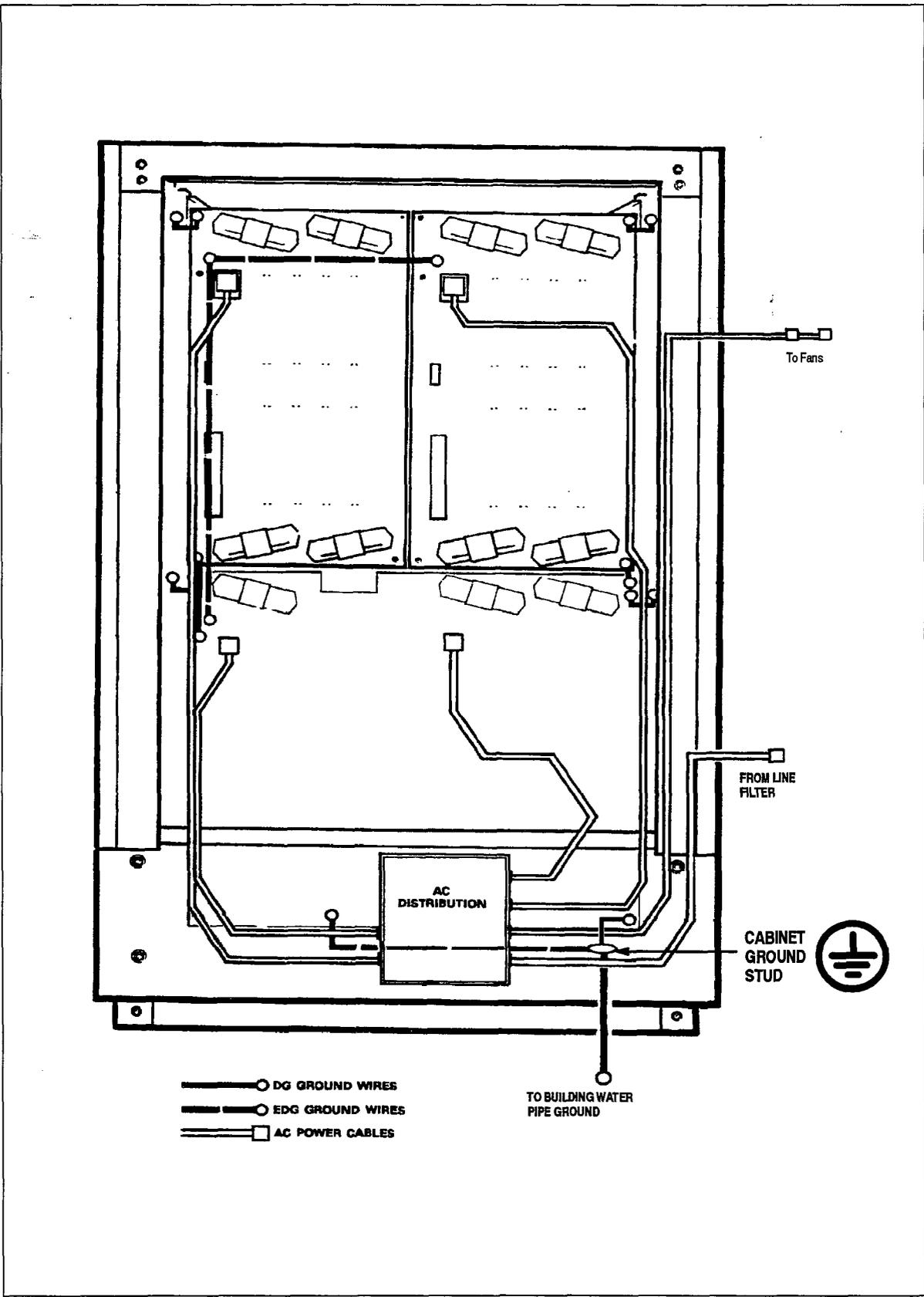


Figure 1-5 336 Port Cabinet Ground Connection Point

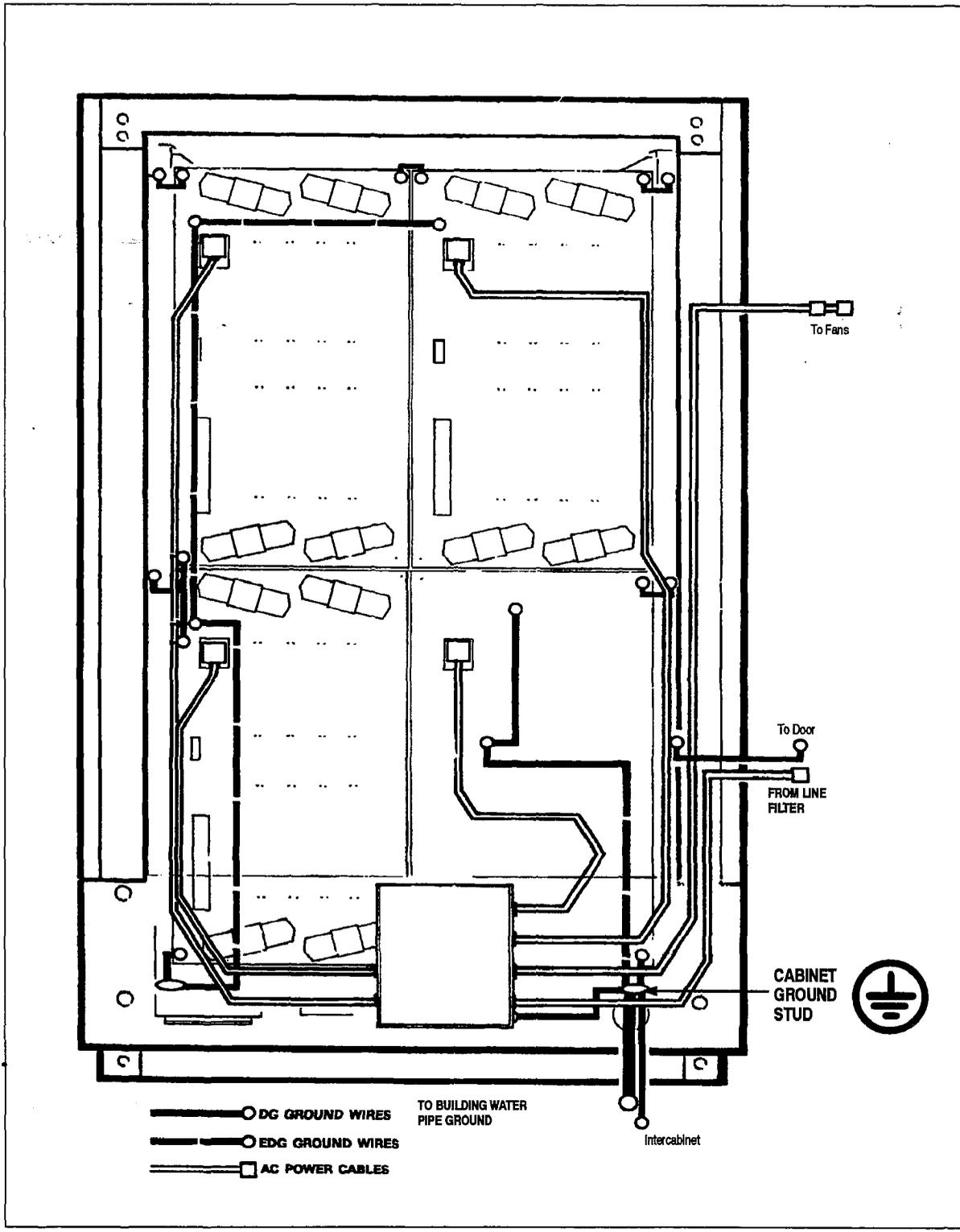


Figure 1-6 672 Port Control Cabinet Ground Connection Point

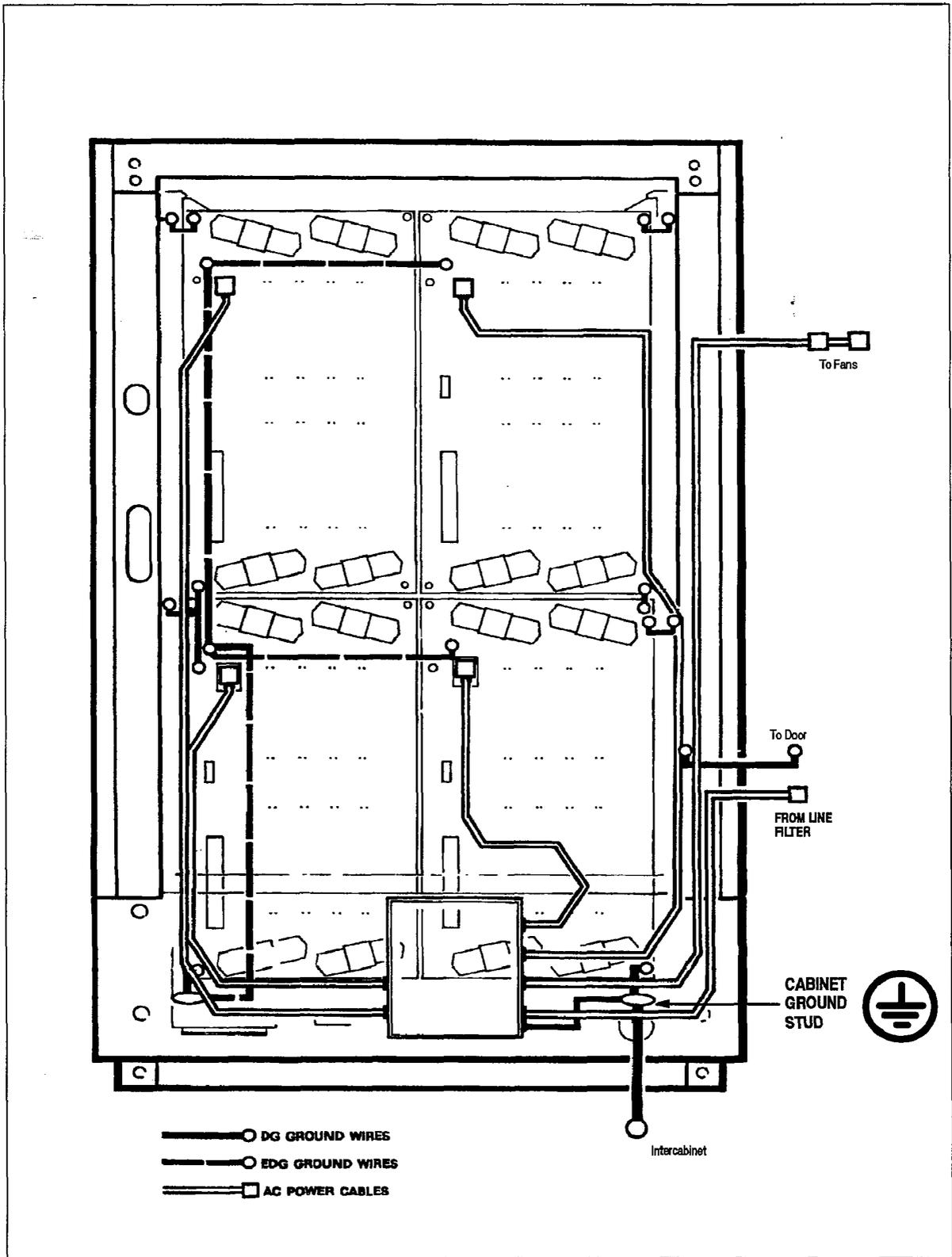


Figure 1-7 672 Port Peripheral Cabinet Ground Connection Point

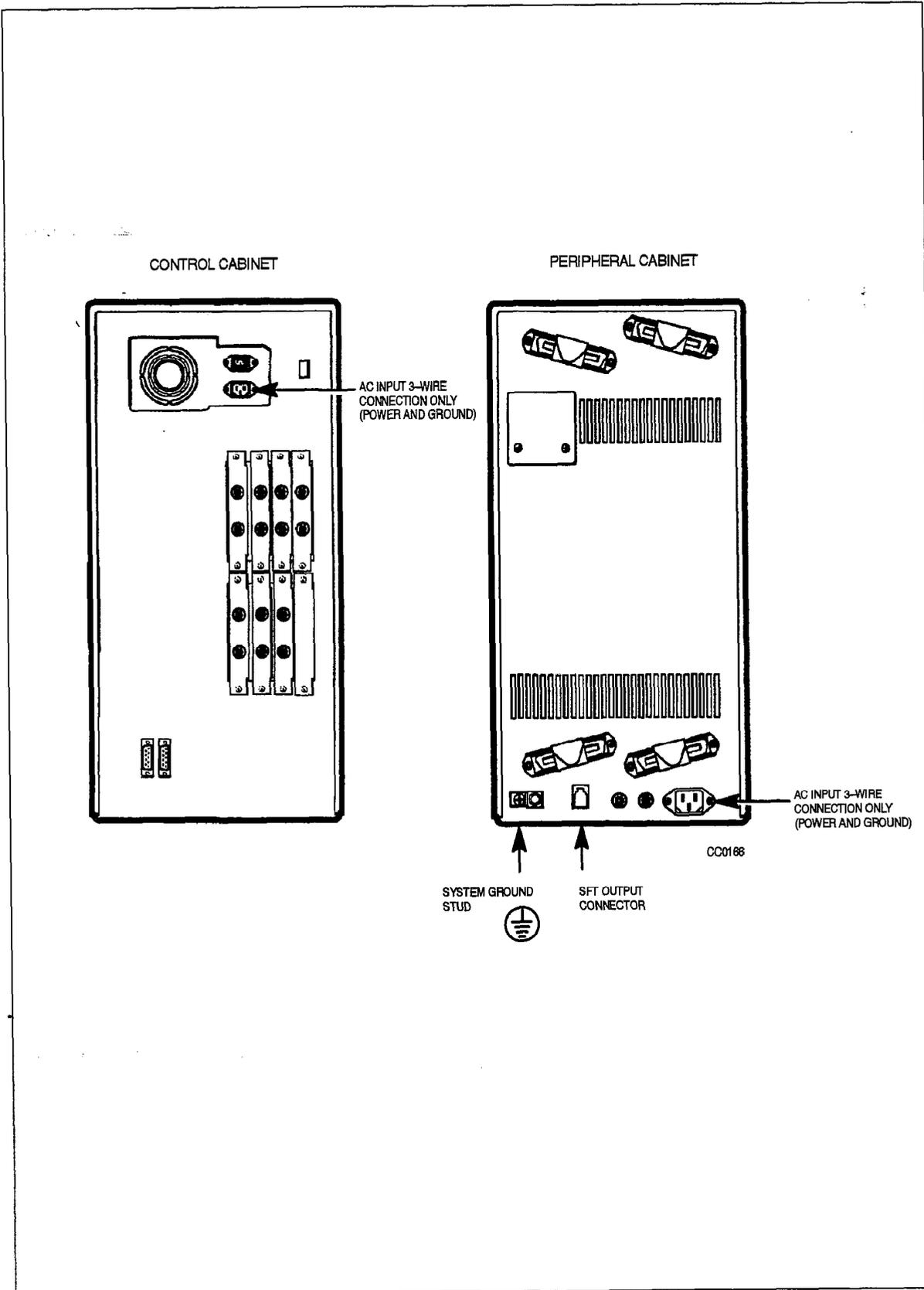


Figure 1-8 SX-200 FD Cabinet Ground Connection Point

### Approved Configurations of Product (United States Of America)

- 1.6 This product has been evaluated and listed with Underwriters' Laboratories Incorporated to their Standard for Safety 1459, "Telephone Equipment", Second Edition. The following assemblies have been investigated and determined suitable for use in this product:

Marketing Number	Description / Common Name
9109-002-005-SA	MEMORY MODULE - 4 MEG
9109-002-003-SA	MEMORY MODULE - 2 MEG
9109-004-000-SA	DX MODULE
9109-005-000-SA	UNIVERSAL CARD
9109-006-000-SA	SWITCH MATRIX CARD
9109-008-000-SA	BAY POWER SUPPLY 120V
9109-010-000-SA	ONS LINE CARD
9109-011-001-SA	LS/GS TRUNK CARD 6CCT-CSA
9109-012-000-SA	DIGITAL LINE CARD
9109-013-000-SA	E&M TRUNK MODULE
9109-016-000-SA	DTMF RX/RELAY MODULE
9109-017-000-SA	BAY CONTROL CARD
9109-018-000-SA	MUSIC/PAGING MODULE
9109-020-000-SA	COV LINE CARD
9109-021-000-SA	T1 TRUNK CARD AND ADAPTOR
9109-023-000-SA	PFT CARD
9109-025-000-SA	CONSOLE MODULE
9109-031-000-SA	DID TRUNK CARD
9109-036-000-SA	MAIN CONTROL LESS MODULES
9109-040-000-SA	OPS LINE CARD
9109-043-000-SA	LS/GS CONVERSION MODULE
9109-060-000-SA	T1 CLOCK MODULE STRATUM 3
9109-061-000-SA	T1 CLOCK MODULE STRATUM 4
9109-124-000-SA	5.25" FLOPPY DISK DRIVE ASSY
9109-125-000-SA	3.5" DISK DRIVE ASSY
9400-100-301-NA	PERIPHERAL FIM CARRIER
9400-100-303-NA	CONTROL RESOURCE CARD
9400-100-300-NA	SWITCH MATRIX MODULE
9400-300-301-NA	FIBER INTERFACE MODULE
9400-300-305-NA	FLOPPY DISK DRIVE
9400-300-302-NA	QUAD FIM CARRIER

## Installation of Telecommunication Wiring

- 1.7 Telecommunication wiring to this product shall conform to all applicable safety and electrical wiring regulations. Installation of telecommunication wiring shall be performed following precautions in accordance with standard industry practice. The precautions to be followed include:
1. Never install telephone wiring during a lightning storm.
  2. Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations.
  3. Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.
  4. Use caution when installing or modifying telephone lines.
  5. Any fiber cabling used to connect the *SX-200* FD control and peripheral cabinets should not be encased in a metal sheath so as to ensure isolation between the two cabinets. Conduit may be used to encase fiber cabling as long as the conduit does not contact the cabinets.
  6. The SFT (System Fail Transfer) output connector (see Figure 1-8) shall not be connected to an off-premise application.

**WARNING**

**Any connection of the assemblies listed below to an outside plant lead, an off-premise application or any other exposed plant application may result in a fire or shock hazard, and/or defective operation and/or equipment damage.**

Marketing Number	Description / Common Name
9109-010-000-SA	ONS LINE CARD
9109-012-000-SA	DIGITAL LINE CARD
9109-018-000-SA	MUSIC/PAGING MODULE
9109-020-000-SA	COV LINE CARD
9109-021-000-SA	T1 TRUNK CARD
136051301, Rev. 1	SFT FILTER ASSY

Examples of installations which shall not be permitted for connection to these interfaces are those which:

- (a) Require protectors in accordance with the National Electrical Code for the United States, NEC, NFPA / ANSI 70, Article 800-30, or,
- (b) Are "Exposed Plant" as defined in the Canadian Electrical Code - CSA C22.1, paragraph 60-100 which states; "Exposed plant means where any portion of the circuit is subject to accidental contact with electric lighting or power conductors operating at a voltage exceeding 300V between conductors or is subject to lightning strikes."

**Note:** The T1 Trunk Card may be connected to an outside plant lead, an off-premise application, or any other exposed plant lead, only through a Customer Service Unit (CSU) which has been suitably investigated and approved by the FCC or DOC, and the appropriate authority for safety.

## Safety Instructions

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9109-096-200-NA

Issue 1

Feb. 1992

**SX-200® DIGITAL PABX**

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# Installation Information

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*VT100™* is a trademark of Digital Equipment Corp.

## IMPORTANT SAFETY INSTRUCTIONS

### WARNING

**Failure to follow all instructions may result in improper equipment operation and/or the risk of electric shock.**

- This product is to be installed and serviced only by qualified personnel.
- Read all instructions before attempting to install or use this product.
- Install all assemblies using the procedures described in this Practice.
- Configure this product with only the assemblies specified in this Practice.
- Grounding circuit continuity is vital for safe operation of telecommunication equipment. Never operate telecommunication equipment with grounding conductor disconnected. Ensure grounding conductor is installed before connecting telecommunication cabling to any system.

## EXPLANATION OF USE FOR SYMBOLS AND NOTICES



**DANGEROUS  
VOLTAGE**

The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of an uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a significant risk of electric shock to persons.



**INSTRUCTIONS**

The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the product.



**PROTECTIVE  
GROUNDING  
TERMINAL**

The ground symbol within a circle identifies the terminal which is intended for connection to an external protective conductor. This connector must be connected to earth ground prior to making any other connections to the equipment.

**DANGER**

Danger indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

**WARNING**

Warning indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

**CAUTION**

Caution indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury and/or damage to the equipment or property.



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## 1.

# INTRODUCTION

## Installation Information

### Intent of this Document

- 1.1 This practice describes the installation procedures for all configurations of the *SX-200*® DIGITAL PABX and the MITEL peripheral equipment designed to be used with it.

**Intended Audience:** MITEL-trained installation and maintenance technicians.

### *SX-200* DIGITAL PABX Configurations

The *SX-200* DIGITAL PABX is available in 336-port, 456-port, and 672-port configurations. Each configuration of the *SX-200* DIGITAL PABX is installed by adding peripheral bay expansion kits to a basic system. The functionality of each configuration depends on the number and type of peripheral cards installed in each peripheral bay.

**The Basic System:** The basic *SX-200* DIGITAL system consists of a control cabinet containing a control shelf with two digital bays, which hold control cards and peripheral (line and trunk) cards for the PABX.

**Expansion Kits:** Additional bays can be added to the basic system, either at the time the basic system is installed, or at any time the customer wants to enhance operational capabilities. These additional bays are shipped as expansion kits, and are added to the original control cabinet, or are installed in a second cabinet called a peripheral cabinet.

Basic System and Expansion Kits	Configuration
Basic system plus two digital peripheral bays	Fully configured 336-port system
Basic system plus one digital peripheral bay in the control cabinet; two analog peripheral bays in the peripheral cabinet	Fully configured 456-port system
Basic 672-port system plus three digital bays in the control cabinet; four digital peripheral bays in the peripheral cabinet	Fully configured 672-port system

The basic system and the expansion kits come with the necessary control cards, cabling, and hardware. Line and trunk cards, software, and peripherals are not included with the expansion kits, and are shipped separately. Available expansion kits, cards, and peripherals are defined in Practice 9109-096-355-NA; Field-Replaceable Units.

### **SX-200 FD PABX Configurations**

The *SX-200* FD PABX is available in 96-port to 672-port configurations. The basic 96-port configuration of the *SX-200* FD PABX can be expanded up to 672 ports by adding peripheral digital bays, housed in separate cabinets, to the basic system of one control cabinet and one peripheral bay cabinet. The functionality of each configuration depends on the number and type of peripheral cards installed in each peripheral bay.

**The Basic System:** The basic *SX-200* FD system is a 96-port configuration. It consists of a Control Node, containing the digital control cards and 2 floppy disk drives, and a Peripheral Node, which consists of 1 digital bay for up to 8 peripheral cards. Optical fiber cabling between cabinets allows the Peripheral Node to be located up to 1 km away from the Control Node.

**System Expansion:** The system may be expanded by adding Peripheral Nodes, to a maximum of 7 Peripheral Nodes. Each Peripheral Node is a 96-port digital bay. Additional bays can be added to the basic system, either at the time the basic system is installed, or at any time the customer wants to enhance operational capabilities.

### **Peripheral Devices, Software and Documentation**

**Peripheral Cards:** Peripheral cards are either line cards (cards that provide lines for telephones or other peripherals) or trunk cards (cards that interface the PABX to the telephone company.) These cards are either analog (voice-only) or digital (voice and data) peripheral cards, depending on the type of bay kit installed. The number and type of line and trunk cards vary with the operational requirements of the customer's system.

**Software:** This document describes the installation of all configurations with Generic 1001, 1002, 1003, 1004, or 1005 software. The software is provided on floppy diskettes. Spare diskettes are available.

**Peripheral Equipment:** All configurations of the *SX-200* DIGITAL PABX and *SX-200* FD PABX support such MITEL peripheral devices as consoles, telephones, and datasets. However, datasets are not supported with Generic 1005 FPKG1 or LIT96 software.

**Documentation:** A set of MITEL Technical Practices is delivered with the Generic 1001, 1002, 1003, 1004, or 1005 software; a list of these documents is in the Practices Index at the front of this binder.

### **Summary of Practice Contents**

Practice 9109-096-200-NA; Installation Information, provides installation procedures for the *SX-200* DIGITAL PABX and *SX-200* FD PABX configurations (basic systems, expansion kits, line and trunk cards, and software), and peripherals as shown in Table 1-1.

Table 1-1 Installation Information

Part	Title	Contents
Part 2	Installing SX-200 DIGITAL and SX-200 FD Systems	Equipment Part Numbers and outlines of installation procedures for: <ul style="list-style-type: none"> <li>- the 336-port SX-200 DIGITAL PABX</li> <li>- the 672-port SX-200 DIGITAL PABX</li> <li>- the SX-200 FD PABX</li> </ul> Prepare for installation
Part 3	Installing Cabinets	Installation of: <ul style="list-style-type: none"> <li>- the SX-200 DIGITAL Control cabinet</li> <li>- SX-200 DIGITAL Peripheral cabinet</li> <li>- the SX-200 FD Control cabinet</li> <li>- SX-200 FD Peripheral cabinet(s)</li> </ul> Verify ground connections
Part 4	Installing Digital Peripheral Bays in Cabinets (SX-200 DIGITAL PABX)	Installation of: <ul style="list-style-type: none"> <li>- digital peripheral shelf with bay</li> <li>- digital peripheral bay without shelf</li> </ul>
Part 5	Handling Printed Circuit Cards	<ul style="list-style-type: none"> <li>- Unpack and handle printed circuit cards</li> <li>- Remove and return printed circuit cards</li> </ul>
Part 6	Installing Digital Control Cards	Installation of: <ul style="list-style-type: none"> <li>- the Main Control Card and modules</li> <li>- the Switch Matrix Card (672-port configuration)</li> <li>- the Control Resource Card (SX-200 FD PABX)</li> <li>- the Fiber Interface Modules (SX-200 FD PABX)</li> <li>- the Floppy Disk Drive (SX-200 DIGITAL PABX)</li> <li>- the Bay Power Supply</li> <li>- the Bay Control Card</li> <li>- the Peripheral FIM Carrier and FIM (SX-200 FD PABX)</li> </ul>
Part 7	Installing Power Fail Transfer Systems	Installation of: <ul style="list-style-type: none"> <li>- Power Fail Transfer Card (SX-200 DIGITAL PABX)</li> <li>- System Fail Transfer Unit (SX-200 FD PABX)</li> </ul>
Part 8	Installing Digital Peripheral Cards	Installation of: <ul style="list-style-type: none"> <li>- the Universal Card</li> <li>- the ONS, OPS, COV and Digital Line Cards</li> <li>- the DID Trunk Card</li> <li>- the LS/GS Trunk Card</li> <li>- the T1-DS1 Trunk Card</li> </ul>

**Table 1-1 Installation Information  
(continued)**

Part	Title	Contents
Part 9	Bring System into Service	<ul style="list-style-type: none"> <li>- Connect Fiber Cables between Nodes (<i>SX-200</i> FD PABX)</li> <li>- Connect cables between PABX and Cross-connect Field</li> <li>- Power Up Cabinets</li> <li>- Install Diskettes in Disk Drives</li> <li>- Check System Initialization</li> </ul>
Part 10	Cabling and Cross Connections	<ul style="list-style-type: none"> <li>- Tip and Ring Assignments</li> <li>- PFT connections</li> <li>- external plug and jack connections to the cross-connect field</li> <li>- interconnect card connections</li> <li>- USOC connector pin connections</li> </ul>
Part 11	Installing Peripheral Equipment	Installation of: <ul style="list-style-type: none"> <li>- terminals</li> <li>- printers</li> <li>- call announce port for a <i>SUPERSET 4</i> telephone</li> <li>- night bells</li> <li>- paging equipment</li> <li>- music on hold equipment</li> <li>- alternate music source for ACD.</li> </ul>
Appendix A	Upgrading Installed Systems	Upgrading: <ul style="list-style-type: none"> <li>- an <i>SX-200</i> PABX to a 456-port <i>SX-200</i> DIGITAL PABX.</li> <li>- a 336-port <i>SX-200</i> DIGITAL PABX to a 672-port <i>SX-200</i> DIGITAL PABX.</li> </ul>
Appendix B	Peripheral Device Connection to the Digital Line Card	<ul style="list-style-type: none"> <li>- Maximum loop lengths for peripheral device connection to the Digital Line Card</li> </ul>

### How to Use this Practice

Refer to the following charts for information on:

- How to use this practice to install the *SX-200* DIGITAL PABX (Chart 1-1).
- How to use installation charts (Chart 1-2).
- How to fill out the MITEL repair tag necessary when returning defective or damaged equipment received for the installation (Chart 1-3).

**Chart 1-1 How to Use This Practice**

Step	Action	Comments
<b>Install Equipment</b>		
1.	Refer to the appropriate part of this document for the PABX configuration you are installing.	Part 2: 336-port configuration Part 3: 672-port configuration Part 4: <i>SX-200</i> FD system
2.	Consult the tables at the beginning of each part.	The tables tell you what equipment is to be installed, and the sequence in which to install it.  <b>Installation:</b> Installation of one variant of a PABX configuration, such as a basic 336-port PABX.  <b>Expansion:</b> Change of an already installed PABX configuration from one variant to another, such as from a basic 336-port PABX to a fully configured 336-port PABX.
3.	Perform the installation charts in the sequence given in the table.	
<b>Install Peripheral Equipment</b>		
4.	When the cabinet(s) and circuit cards are installed, refer to practice 9109-096-126-NA, Peripheral Devices, for information on how to install optional equipment such as terminals, data sets, and modems.	
<b>Cabling and Cross Connections</b>		
5.	Go to Part 6 for information on tip and ring assignments, power fail transfer connections, backplane connector pinouts to the cross-connect field, interconnect card connections, and USOC connector pin designations.	
<b>Upgrade Older Equipment</b>		
6.	If you are upgrading equipment, such as an <i>SX-200</i> PABX to an <i>SX-200</i> DIGITAL 456-port PABX, or a 336-Port PABX to a 672-port PABX go to Appendix A for information.	<b>Upgrade:</b> A change from one PABX configuration to another, such as a 336-port PABX to a 672-port PABX.

### How to Use an Installation Chart

Refer to the following chart for information on how to follow the installation charts in Parts 2 to 6 and Appendix A.

**Chart 1-2 How to Use an Installation Chart**

Step	Action	Comments
<b>Read The Information</b>		
1.	Read the information at the beginning of the chart.	This information includes: – A list of what you will accomplish when you complete the chart. – Information about the item you are installing.
2.	Read the tasks outlined in the chart.	The chart is divided into major activities called tasks. These tasks are the same as the list of what you will accomplish when you finish the chart. Tasks are identified by headings like this: <b>Install Card</b> . Tasks are not numbered.
3.	Read the action and comments for each step before you do it.	The comments give extra information you need to complete the action.
4.	<i>If an action is in italics</i> , perform the action only if it is necessary in your circumstances.	These circumstances are usually stated in italics at the beginning of the action. For instance, <i>If you are installing a COV card</i> means "Perform this action only if you are installing a COV card. Otherwise, go on to the next step."
<b>Complete The Actions</b>		
5.	Follow the steps in sequence.	The steps are numbered beginning at 1.
6.	Do the action associated with each step.	
7.	When you are finished, go on to the next chart.	

### How to Complete a Repair Tag

Each unpacked item should be inspected for damage. If an item is damaged, the MITEL repair tag should be filled out and attached to it. This makes sure that the item is set aside for repacking and return. Refer to Chart 1-3.

- Notes:**
1. Any item that is damaged or faulty when you unpack it, or install it, must be returned with a properly filled out MITEL repair tag. See Figure 1-1.
  2. A repair tag is shipped with each item.
  3. The more information that is provided on the tag, the easier it is to have the item repaired.

Chart 1-3 How to Fill Out a Repair Tag

Step	Action	Comments
1.	<p><b>Fill Out Repair Tag</b></p> <p>Fill in the information required on the front of the tag.</p>	<p><b>Date:</b> The date the item is being returned on.</p> <p><b>Location:</b> Address of installation site.</p> <p><b>Company:</b> Installing company name.</p> <p><b>Product Name:</b> for instance, <i>SX-200 DIGITAL</i></p> <p><b>System Serial Number:</b> on the front of the cabinet.</p> <p><b>Software ID Generic:</b> for example, <i>Generic1003</i></p> <p><b>Software Revision:</b> for example, <i>336P/D66.6 9-Sep-1986</i></p> <p><b>Assembly Number:</b> the assembly part number of the item being returned (such as <i>DTMF receiver module - 9109-016-000-NA.</i>)</p> <p><b>Assembly Serial Number:</b> of the item being returned. This is a white sticker located on circuit cards.</p> <p><b>Alarm/Error Displays:</b> Any pertinent alarm or error displays such as alarm LEDs, seven-segment displays, console or maintenance terminal error messages, or maintenance log messages.</p> <p><b>Trouble Symptoms:</b> A brief description of what happened.</p> <p><b>Failure Occurred:</b>  During Installation  In Service</p>

**Chart 1-3 How to Fill Out a Repair Tag  
(continued)**

Step	Action	Comments
2.	Use the back of the tag for any other information that might be useful to the repair staff.	
3.	Attach the tag to the damaged or defective item.	

For Customer Use

**MITEL<sup>®</sup> Repair Tag**

1. Date: \_\_\_\_\_

2. Location: \_\_\_\_\_

3. Company: \_\_\_\_\_

---

4. Product Name: \_\_\_\_\_

5. System Serial No.: \_\_\_\_\_

6. Software ID Generic: \_\_\_\_\_  
Revision: \_\_\_\_\_

7. Assembly No.: \_\_\_\_\_

8. Assembly Serial No.: \_\_\_\_\_

---

9. Alarm/Error Displays: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

(BE SURE TO INCLUDE ALL DISPLAYED INFORMATION)

10. Trouble Symptoms \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

11. Failure Occurred A) During Installation

B) In Service

Repair Tag Order No.: 9110-096-018-NA,  
Issue 3

Further Details \_\_\_\_\_

\_\_\_\_\_

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**CAUTION: PLEASE ENSURE PCB ASSEMBLY IS  
RETURNED IN ANTISTATIC BAG.**

CC0025

**Figure 1-1 MITEL Repair Tag**

## Prerequisites To Installation

**WARNING**

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.

### Tools Needed

- 1.2 The *SX-200* DIGITAL PABX and *SX-200* FD PABX can be installed with a standard set of tools.

### Training Requirements

Only those who have successfully completed a MITEL installation and maintenance training course for the *SX-200* DIGITAL PABX should install an *SX-200* DIGITAL PABX.

The same applies to the *SX-200* FD PABX.

### Referenced Documents

The MITEL documents that are referred to in this practice are listed in Table 1-2.

Practice Number	Title	Contains Information On
9109-096-126-NA	<i>Peripherals Information</i>	Describes all peripherals, including <i>SUPERSET™</i> telephones, consoles, datasets, and other devices, and the installation procedures for those devices
9109-096-180-NA	Engineering Information	Configuring the system
9109-096-210-NA	Customer Data Entry (CDE)	Programming the PABX when hardware installation is complete
9109-096-350-NA	Troubleshooting	Problems during initialization
9109-096-351-NA	RS-232 Maintenance Terminal	Installing the maintenance terminal
9109-096-355-NA	Field-Replaceable Units	Ordering part numbers for expansion kits, cards, and peripherals
9109-953-011-NA	Install a T1 Trunk Adapter Card and T1 Adapter Cable Assembly	Installing the T1-DS1 trunk card



## 2.

## INSTALLING SX-200 DIGITAL AND SX-200 FD SYSTEMS

### Installing the 336-port SX-200 DIGITAL PABX

#### Introduction

- 2.1 The SX-200 DIGITAL PABX in 336-port configuration can be installed in several bay combinations. See Table 2-1.

**Table 2-1 Bay Combinations of the 336-port SX-200 DIGITAL PABX**

Variation	Control Cabinet Equipment
Basic 336-port system	Control shelf (Bays 1 and 2*)
336-port system with digital peripheral Bay 3	Control shelf (Bays 1 and 2) and digital peripheral Bay 3
336-port system with digital peripheral Bays 3 and 4	Control shelf (Bays 1 and 2), digital peripheral Bay 3, and digital peripheral Bay 4

\* In the basic system, Bay 2 always contains cards. Bay 1 can be empty.

The equipment to be installed to create the bay combinations of the 336-port SX-200 DIGITAL PABX is shown in Table 2-2.

**Table 2-2 Equipment Installed in Variations of the 336-port PABX**

Basic 336-port system <sup>1</sup> .	
Control Cabinet Hardware	<ul style="list-style-type: none"> <li>- digital control shelf</li> <li>- a maintenance panel</li> <li>- a six-circuit Power Fail Transfer card</li> <li>- Control cabinet</li> </ul> <p>shipped installed</p>
Digital Control Cards	<ul style="list-style-type: none"> <li>- Main Control Card</li> <li>- two Bay Power Supplies</li> <li>- two Floppy Disk Drives</li> </ul>
Page 1 of 2	

<b>Table 2-2 Equipment Installed in Variations of the 336-port PABX (continued)</b>	
Digital Peripheral Cards	Any of: – universal card and modules – ONS line card – OPS line card – COV line card – Digital Line Card – LS/GS trunk card – DID trunk card – T1-DS1 trunk card
Add a digital peripheral Bay 3 <sup>2</sup> .	
Control Cabinet Hardware	– one digital peripheral shelf – one digital backplane – one blanking panel
Control Cards	–one Bay Power Supply –one Bay Control Card
Digital Peripheral Cards	Any of: – universal card and modules – ONS line card – OPS line card – COV line card – Digital Line Card – LS/GS trunk card – DID trunk card – T1-DS1 trunk card
Add a digital peripheral Bay 4 <sup>3</sup> .	
Control Cabinet Hardware	– one digital backplane
Control Cards	– one Bay Power Supply – one Bay Control Card
Digital Peripheral Cards	Any of: – universal card and modules – ONS line card – OPS line card – COV line card – Digital Line Card – LS/GS trunk card – DID trunk card – T1-DS1 trunk card
Page 2 of 2	

- Notes:**
1. The Control cabinet and the control cards make up the basic system. The basic system does not come equipped with digital peripheral cards. These cards are ordered separately and installed in the basic system to provide functionality. Table 2-3 shows the contents of the basic system.
  2. The digital peripheral Bay 3 kit does not come equipped with digital peripheral cards. These cards are ordered separately and installed in the basic system to provide functionality. Table 2-3 shows the contents of the digital peripheral bay kit (with shelf).
  3. The digital peripheral Bay 4 kit does not come equipped with digital peripheral cards. These cards are ordered separately and installed in the basic system to provide functionality. Table 2-3 shows the contents of the digital peripheral bay kit (without shelf).

Figure 2-1 shows a fully equipped 336-port SX-200 DIGITAL PABX; digital peripheral cards are identified as "voice or data" cards.

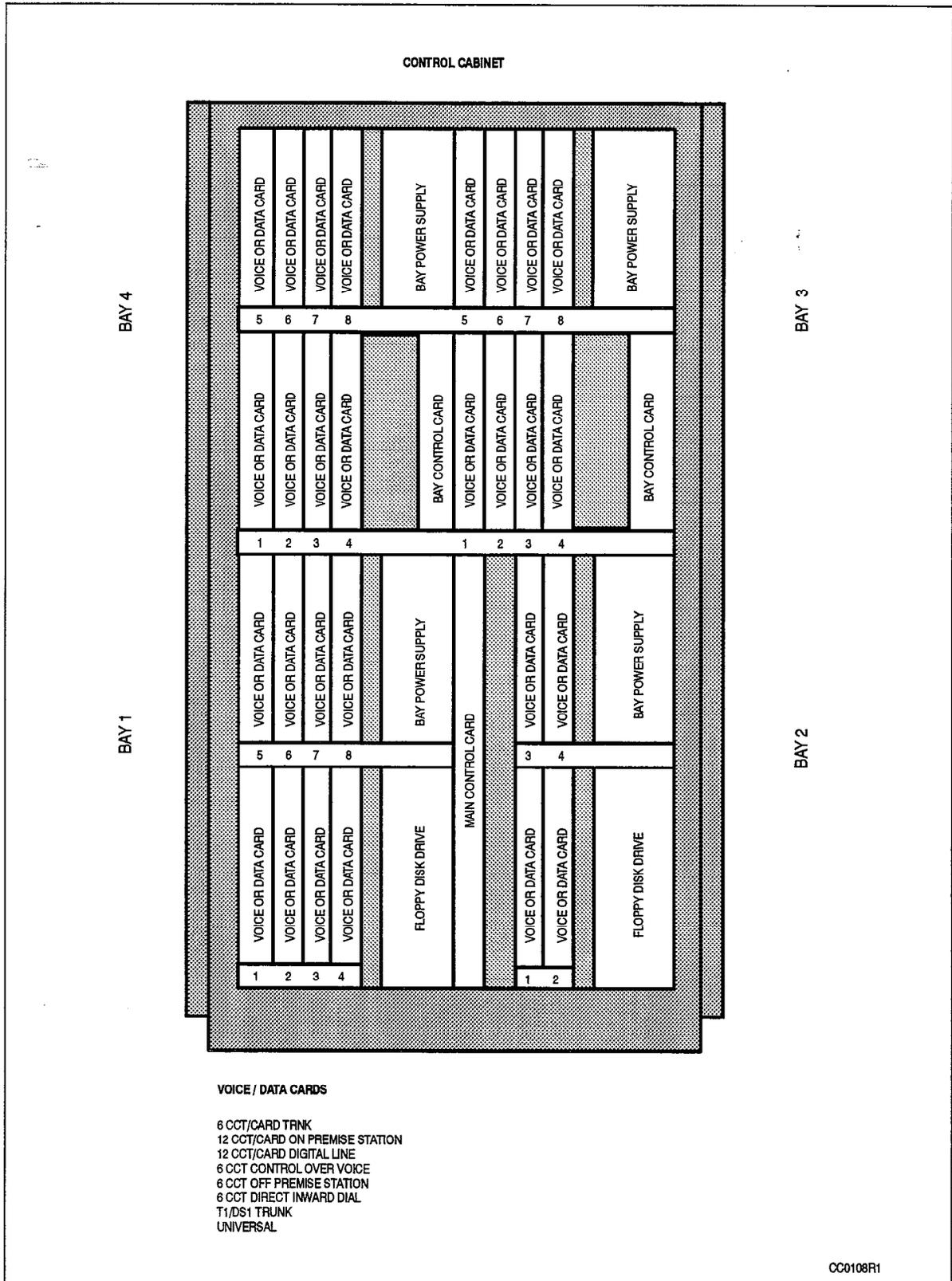


Figure 2-1 Fully Equipped 336-port Configuration SX-200 DIGITAL PABX

**Equipment Part Numbers**

The part numbers of equipment to be installed as the 336-port configuration SX-200 DIGITAL PABX are shown in Table 2-3.

**Table 2-3 Equipment Part Numbers**

Equipment Name	Part Number	Comments
Basic System (United States)	9109-000-000-SA	The basic system is made up of: - Control cabinet - control shelf assembly - blank rear door with fans - maintenance panel - six-circuit PFT card - PFT cutover monitor cable - Main Control Card - DX module - Floppy Disk Drive - Bay Power Supply
Basic System (Canada)	9109-000-011-NA	
<b>Cabinet and hardware</b>		
Control cabinet with control shelf and maintenance panel.	9108-000-001-01	United States
	9109-000-011-01	Canada
	9108-000-005-01	230V
Six-circuit Power Fail Transfer kit ( card and PFT cable)	9109-030-000-SA	One card shipped installed
- LS/GS conversion module	9109-043-000-SA	
Six-circuit PFT card	9109-023-000-SA	
<b>Digital control cards</b>		
Main Control Card	9109-036-000-SA	Without modules
- Memory module	Included with software 9109-002-003-SA 9109-002-005-SA	2 Meg 4 Meg (needed for ACD, Generic 1004 and up)
- DX module	9109-004-000-SA	
- Decryption module	Included with software	
- T1 clock module	9109-060-000-SA 9109-061-000-SA	STRAT 3 STRAT 4
Bay Power Supply	9109-008-000-SA	115V
	9109-008-002-NA	230V
Bay Control Card	9109-017-000-SA	
Floppy Disk Drive: 5 1/4"	9109-124-000-SA	required for Generic 1001 - Generic 1004 software

**Table 2-3 Equipment Part Numbers  
(continued)**

Equipment Name	Part Number	Comments
3 1/2"	9109-125-000-SA	required for Generic 1005 software
Digital peripheral cards		
Universal Card	9109-005-000-SA	Without modules
– Receiver/relay module	9109-016-000-SA	
– Music on hold/pager module	9109-018-000-SA	
– Console module	9109-025-000-SA	
– E&M trunk module	9109-013-000-SA	
ONS line card	9109-010-000-SA	
COV line card	9109-020-000-SA	
OPS line card	9109-040-000-SA	
Digital Line Card	9109-012-000-SA	
LS/GS trunk card	9109-011-001-SA	
DID trunk card	9109-031-000-SA	
Shelf kits <sup>1</sup> .		
Digital Peripheral Bay Kit (with shelf) 115V	9109-046-000-SA	This kit is made up of: – peripheral shelf – peripheral backplane – blanking panel – PCM cable – Bay Control Card – Bay Power Supply
Digital Peripheral Bay Kit (with shelf) 230V	9109-046-001-NA	This kit is made up of: – peripheral shelf – peripheral backplane – blanking panel – PCM cable – Bay Control Card – Bay Power Supply
Digital Peripheral Bay Kit (without shelf) 115V	9109-047-000-SA	This kit is made up of: – peripheral backplane – PCM cable – Bay Control Card – Bay Power Supply
Digital Peripheral Bay Kit (without shelf) 230V	9109-047-001-NA	This kit is made up of: – peripheral backplane – PCM cable – Bay Control Card – Bay Power Supply

**Table 2-3 Equipment Part Numbers  
(continued)**

Equipment Name	Part Number	Comments
<b>Software<sup>2</sup></b>		
Generic 1001 software	9108-518-001-SA	Includes: - Generic 1001 software - memory module - Decryption module - system documentation
Spare system diskettes (Generic 1001 base)	9108-034-000-NA	
Generic 1002 software (base)	9109-518-100-SA	Includes: - Generic 1002 software - memory module - Decryption module - system documentation
Spare system diskettes (Generic 1002 base)	9109-034-001-NA	
Generic 1003 software (base)	9109-518-300-SA	Includes: - Generic 1003 software (base) - memory module - Decryption module - system documentation
Generic 1003 software (ACD)	9109-518-310-SA	Includes: - Generic 1003 software (plus ACD) - 4 Meg memory module - Decryption module - system documentation (plus ACD)
Generic 1003 software (base upgrade) without memory module	9109-518-320-SA	Includes: - Generic 1003 software (base up- grade) - Decryption module - system documentation
Spare system diskettes (Generic 1003 base)	9109-034-301-NA	
Spare system diskettes (Generic 1003 plus ACD)	9109-034-302-NA	
Generic 1004 software (base)	9109-518-400-SA	Includes: - Generic 1004 software (base) - 4 Meg memory module - Decryption module - system documentation

**Table 2-3 Equipment Part Numbers  
(continued)**

<b>Equipment Name</b>	<b>Part Number</b>	<b>Comments</b>
Generic 1004 software (ACD)	9109-518-410-SA	Includes: - Generic 1004 software (plus ACD) - 4 Meg memory module - Decryption module - system documentation (plus ACD)
Generic 1004 software (ACD) without memory module	9109-518-420-SA	Includes: - Generic 1004 software (plus ACD) - Decryption module - system documentation (plus ACD)
Generic 1004 software (MAI)	9109-518-440-SA	Includes: - Generic 1004 software (plus MAI) - 4 Meg memory module - Decryption module - system documentation (plus MAI)
Generic 1004 software (ACD and MAI)	9109-518-460-SA	Includes: - Generic 1004 software (plus ACD and MAI) - 4 Meg memory module - Decryption module - system documentation (plus ACD and MAI)
Spare system diskettes (Generic 1004)	9109-034-400-NA	
Generic 1005 software (base)	9109-518-500-SA	Includes: - Generic 1005 software (base) - 4 Meg memory module - Decryption module - system documentation
Generic 1005 software (ACD)	9109-518-510-SA	Includes: - Generic 1005 software (plus ACD) - memory module - Decryption module - system documentation (plus ACD)
Generic 1005 software (ACD) without memory module	9109-518-520-SA	Includes: - Generic 1005 software (plus ACD) - Decryption module - system documentation (plus ACD)
Generic 1005 software (base) without memory module	9109-518-530-SA	Includes: - Generic 1005 software (base) - Decryption module - system documentation

**Table 2-3 Equipment Part Numbers  
(continued)**

Equipment Name	Part Number	Comments
Generic 1005 software (MAI)	9109-518-540-SA	Includes: - Generic 1005 software (plus MAI) - 4 Meg memory module - Decryption module - system documentation (plus MAI)
Generic 1005 software (MAI and ACD)	9109-518-560-SA	Includes: - Generic 1005 software (plus MAI and ACD) - 4 Meg memory module - Decryption module - system documentation (plus MAI and ACD)
Spare system diskettes (Generic 1005 base)	9109-034-500-SA	
Documentation <sup>2</sup> :		
System documentation	9109-035-004-NA	Technical documentation – Included with software
Page 5 of 5		

- Notes:**
1. Part numbers for expansion kits are for ordering and shipping control (invoicing) only. The components of kits are shipped packaged separately. During unpacking and installation, the components of expansion kits can be identified by the component's part number on each shipping container, not by the kit part number.
  2. System software diskettes, Decryption module, memory module, and documentation are ordered as a kit. The documentation is packaged separately. The Decryption module is packaged with the system software diskettes; it has no part number.

### Installation Charts

Table 2-4 indicates which charts to follow in sequence to install:

- a new basic 336-port system. (See Basic .)
- a 336-port system with digital peripheral Bay 3. (See Add Bay 3.)
- a 336-port system with digital peripheral Bay 4. (See Add Bay 4.)

<b>Table 2-4 Charts to Follow to Install the 336-port System</b>				
<b>Activity</b>	<b>Basic</b>	<b>Add Bay 3</b>	<b>Add Bay 4</b>	<b>Chart</b>
<b>Prepare for Installation</b>				
Prepare for Installation	X	X	X	Chart 2-1
<b>Install Cabinet</b>				
Unpack and Inspect Control Cabinet	X			Chart 3-1
Install Control Cabinet	X			Chart 3-2
Verify Ground Connection	X			Chart 3-11
<b>Install Digital Peripheral Bays in Cabinet</b>				
Install Digital Peripheral Bay 3		X		Chart 4-1
Install Digital Peripheral Bay 4			X	Chart 4-2
<b>Handle Printed Circuit Cards</b>				
Unpack and Handle Printed Circuit Cards	X	X	X	Chart 5-1
Remove and Repack Printed Circuit Cards	@			Chart 5-2
<b>Install Digital Control Cards</b>				
Install the Main Control Card	X			Chart 6-1
Remove a Module From the Main Control Card	X			Chart 6-2
Install Floppy Disk Drive	X			Chart 6-6
Install Bay Power Supply	X	X	X	Chart 6-7
Install Bay Control Card	X	X	X	Chart 6-8
<b>Install Power Fail Transfer</b>				
Install Six-circuit Power Fail Transfer Card		@	@	Chart 7-1
<b>Install Digital Peripheral Cards</b>				
Install Universal Card and Modules	#	#	#	Chart 8-1
Install Line (ONS, OPS, COV, or Digital) and DID Trunk Cards	#	#	#	Chart 8-2
Page 1 of 2				

**Table 2-4 Charts to Follow to Install the 336-port System  
(continued)**

Activity	Basic	Add Bay 3	Add Bay 4	Chart
Install LS/GS Trunk Card	#	#	#	Chart 8-3
Install T1-DS1 Trunk Card	#	#	#	Chart 8-4
<b>Put System Into Service</b>				
Connect Cables Between System and Cross-connect Field	X	X	X	Chart 9-2
Control Cabinet Power On	X	X	X	Chart 9-3
Install Diskette(s) Into Disk Drive(s)	X	X	X	Chart 9-5
Check System Initialization	X	X	X	Chart 9-7
Remove Diskette(s) From Disk Drive(s)	@	@	@	Chart 9-8
Page 2 of 2				

X means: Do this chart  
 @ means: Do this chart as required.  
 # means: Type and number of circuit cards to be installed vary according to customer requirements.

## Installing the 672-port SX-200 DIGITAL PABX

### Introduction

2.2 The SX-200 DIGITAL PABX in 672-port configuration can be installed in several bay combinations. See Table 2-5.

**Table 2-5 Bay Combinations of the 672-port SX-200 DIGITAL PABX**

Variation	Control Cabinet Equipment	Peripheral Cabinet Equipment
<b>Basic 672-port system</b>	Control shelf (Bays 0 and 1)	No peripheral cabinet
<b>672 with digital peripheral Bay 2 and/or 3</b>	Control shelf (Bays 0 and 1) and digital peripheral Bay 2 and/or 3	No peripheral cabinet
<b>672 with digital peripheral Bay 4</b>	Control shelf (Bays 0 and 1)	Digital peripheral Bay 4
<b>672 with digital peripheral Bay 2 and/or 3, digital peripheral Bay 4, and/or digital peripheral Bays 5,6,7.</b>	Control shelf (Bays 0 and 1), and digital peripheral Bay 2 and/or 3	Digital peripheral Bay 4, and Bays 5, 6, and/or 7.

The equipment to be installed to create the bay combinations of the 672-port configuration SX-200 DIGITAL PABX is shown in Table 2-6.

<b>Table 2-6 Equipment Installed in Variations of the 672-port PABX</b>	
<b>Basic 672-port system<sup>1</sup>.</b>	
Control cabinet Hardware	<ul style="list-style-type: none"> <li>- digital control shelf</li> <li>- a maintenance panel</li> <li>- a six-circuit PFT card</li> <li>- Control cabinet</li> </ul> Hardware shipped installed in cabinet. <ul style="list-style-type: none"> <li>- Bay 0 to Bay 1 PCM cable</li> </ul>
Digital Control Cards	Bay 0: <ul style="list-style-type: none"> <li>- Main Control Card</li> <li>- Switch Matrix Card</li> <li>- Bay Power Supply</li> <li>- Two Floppy Disk Drive(s)</li> </ul> Bay 1: <ul style="list-style-type: none"> <li>- Bay Power Supply</li> <li>- Bay Control Card</li> </ul>
Digital Peripheral Cards	Any of: <ul style="list-style-type: none"> <li>- universal card and modules</li> <li>- ONS line card</li> <li>- OPS line card</li> <li>- COV line card</li> <li>- Digital Line Card</li> <li>- LS/GS trunk card</li> <li>- DID trunk card</li> <li>- T1-DS1 trunk card</li> </ul>
<b>Add a digital peripheral Bay 2/3<sup>1</sup>.<sup>2</sup>.</b>	
Control cabinet Hardware	Bay 2: <ul style="list-style-type: none"> <li>- one digital peripheral shelf</li> <li>- one digital backplane</li> <li>- Bay 0 to Bay 2 PCM cable</li> <li>- one blanking panel</li> </ul> Bay 3: <ul style="list-style-type: none"> <li>- one digital backplane</li> <li>- Bay 0 to Bay 3 PCM cable</li> </ul>
Digital Control Cards	<ul style="list-style-type: none"> <li>- one Bay Power Supply for each bay</li> <li>- one Bay Control Card for each bay</li> </ul>
Page 1 of 3	

**Table 2-6 Equipment Installed in Variations of the 672-port PABX  
(continued)**

Digital Peripheral Cards	Any of: - universal card and modules - ONS line card - OPS line card - COV line card - Digital Line Card - LS/GS trunk card - DID trunk card - T1-DS1 trunk card
<b>Add a digital peripheral Bay 4/5<sup>2</sup>,<sup>3</sup>.</b>	
Peripheral Cabinet Hardware	Bay 4: - digital peripheral cabinet - 672-port intercabinet cable assembly - one digital peripheral shelf - one digital backplane - one six-circuit PFT card Hardware shipped installed in cabinet.  Bay 5: - one digital backplane
Digital Control Cards	- one Bay Power Supply per bay - one Bay Control Card per bay
Digital Peripheral Cards	Any of: - universal card and modules - ONS line card - OPS line card - COV line card - Digital Line Card - LS/GS trunk card - DID trunk card - T1-DS1 trunk card
<b>Add a digital peripheral Bay 6/7<sup>2</sup>,<sup>3</sup>.</b>	
Peripheral Cabinet Hardware	Bay 6: - one digital peripheral shelf - one digital backplane - one blanking panel  Bay 7: - one digital backplane
Page 2 of 3	

<b>Table 2-6 Equipment Installed in Variations of the 672-port PABX (continued)</b>	
<b>Control Cards</b>	<ul style="list-style-type: none"> <li>- one Bay Power Supply per bay</li> <li>- one Bay Control Card per bay</li> </ul>
<b>Digital Peripheral Cards</b>	Any of: <ul style="list-style-type: none"> <li>- universal card and modules</li> <li>- ONS line card</li> <li>- OPS line card</li> <li>- COV line card</li> <li>- Digital Line Card</li> <li>- LS/GS trunk card</li> <li>- DID trunk card</li> <li>- T1-DS1 trunk card</li> </ul>
<b>Page 3 of 3</b>	

- Notes:**
1. The Control cabinet and the control cards make up the basic system. The basic system does not come equipped with digital peripheral cards. These cards are installed in the basic system to provide functionality. The cards are ordered separately. Table 2-6 shows the contents of the basic system. Only control cards can be installed in Bay 0.
  2. The digital peripheral bay kit (with shelf) does not come equipped with digital peripheral cards. The cards are ordered separately. Table 2-6 shows the contents of the basic system.
  3. The digital peripheral bay kit (without shelf) does not come equipped with digital peripheral cards. The cards are ordered separately. Table 2-6 shows the contents of the basic system.

Figure 2-2 shows a fully configured 672-port SX-200 DIGITAL PABX. In this figure the digital peripheral cards are identified as "voice/data" cards.

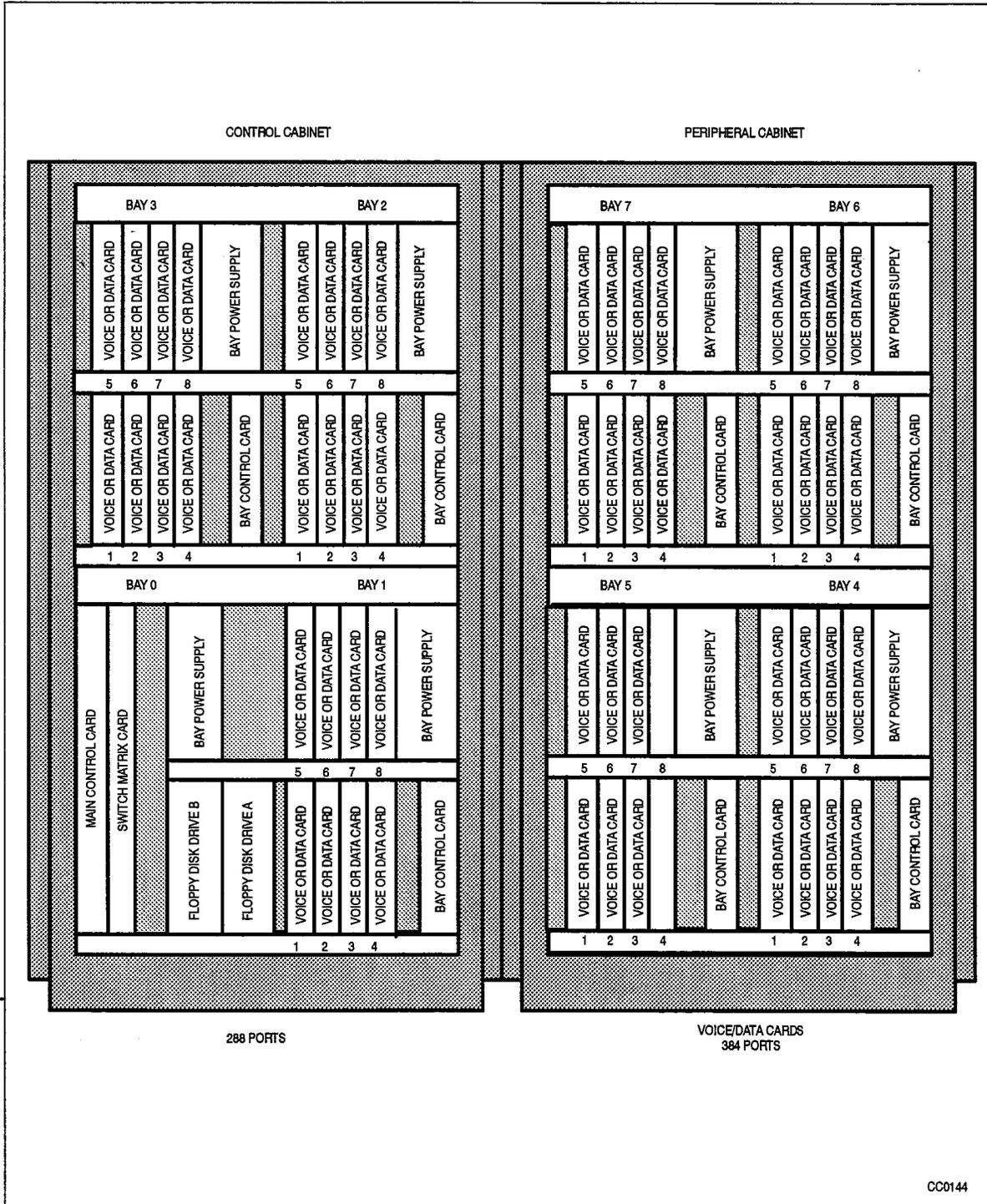


Figure 2-2 Fully Configured 672-port SX-200 DIGITAL PABX

### Equipment Part Numbers

The part numbers of equipment to be installed as the 672-port SX-200 DIGITAL PABX are shown in Table 2-7.

<b>Table 2-7 Equipment Part Numbers</b>		
<b>Equipment Name</b>	<b>Part Number</b>	<b>Comments</b>
Basic System	9109-000-002-SA (US) 9109-000-003-BA (230V) 9109-000-012-NA (Canada)	The basic system is made up of: - Control cabinet - control shelf assembly - blank rear door with fans - maintenance panel - six-circuit PFT card - PFT cutover monitor cable - Main Control Card - DX module - Switch Matrix Card - Bay Control Card - 2 Floppy Disk Drives - 2 Bay Power Supplies
<b>Cabinet hardware</b>		
Basic Control Cabinet	9109-000-002-01	Universal Cabinet with 672-port Control Bay (Bays 0 and 1) (for use in United States)
Basic Control Cabinet	9109-000-012-00	Universal Cabinet with 672-port Control Bay (Bays 0 and 1) (for use in Canada)
672 port Control Cabinet	9109-000-003-00	Universal Cabinet with 672-port Control Bay (Bays 0 and 1) - 240 volt
Six-circuit Power Fail Transfer kit (card and cable)	9109-030-000-SA	One card shipped installed
-LS/GS conversion module	9109-043-000-SA	
Six-circuit PFT card	9109-023-000-SA	
<b>Digital control cards</b>		
Main Control Card	9109-036-000-SA	Without modules
- Memory module	Included with software 9109-002-003-SA 9109-002-005-SA	2 Meg 4 Meg (needed for ACD, Generic 1004 and up)
-Decryption module	Included with software	
-T1 clock module	9109-060-000-SA 9109-061-000-SA	STRAT 3 STRAT 4

**Table 2-7 Equipment Part Numbers  
(continued)**

Equipment Name	Part Number	Comments
Bay Power Supply	9109-008-000-SA	115V
	9109-008-002-NA	230V
Bay Control Card	9109-017-000-SA	
Floppy Disk Drive: 5 1/4"	9109-124-000-SA	required for Generic 1001 – Generic 1004 software
	3 1/2"	9109-125-000-SA
Switch Matrix Card	9109-006-000-SA	
<b>Digital peripheral cards</b>		
Universal Card	9109-005-000-SA	Without modules
–Receiver/relay module	9109-016-000-SA	
–Music on hold/pager module	9109-018-000-SA	
–Console module	9109-025-000-SA	
–E&M trunk module	9109-013-000-SA	
ONS line card	9109-010-000-SA	
COV line card	9109-020-000-SA	
OPS line card	9109-040-000-SA	
Digital Line Card	9109-012-000-SA	
LS/GS trunk card	9109-011-001-SA	
DID trunk card	9109-031-000-SA	
<b>Digital Peripheral cabinet and hardware</b>		
Peripheral cabinet	9109-000-004-SA (US) 9109-000-014-NA (Canada) 9109-000-004-BA (230 V)	contains: – shelf and one backplane – blank rear door with fans – Bay Control Card – Bay Power Supply – Intercabinet cable assembly (672-port)
	9109-000-014-NA (Canada)	
	9109-000-004-BA (230 V)	
672 port Peripheral Cabinet	9109-000-004-01	for 672 port configurations only (for use in United States)
672 port Peripheral Cabinet	9109-000-014-00	for 672 port configurations only (for use in Canada)

**Table 2-7 Equipment Part Numbers  
(continued)**

Equipment Name	Part Number	Comments
672 port Peripheral Cabinet	9109-000-004-02	for 672 port configurations only - 240 volt
Intercabinet cable assembly (672-port)	9109-026-000-NA	for 672 port configurations only
Six-circuit Power Fail Transfer kit (card and cable)	9109-030-000-SA	One card shipped installed
-LS/GS conversion module	9109-043-000-SA	
Six-circuit PFT card	9109-023-000-SA	
<b>Shelf kits<sup>1</sup></b>		
Digital Peripheral Bay Kit (with shelf) 115V	9109-046-000-SA	This kit is made up of: - peripheral shelf - peripheral backplane - blanking panel - PCM cable - Bay Control Card - Bay Power Supply
Digital Peripheral Bay Kit (with shelf) 230V	9109-046-001-NA	This kit is made up of: - peripheral shelf - peripheral backplane - blanking panel - PCM cable - Bay Control Card - Bay Power Supply
Digital Peripheral Bay Kit (without shelf) 115V	9109-047-000-SA	This kit is made up of: - peripheral backplane - PCM cable - Bay Control Card - Bay Power Supply
Digital Peripheral Bay Kit (without shelf) 230V	9109-047-001-NA	This kit is made up of: - peripheral backplane - PCM cable - Bay Control Card - Bay Power Supply
<b>Software<sup>2</sup></b>		
Generic 1003 software (672 base)	9109-518-330-SA	Includes: - Generic 1003 software - memory module - decryption module - system documentation
Page 3 of 5		

**Table 2-7 Equipment Part Numbers  
(continued)**

Equipment Name	Part Number	Comments
Generic 1003 software (ACD)	9109-518-340-SA	Includes: - Generic 1003 software (ACD) - memory module - decryption module - system documentation
Generic 1003 software (base upgrade) without memory module	9109-518-350-SA	Includes: - Generic 1003 software (base upgrade) - decryption module - system documentation
Spare system diskettes (base)	9109-034-311-NA	
Spare system diskettes (ACD)	9109-034-312-NA	
Generic 1004 software (672 base)	9109-518-400-SA	Includes: - Generic 1004 software - 4 Meg memory module - decryption module - system documentation
Generic 1004 software (ACD)	9109-518-410-SA	Includes: - Generic 1004 software (ACD) - 4 Meg memory module - decryption module - system documentation
Generic 1004 software (ACD) without memory module	9109-518-420-SA	Includes: - Generic 1004 software (plus ACD) - Decryption module - system documentation (plus ACD)
Generic 1004 software (MAI)	9109-518-440-SA	Includes: - Generic 1004 software (plus MAI) - 4 Meg memory module - Decryption module - system documentation (plus MAI)
Generic 1004 software (ACD and MAI)	9109-518-460-SA	Includes: - Generic 1004 software (plus ACD and MAI) - 4 Meg memory module - Decryption module - system documentation (plus ACD and MAI)
Spare system diskettes (Generic 1004)	9109-034-400-NA	

<b>Table 2-7 Equipment Part Numbers (continued)</b>		
<b>Equipment Name</b>	<b>Part Number</b>	<b>Comments</b>
Generic 1005 software (base)	9109-518-500-SA	Includes: - Generic 1005 software (base) - 4 Meg memory module - Decryption module - system documentation
Generic 1005 software (ACD)	9109-518-510-SA	Includes: - Generic 1005 software (plus ACD) - 4 Meg memory module - Decryption module - system documentation (plus ACD)
Generic 1005 software (ACD) without memory module	9109-518-520-SA	Includes: - Generic 1005 software (plus ACD) - Decryption module - system documentation (plus ACD)
Generic 1005 software (base) without memory module	9109-518-530-SA	Includes: - Generic 1005 software (base) - Decryption module - system documentation
Generic 1005 software (MAI)	9109-518-540-SA	Includes: - Generic 1005 software (plus MAI) - 4 Meg memory module - Decryption module - system documentation (plus MAI)
Generic 1005 software (MAI and ACD)	9109-518-560-SA	Includes: - Generic 1005 software (plus MAI and ACD) - 4 Meg memory module - Decryption module - system documentation (plus MAI and ACD)
Spare system diskettes (Generic 1005 base)	9109-034-500-SA	
<b>Documentation</b>		
System documentation	9109-035-004-NA	Technical documentation – included with software
Page 5 of 5		

**Notes:** 1. Part numbers for expansion kits are for ordering and shipping control (invoicing) only. The components of kits are shipped packaged separately. During unpacking and installation, the components of expansion kits can be identified by the component's part number on each shipping container, not by the kit part number.

2. System software diskettes, decryption module, memory module, and documentation are ordered as a kit. The documentation is packaged separately. The decryption module is packaged with the system software diskettes: it has no part number.

**Installation Charts**

Table 2-8 indicates which charts to follow in sequence to install:

- a new basic 672-port system. (See Basic System column.)
- digital peripheral Bay 2. (See Add Bay 2 column.)
- digital peripheral Bay 3. (See Add Bay 3 column.)
- digital peripheral Bay 4. (See Add Bay 4 column.)
- digital peripheral Bay 5 or 7. (See Add Bay 5 or 7 column.)
- digital peripheral Bay 6. (See Add Bay 6 column.)

<b>Table 2-8 Charts To Follow To Install The SX-200 DIGITAL PABX in 672-port Configuration</b>							
<b>Activity</b>	<b>Basic</b>	<b>Add Bay 2</b>	<b>Add Bay 3</b>	<b>Add Bay 4</b>	<b>Add Bay 5 or 7</b>	<b>Add Bay 6</b>	<b>Chart</b>
<b>Prepare for Installation</b>							
Prepare for Installation	X			X			Chart 2-1
<b>Install Cabinets</b>							
Unpack and Inspect Control Cabinet	X						Chart 3-1
Install Control Cabinet	X						Chart 3-2
Unpack and Inspect Peripheral Cabinet				X			Chart 3-7
Install Peripheral Cabinet				X			Chart 3-8
Verify Ground Connection	X						Chart 3-11
<b>Install Digital Peripheral Bays in Cabinets</b>							
Install Digital Peripheral Bay 2 (Bay with Shelf)		X					Chart 4-1
Install Digital Peripheral Bay 3 (Bay without Shelf)			X				Chart 4-2
Install Digital Peripheral Bay 5 or 7 (Bay without Shelf) in Peripheral Cabinet					X		Chart 4-2
Install Digital Peripheral Bay 6 (Bay with Shelf) in Peripheral Cabinet						X	Chart 4-1
<b>Handle Printed Circuit Cards</b>							
Unpack and Handle Printed Circuit Cards	X	X	X	X	X	X	Chart 5-1
Remove and Repack Printed Circuit Cards	X	X	X	X	X	X	Chart 5-2
Page 1 of 2							

**Table 2-8 Charts To Follow To Install The SX-200 DIGITAL PABX in 672-port Configuration  
(continued)**

Activity	Basic	Add Bay 2	Add Bay 3	Add Bay 4	Add Bay 5 or 7	Add Bay 6	Chart
<b>Install Digital Control Cards</b>							
Install the Main Control Card	X						Chart 6-1
Remove a Module From the Main Control Card	@						Chart 6-2
Install Switch Matrix Card	X						Chart 6-3
Install Floppy Disk Drive	X						Chart 6-6
Install Bay Power Supply	X	X	X	X	X	X	Chart 6-7
Install Bay Control Card	X	X	X	X	X	X	Chart 6-8
<b>Install Power Fail Transfer</b>							
Install 6-circuit PFT Card		@	@		@	@	Chart 7-1
<b>Install Digital Peripheral Cards</b>							
Install Universal Card	#	#	#	#	#	#	Chart 8-1
Install Line (ONS, OPS, COV, or Digital) and DID Trunk Cards	#	#	#	#	#	#	Chart 8-2
Install LS/GS Trunk Card	#	#	#	#	#	#	Chart 8-3
Install T1-DS1 Trunk Card	#	#	#	#	#	#	Chart 8-4
<b>Put System Into Service</b>							
Connect Cables Between System and Cross-connect Field	X	X	X	X	X	X	Chart 9-2
Control Cabinet Power On	X	X	X	X	X	X	Chart 9-3
Peripheral Cabinet Power On				X	X	X	Chart 9-4
Install Diskettes Into Disk Drives	X	X	X	X	X	X	Chart 9-5
Check System Initialization	X	X	X	X	X	X	Chart 9-7
Remove Diskettes From Disk Drives	X	X	X	X	X	X	Chart 9-8
Page 2 of 2							

X means: Do this chart.

@ means: Do this chart as required.

# means: Type and number of circuit cards to be installed vary according to customer requirements.

## Installing the SX-200 FD PABX

### Introduction

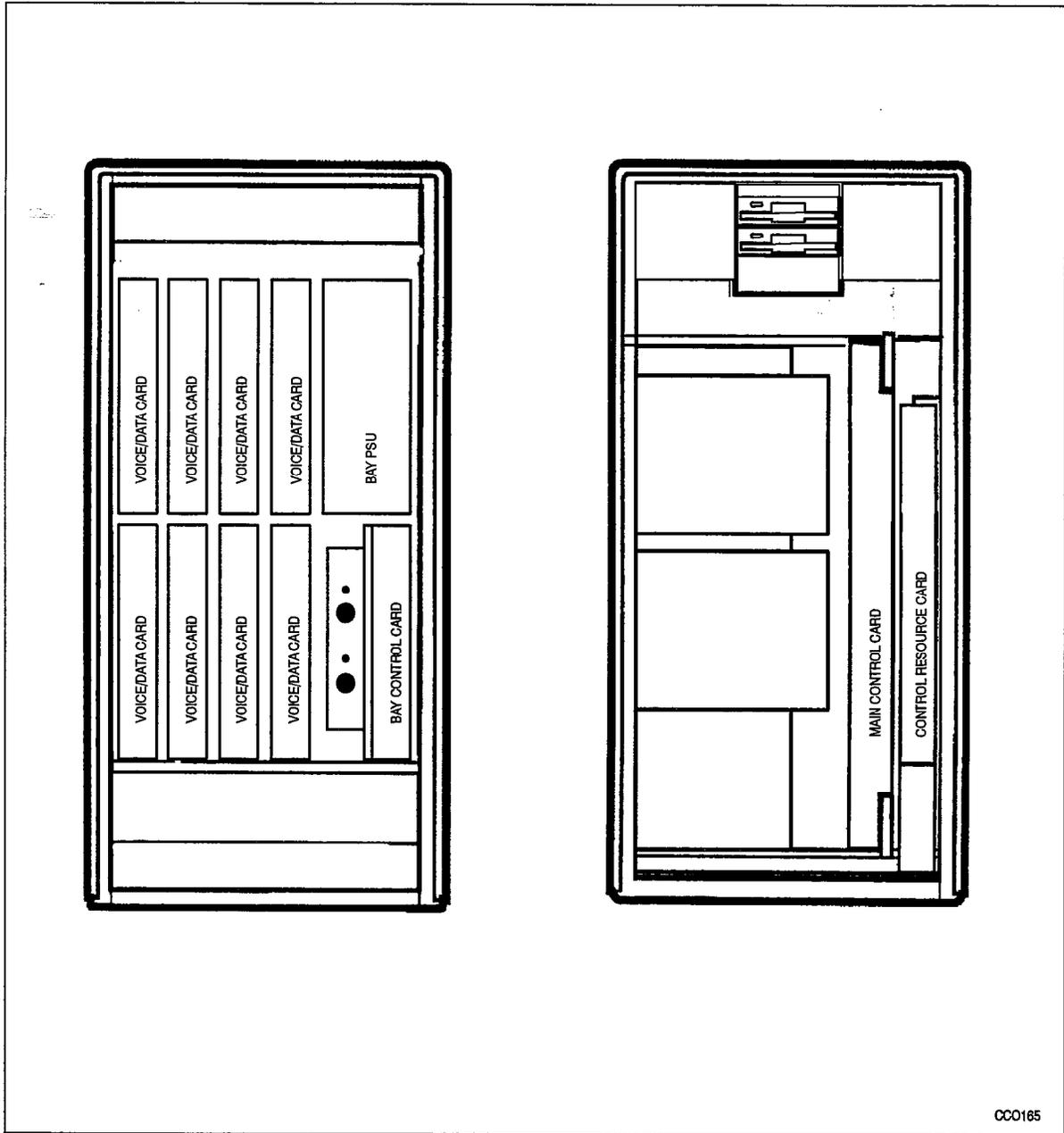
2.3 The SX-200 FIBER DISTRIBUTED (FD) PABX can be installed with up to seven 96-port peripheral bays. The basic system consists of one Control Node, containing all of the Control cards and disk drives, and a peripheral cabinet/bay containing a Bay Control card and all of the digital peripheral cards. Up to 7 peripheral bays can be installed in an SX-200 FD system. Fiber optic interconnection allows the peripheral bays to be distributed up to 1 km away from the Control Node.

The equipment to be installed to create the SX-200 FD system is shown in Table 2-9. Some of the equipment listed as requiring installation may be shipped already installed. If that is the case, that equipment should be removed and reseated during the installation procedure.

**Table 2-9 Equipment Installed in SX-200 FD PABX**

Control Node	<p>Shipped installed:</p> <ul style="list-style-type: none"> <li>- Power Supply Unit (PSU)</li> <li>- two 3 1/2" Floppy Disk Drives</li> <li>- 1 or 2 FIM Carriers</li> <li>- MCC Carrier</li> <li>- Control Node cabinet</li> </ul> <p>Requiring installation:</p> <ul style="list-style-type: none"> <li>- Main Control card</li> <li>- Switch Matrix Module</li> <li>- 4 Meg memory module</li> <li>- up to 7 Fiber Interface Modules (FIMs)</li> <li>- Control Resources card (CRC)</li> </ul>
Peripheral Cabinet/Bay(s)	<p>Shipped installed in each Peripheral Bay:</p> <ul style="list-style-type: none"> <li>- Peripheral Backplane</li> <li>- Peripheral cabinet</li> </ul> <p>Requiring installation in each Peripheral Bay:</p> <ul style="list-style-type: none"> <li>- Bay Control card</li> <li>- Peripheral FIM Carrier</li> <li>- one FIM</li> <li>- Bay Power Supply</li> <li>- up to 8 digital peripheral cards</li> <li>- System Fail Transfer (SFT) Unit</li> </ul>
Digital Peripheral Cards	<p>Any of:</p> <ul style="list-style-type: none"> <li>- Universal card and modules</li> <li>- ONS line card</li> <li>- OPS line card</li> <li>- COV line card</li> <li>- Digital Line Card</li> <li>- LS/GS trunk card</li> <li>- DID trunk card</li> <li>- T1-DS1 trunk card</li> </ul>

Figure 2-3 shows the SX-200 FD PABX Control Node and a peripheral bay.



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Figure 2-3 SX-200 FD PABX Control Node and Peripheral Bay

**Equipment Part Numbers**

The part numbers of equipment to be installed in the SX-200 FD PABX are shown in Table 2-10.

<b>Table 2-10 Equipment Part Numbers</b>		
<b>Equipment Name</b>	<b>Part Number</b>	<b>Comments</b>
<b>Cabinet and Hardware</b>		
Control Node cabinet	9400-100-100-NA	
Quad FIM Carrier	9400-300-302-NA	
Floppy Disk Drive	9400-300-305-NA	
Peripheral Bay cabinet	9400-100-110-NA	
Peripheral FIM Carrier	9400-100-301-NA	
<b>Digital Control Cards</b>		
Main Control Card	9109-036-000-SA	Without modules
– 4 Meg Memory module	9109-002-005-SA	Included with software. See Note.
– Switch Matrix module	9400-100-300-NA	
– Decryption module		Included with software. See Note.
– T1 clock module	9109-060-000-SA 9109-061-000-SA	STRAT 3 STRAT 4
Power Supply Unit	9400-300-200-NA	
Control Resource Card	9400-100-303-NA	
Bay Power Supply	9109-008-000-SA	115V
	9109-008-002-NA	230V
Bay Control Card	9109-017-000-SA	
Fiber Interface Module	9400-300-301-NA	
<b>Digital Peripheral Cards</b>		
Universal Card	9109-005-000-SA	Without modules
– Receiver/relay module	9109-016-000-SA	
– Music on hold/pager module	9109-018-000-SA	
– Console module	9109-025-000-SA	
– E&M trunk module	9109-013-000-SA	
ONS line card	9109-010-000-SA	
COV line card	9109-020-000-SA	
OPS line card	9109-040-000-SA	
Digital Line Card	9109-012-000-SA	
LS/GS trunk card	9109-011-001-SA	
Page 1 of 3		

<b>Table 2-10 Equipment Part Numbers (continued)</b>		
<b>Equipment Name</b>	<b>Part Number</b>	<b>Comments</b>
DID trunk card	9109-031-000-SA	
<b>Software (see Note)</b>		
Generic 1005 software (base)	9109-518-500-SA	Includes: - Generic 1005 software (base) - 4 Meg memory module - Decryption module - system documentation
Generic 1005 software (ACD)	9109-518-510-SA	Includes: - Generic 1005 software (plus ACD) - 4 Meg memory module - Decryption module - system documentation (plus ACD)
Generic 1005 software (ACD) without memory module	9109-518-520-SA	Includes: - Generic 1005 software (plus ACD) - Decryption module - system documentation (plus ACD)
Generic 1005 software (base) without memory module	9109-518-530-SA	Includes: - Generic 1005 software (base) - Decryption module - system documentation
Generic 1005 software (MAI)	9109-518-540-SA	Includes: - Generic 1005 software (plus MAI) - 4 Meg memory module - Decryption module - system documentation (plus MAI)
Generic 1005 software (MAI and ACD)	9109-518-560-SA	Includes: - Generic 1005 software (plus ACD and MAI) - 4 Meg memory module - Decryption module - system documentation (plus ACD and MAI)
Generic 1005 software (FPKG 1)	9109-518-580-SA	Includes: - Generic 1005 software (FPKG 1) - 4 Meg memory module - Decryption module - system documentation
Generic 1005 software (LIT96)	9109-518-590-SA	Includes: - Generic 1005 software (LIT96) - 4 Meg memory module - Decryption module - system documentation
Spare system diskettes (Generic 1005 base)	9109-034-500-SA	

Table 2-10 Equipment Part Numbers (continued)		
Equipment Name	Part Number	Comments
<b>Documentation (see Note)</b>		
System documentation		Technical documentation – Included with software
		Page 3 of 3

**Note:** System software diskettes, Decryption module, memory module, and documentation are ordered as a kit. The documentation is packaged separately. The Decryption module is packaged with the system software diskettes; it has no part number.

**Installation Charts**

Table 2-11 indicates which charts to follow in sequence to install the SX-200 FD PABX.

Table 2-11 Charts to Follow to Install the SX-200 FD System		
Activity	Basic	Chart
<b>Prepare for Installation</b>		
Prepare for Installation	X	Chart 2-1
<b>Install Cabinets</b>		
Unpack and Inspect Control Node	X	Chart 3-3
Open and Close Node Front Door	X	Chart 3-4
Install Control Node	X	Chart 3-5
Install Second FIM Carrier	@	Chart 3-6
Unpack and Inspect Peripheral Cabinet	X	Chart 3-9
Install Peripheral Cabinet	X	Chart 3-10
Verify Peripheral Ground Connection	X	Chart 3-11
<b>Handle Printed Circuit Cards</b>		
Unpack and Handle Printed Circuit Cards	X	Chart 4-1
Remove and Repack Printed Circuit Cards	@	Chart 4-2
<b>Install Digital Control Cards</b>		
Install the Main Control Card	X	Chart 6-1
Remove a Module From the Main Control Card	X	Chart 6-2
Install Control Resource Card	X	Chart 6-4
		Page 1 of 2

<b>Table 2-11 Charts to Follow to Install the SX-200 FD System (continued)</b>		
<b>Activity</b>	<b>Basic</b>	<b>Chart</b>
Install Fiber Interface Modules in the Control Node	X	Chart 6-5
Install Bay Power Supply	X	Chart 6-7
Install Bay Control Card	X	Chart 6-8
Install Peripheral FIM Carrier and FIM	X	Chart 6-9
<b>Install System Fail Transfer</b>		
Connect System Fail Transfer Unit to Peripheral Cabinet	@	Chart 7-2
<b>Install Digital Peripheral Cards</b>		
Install Universal Card and Modules	#	Chart 8-1
Install Line (ONS, OPS, COV, and Digital) and DID Trunk Cards	#	Chart 8-2
Install LS/GS Trunk Card	#	Chart 8-3
Install T1-DS1 Trunk Card	#	Chart 8-4
<b>Put System Into Service</b>		
Connect Optical Fiber Cables between Nodes	X	Chart 9-1
Connect Cables Between System and Cross-connect Field	X	Chart 9-2
Control Cabinet Power On	X	Chart 9-3
Peripheral Cabinet Power On	X	Chart 9-4
Install Diskettes Into Disk Drives	X	Chart 9-6
Check System Initialization	X	Chart 9-7
Remove Diskettes From Disk Drives	@	Chart 9-8
Page 2 of 2		

X means: Do this chart.

@ means: Do this chart as required.

# means: Type and number of circuit cards to be installed vary according to customer requirements.

## Prepare for Installation

- 2.4 When you have completed Chart 2-1 you will have:
- Made sure the site survey information is available.
  - Made sure the system configuration information is available.
  - Assembled the material you need for the installation.

---

**Chart 2-1 Prepare For Installation**

Step	Action	Comments
	<b>Prepare For Installation</b>	
1.	Make sure all stations, trunks, and other equipment to be connected to the system are identified	This information is usually prepared by a customer service representative before installation begins
	<b>Refer to System Configuration</b>	
2.	Check that the quantities and types of printed circuit cards to be installed have been identified.	Practice 9109-096-180-NA ; Engineering Information, gives configuration rules
3.	Make sure that stations and trunks are assigned to specific cards.	This ensures proper handling and distribution of traffic.
4.	Make sure cards are assigned to specific slots in the cabinet.	
	<b>Prepare Support Material</b>	
5.	Make sure that all material required for the installation is available.	Such as telephone sets, cables, cross-connection blocks

## 3.

## INSTALLING CABINETS

### Install Control Cabinet

#### Unpack and Inspect SX-200 DIGITAL Control Cabinet

- 3.1. When you have completed Chart 3-1:
- Other items will be set aside to be unpacked later.
  - The SX-200 DIGITAL PABX Control cabinet will be inspected and ready to install.
  - Defective items will be repacked for return.

Chart 3-1 Unpack and Inspect an SX-200 DIGITAL Control Cabinet

Step	Action	Comments
	<b>Receive Control Cabinet</b>	
1.	Identify the Control cabinet.	The cabinet is shipped in a triwall carton held by retaining straps.
2.	Set aside all other packaged items for later unpacking and installation.	
	<b>Unpack</b>	
3.	Cut and remove retaining straps.	
4.	Open and remove triwall carton and other packing material.	Shown in Figure 3-1.
5.	Remove the cabinet from the shipping pallet.	Foam pads are glued to the pallet under the cabinet.
6.	Remove the plastic sheet from the cabinet.	Packing material should be kept until cabinet is inspected, in case it must be returned.
	<b>Inspect Control Cabinet</b>	
7.	Remove keys.	Keys are taped to top of cabinet.
8.	Unlock and open cabinet front door. Check that door opens and closes easily.	
9.	Check shelves and other components for damage.	
10.	Make sure that all connector contacts are free of foreign matter.	
11.	Close and lock cabinet front door.	

---

**Chart 3-1 Unpack and Inspect an SX-200 DIGITAL Control Cabinet  
(continued)**

<b>Step</b>	<b>Action</b>	<b>Comments</b>
12.	Unlock and open rear door.	
13.	Check that all cable connectors are seated firmly and are undamaged.	
14.	Inspect backplane for damage. <b>Repack Defective Items</b>	
15.	Tag defective items.	
16.	Fill in relevant portion of damage report.	
17.	Repack tagged items and return according to local procedures.	

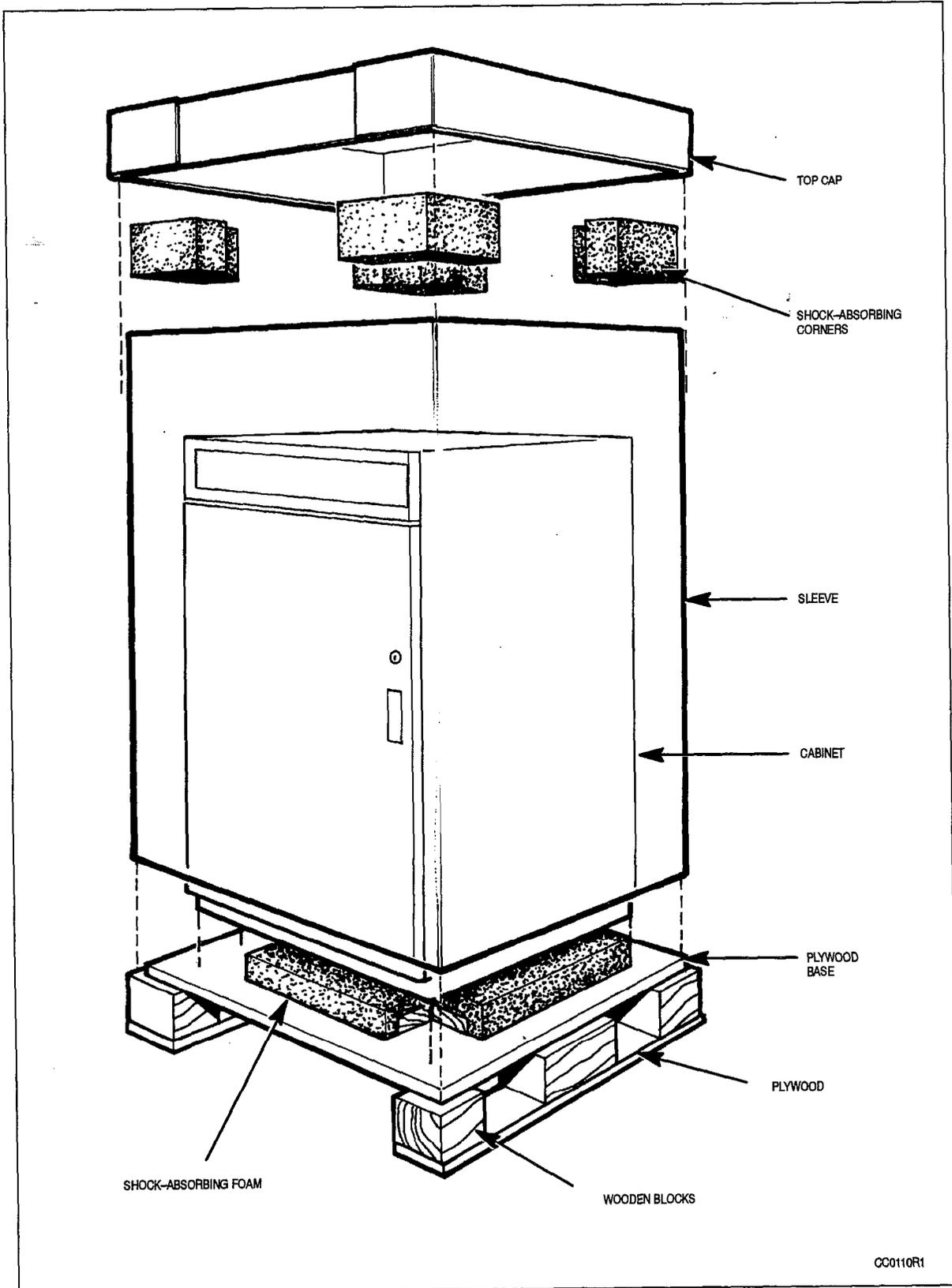


Figure 3-1 External Packaging of an SX-200 DIGITAL PABX Cabinet

**Install SX-200 DIGITAL Control Cabinet**

When you have completed Chart 3-2:

- The Control cabinet will be in its assigned position.
- Power requirements will be checked.
- Shelf screws will be tightened.
- Bays will be numbered
- The cabinet will not be plugged in.

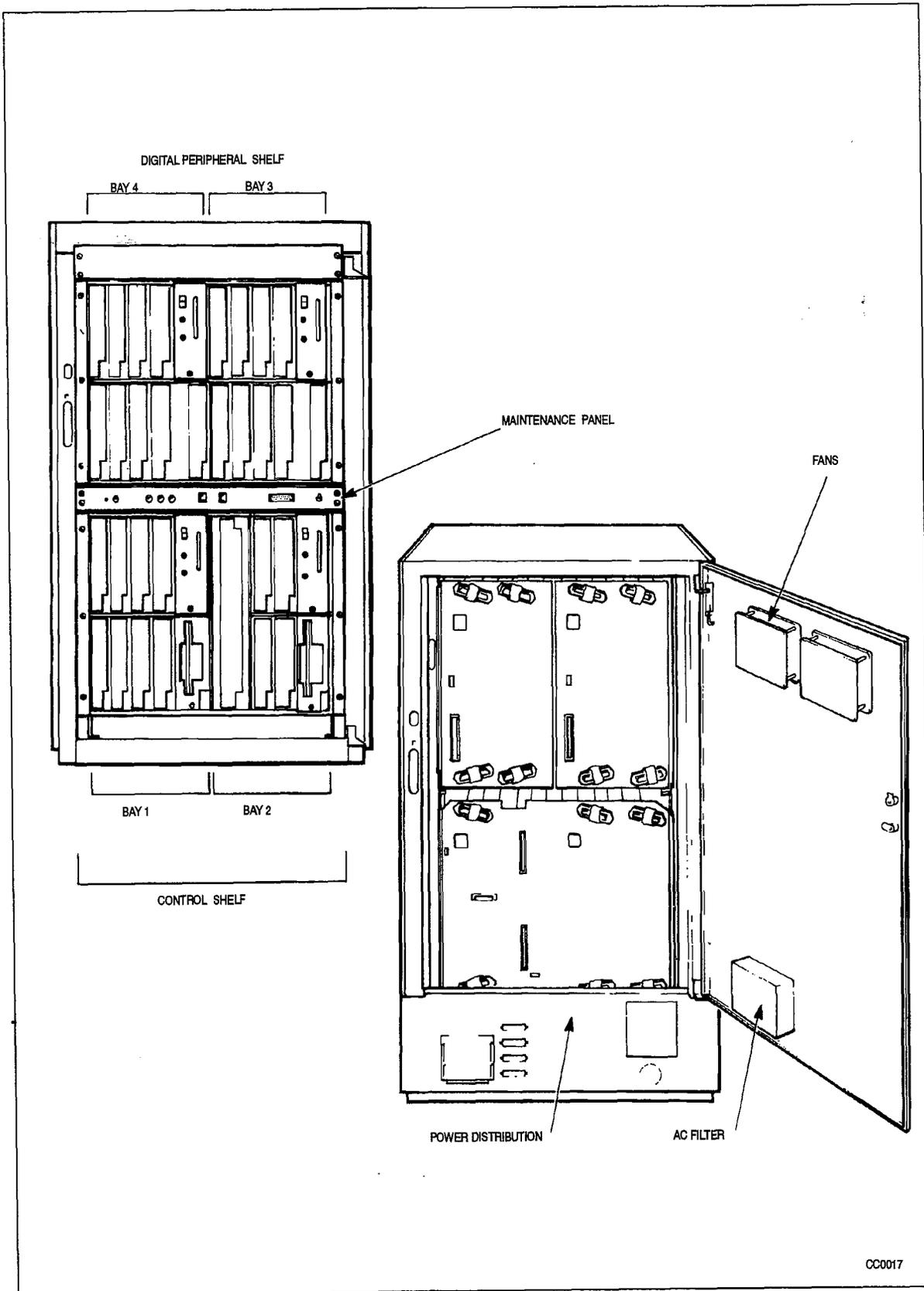
- Notes:**
1. When positioning the Control cabinet, allow room for any PABX accessories or peripherals, such as a UPS or a maintenance terminal.
  2. Arrange for the power requirements for these peripherals and accessories. These power requirements are described in the documentation provided with the items.

**Chart 3-2 Install an SX-200 DIGITAL Control Cabinet**

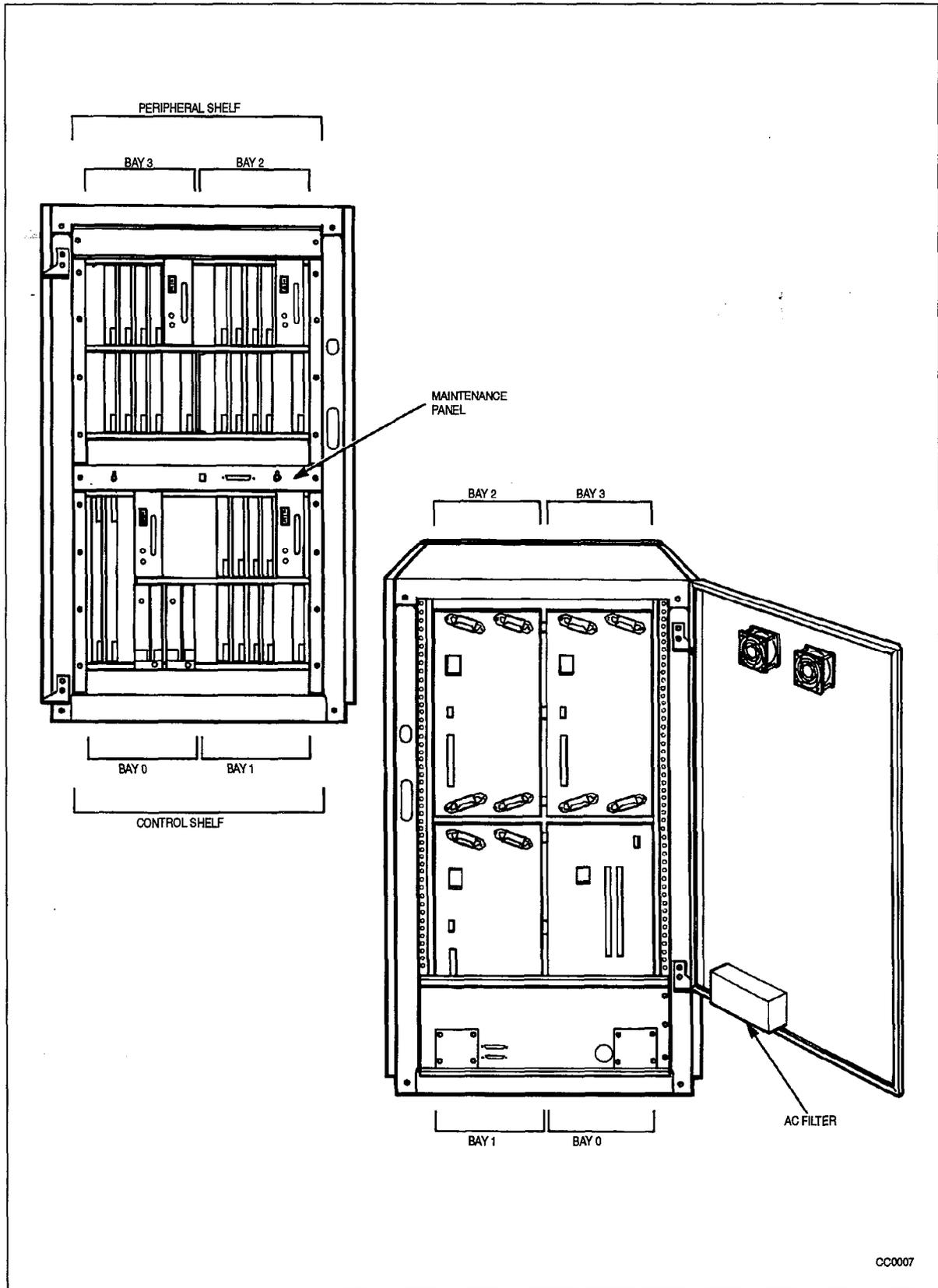
Step	Action	Comments
1.	<p><b>Position Cabinet</b></p> <p>Put the Control cabinet in its assigned position.</p>	<p><b>Equipment Location:</b> The cabinet has a fan assembly mounted in the rear door for cooling. Therefore, the bottom area of the cabinet must be unobstructed and not too close to a wall or other equipment so the air vents are clear.</p> <p>The location <b>MUST</b> be:</p> <ul style="list-style-type: none"> <li>- Dry, clean, well ventilated</li> <li>- Well lit</li> <li>- Readily accessible</li> </ul> <p>The location <b>MUST NOT</b> be:</p> <ul style="list-style-type: none"> <li>- Near a sprinkler, sweating pipes, steam pipes, or steam vents.</li> <li>- In temperatures less than 10° C or greater than 40° C (50° F to 104° F).</li> <li>- Near corrosive fumes or machinery exhaust.</li> <li>- Near a copying machine or power transformer. Minimum 3 m (10 ft) from a copying machine without a filtering system. The room should be ventilated by an exhaust fan.</li> </ul>
2.	<p>Make sure there is adequate room for access.</p>	<p>The minimum floor space is 75 cm (30 in.) front and rear, 60 cm (24 in.) at one side, and 5 cm (2 in.) at the other side.</p>
3.	<p>Allow enough room for cables to enter the rear base of the cabinet.</p>	

**Chart 3-2 Install an SX-200 DIGITAL Control Cabinet  
(continued)**

Step	Action	Comments
4.	Make sure the cabinet is within reach of the cross-connect block.	
5.	Make sure it is within reach of the ac receptacle.	The plug should be accessible enough so you can unplug the cabinet for maintenance. However, you shouldn't be able to unplug the cabinet accidentally.
	<b>Check Power Requirements</b>	
6.	Check the power and power receptacle provided.	<p>The cabinet has a line cord with a three-prong plug.</p> <p><b>Power Requirements:</b></p> <p>There must be one single-phase power receptacle for the cabinet, as follows:</p> <ul style="list-style-type: none"> <li>- The cabinet should have its own 120 V, 60 Hz, 15 A branch circuit, (or 230 V, 50 Hz, 8 A circuit for 230V systems).</li> <li>- The power receptacle must be a three-wire type, with the ground wire connected to the ground of the electrical system.</li> <li>- There must be no attempt to defeat the grounding conductor.</li> <li>- The power receptacle must not be controlled by a switch.</li> </ul>
7.	Attach a warning tag to the plug end of the power cord to prevent its accidental removal.	
8.	Attach a warning tag to circuit breakers to prevent unauthorized manual operation.	
	<b>Tighten Shelf Screws</b>	
9.	Tighten all shelf retaining screws.	
	<b>Label Bays</b>	
10.	Remove the bay numbering labels from inside the front door.	
11.	Stick the appropriate label onto the inside of each cardfile at the back.	Bay numbering is shown in Figure 3-2 for the 336-port configuration, and Figure 3-3 for the 672-port configuration.
12.	Keep unused numbers for new bays as the PABX is expanded.	Numbers are supplied for two cabinets.



**Figure 3-2 336-port Configuration Control Cabinet With Digital Peripheral Shelf**



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Figure 3-3 672-Port Control Cabinet With Digital Peripheral Shelf

**Unpack and Inspect SX-200 FD Control Cabinet**

Chart 3-3 presents the procedures required to unpack and inspect for damage the SX-200 FD Control Node cabinet. The SX-200 FD system consists of one Control Node and one to seven Peripheral Nodes/Bays.

When you have completed Chart 3-3:

- The node cabinet will be ready to install.
- Other items will be set aside to be unpacked later.
- Defective items will be repacked for return.

**CAUTION**

**Do not open or unpack any printed circuit board cartons at this time.**

**Chart 3-3 Unpack and Inspect an SX-200 FD Control Node Cabinet**

Step	Action	Comments
	<p><b>Open Carton and Remove Node from Carton</b></p> <p>1. Identify the node cabinet. Set aside all other packaged items for later unpacking and installation.</p> <p>2. Unpack carton(s) and check contents against packing list. Retain some packing material in case any items are to be returned.</p> <p>3. Remove the cabinet from the carton.</p> <p><b>Inspect for Transit Damage</b></p> <p>4. Visually check that the node and all attached equipment is undamaged.</p> <p>5. Open the Control Node front door panel.</p> <p>6. Make sure that all connector contacts are free of foreign matter.</p> <p>7. Check that all cable connectors are seated firmly and are undamaged.</p> <p>8. Inspect backplane for damage.</p> <p><b>Repack Defective Items</b></p> <p>9. Tag defective items, and fill in relevant portion of damage report.</p> <p>10. Repack tagged items and return according to local procedures.</p>	<p>See Chart 3-4.</p>

### Open and Close SX-200 FD Cabinet Front Door

For most card installation procedures, the front door panel of the node cabinet must be removed. Chart 3-4 provides instructions for removing and replacing the node front door panel.

**Chart 3-4 Open and Close SX-200 FD Cabinet Front Door**

Step	Action	Comments
	<p><b>Open Node Front Door</b></p> <ol style="list-style-type: none"> <li>1. Pry open the 2 latches on the right hand side of the black cover panel on the front door, and swing the cover panel off to the left.</li> <li>2. Remove the 2 Phillips screws under the black panel to release the front door panel.</li> <li>3. Pull the top of the front door out from the node cabinet and lift off the lower front cabinet rail.</li> </ol> <p><b>Close Node Front Door</b></p> <ol style="list-style-type: none"> <li>4. Lower the front door panel down over the front cabinet rail and position it on the front of the node so that the 2 screw slots are aligned.</li> <li>5. Replace the 2 Phillips screws holding the door panel on the front of the node.</li> <li>6. Place the black cover panel over the appropriate opening, first catching the latch on the left hand side, and then the 2 latches on the right hand side.</li> </ol>	

**Install SX-200 FD Control Node Cabinet**

When you have completed Chart 3-5 for the Control Node cabinet:

- The Control Node cabinet will be in its assigned position.
- Power requirements will be checked.
- The cabinet will not be plugged in.

- Notes:**
1. When positioning node cabinets, allow room for any PABX accessories, such as a UPS, or peripherals such as a maintenance terminal.
  2. Arrange for the power requirements for these peripherals and accessories. These power requirements are described in the documentation provided with the items.
  3. A UPS (Uninterruptible Power Supply) is recommended for the SX-200 FD Control Node.

**Chart 3-5 Install an SX-200 FD PABX Control Node Cabinet**

Step	Action	Comments
1.	<p><b>Position Cabinet</b></p> <p>Put the Control Node cabinet in its assigned position.</p>	<p><b>Equipment Location:</b></p> <p>The location <b>MUST</b> be:</p> <ul style="list-style-type: none"> <li>- Dry, clean, well ventilated</li> <li>- Well lit</li> <li>- Readily accessible</li> </ul> <p>The location <b>MUST NOT</b> be:</p> <ul style="list-style-type: none"> <li>- Near a sprinkler, sweating pipes, steam pipes, or steam vents.</li> <li>- In temperatures less than 0° C or greater than 40° C (32° F to 104° F).</li> <li>- Near corrosive fumes or machinery exhaust.</li> <li>- Near a copying machine or power transformer. Minimum 3 m (10 ft) from a copying machine without a filtering system.</li> </ul>
2.	<p>Make sure there is adequate room for access and cabinet ventilation.</p>	<p>The Control Node cabinet has a fan for cooling in the Power Supply Unit, mounted on the backplate. Therefore, the rear of the cabinet must be unobstructed and not too close to a wall or other equipment so the air vents are clear.</p>
3.	<p>Make sure it is within reach of the ac receptacle.</p>	<p>The plug should be accessible enough so you can unplug the cabinet for maintenance. However, you shouldn't be able to unplug the cabinet accidentally.</p>

**Chart 3-5 Install an SX-200 FD PABX Control Node Cabinet  
(continued)**

Step	Action	Comments
4.	<p><b>Check Power Requirements</b></p> <p>Check the power and power receptacles provided.</p>	<p><b>System Power Requirements:</b></p> <p>The power requirements of the SX-200 FD system are as follows:</p> <ul style="list-style-type: none"> <li>- The cabinets of an SX-200 FD system may share a branch circuit dedicated to that one system only.</li> <li>- Each receptacle of the branch circuit should have ratings of 120 V, 60 Hz, 15 A (or 230 V, 50 Hz, 8 A circuit for 230V systems).</li> <li>- More than one receptacle may be installed on the branch circuit if more power rating or plugs are required.</li> <li>- If the total power requirements of the entire system exceed the rating of one branch circuit, individual dedicated branch circuits may be installed per cabinet.</li> </ul> <p><b>Cabinet Power Requirements:</b></p> <p>The cabinet has a line cord with a three-prong plug. There must be one single-phase power receptacle for each cabinet, as follows:</p> <ul style="list-style-type: none"> <li>- The power receptacle must be a three-wire type, with the ground wire connected to the ground of the electrical system.</li> <li>- There must be no attempt to defeat the grounding conductor.</li> <li>- The power receptacle must not be controlled by a switch.</li> </ul> <p>The Power Supply Unit (PSU) on the upper backplate of the Control Node has a fan, a power input jack, an IEC outlet, and a power switch. The IEC outlet (above the power input jack) is not to be used for any equipment. The power line cord plugs into the power input jack on the PSU and the wall power receptacle.</p>
	5.	<p>Attach a warning tag to the plug end of the power cord to prevent its accidental removal. Fasten the power cord to the cabinet securely.</p>



### Install Second FIM Carrier (SX-200 FD PABX)

The Control Node is delivered with one FIM Carrier installed. It can hold up to 4 FIMs, for interconnection with up to 4 Peripheral bays. If more than 4 Peripheral bays are to be installed, then a second FIM Carrier is required. The following chart describes the installation of the second FIM Carrier.

When you have completed Chart 3-6:

- A second FIM Carrier will be installed, in the opening under the first FIM Carrier.

**CAUTION**

Power to the Control Node should be OFF during this procedure. If the Control Node is powered on, power down now.

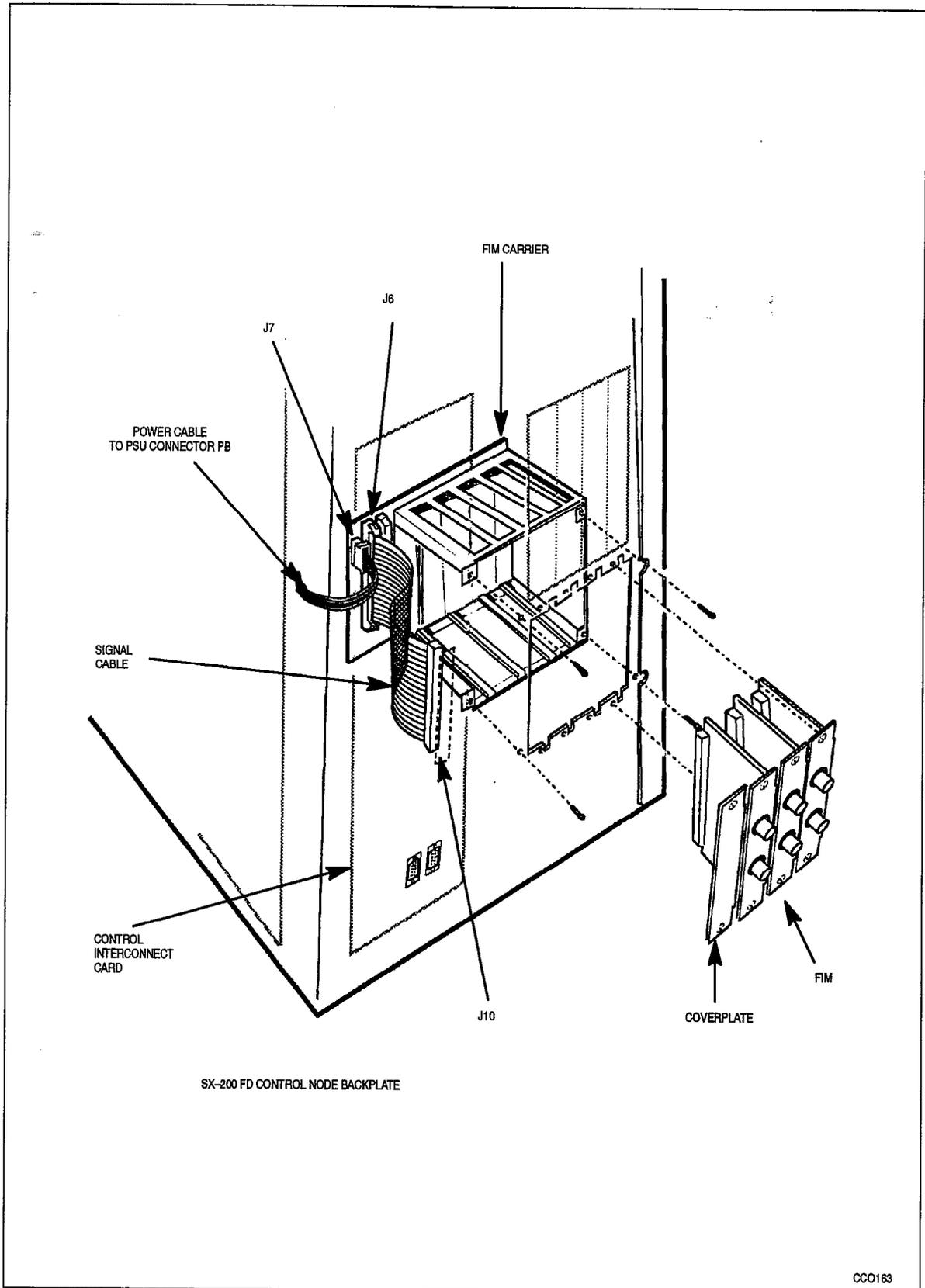
**Chart 3-6 Install Second FIM Carrier in SX-200 FD Control Node**

Step	Action	Comments
	<b>Unpack and Inspect the FIM Carrier</b>	
1.	Attach the antistatic wrist strap while unpacking and handling the FIM Carrier.	
2.	Unpack the FIM Carrier and inspect for damage.	
3.	Complete repair tag, repack and return any damaged or incorrect items.	
	<b>Remove Cabinet Sleeve</b>	
4.	Open the front panel on the Control Node as described in Chart 3-4.	
5.	Remove all of the screws holding the cabinet sleeve in place on the node backplate.	
6.	Lift the sleeve up off of the node cabinet.	
	<b>Remove Cover Plate from FIM Carrier Opening</b>	
7.	Remove the 4 screws holding the cover plate in place over the opening for the FIM Carrier, on the backplate.	
	<b>Connect Power and Signal Cables</b>	
8.	Lay the FIM Carrier on the Control Node floor, directly below the installed FIM Carrier, and in the same position.	The FIM backplane should be away from the cabinet backplate, and the cable connectors on the side of the FIM Carrier away from the cabinet side.

Page 1 of 2

**Chart 3-6 Install Second FIM Carrier in SX-200 FD Control Node  
(continued)**

Step	Action	Comments
9.	Connect the extender power cable from connector J7 on the FIM Carrier to the PB or P4 cable connector on the PSU.	There should only be one PSU cable connector not in use when you install a second FIM Carrier. This is the cable connector for the second FIM Carrier.
10.	Connect the signal ribbon cable from J6 on the FIM Carrier backplane to J10 on the Control Interconnect card (Control Node backplane).	See Figure 3-6.
<b>Mount FIM Carrier in Cabinet</b>		
11.	Position the FIM Carrier in the Control Node so that the screw holes on the FIM Carrier align with the 4 screw holes in the backplate around the opening directly below the first FIM Carrier.	See Figure 3-5.
12.	Mount the FIM Carrier securely in place with the 4 screws provided.	
<b>Install FIM Slot Filler Plates</b>		
13.	On the backplate, cover each FIM slot that will not be used with a FIM filler plate (provided). Secure each filler plate in place with the 2 screws provided.	
<b>Replace Cabinet Sleeve</b>		
14.	Lower the cabinet sleeve down over the cabinet, making sure that the screw holes in the sleeve are on the back of cabinet, and that the lips of the sleeve slide down over top of the backplate.	
15.	The sleeve should catch on 2 lip plates on the bottom sides of the cabinet. Press down firmly until the screw holes on the back align.	
16.	Secure the sleeve in place, using the screws removed in step 5.	



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Figure 3-5 Second (Optional) FIM Carrier in the SX-200 FD Control Node

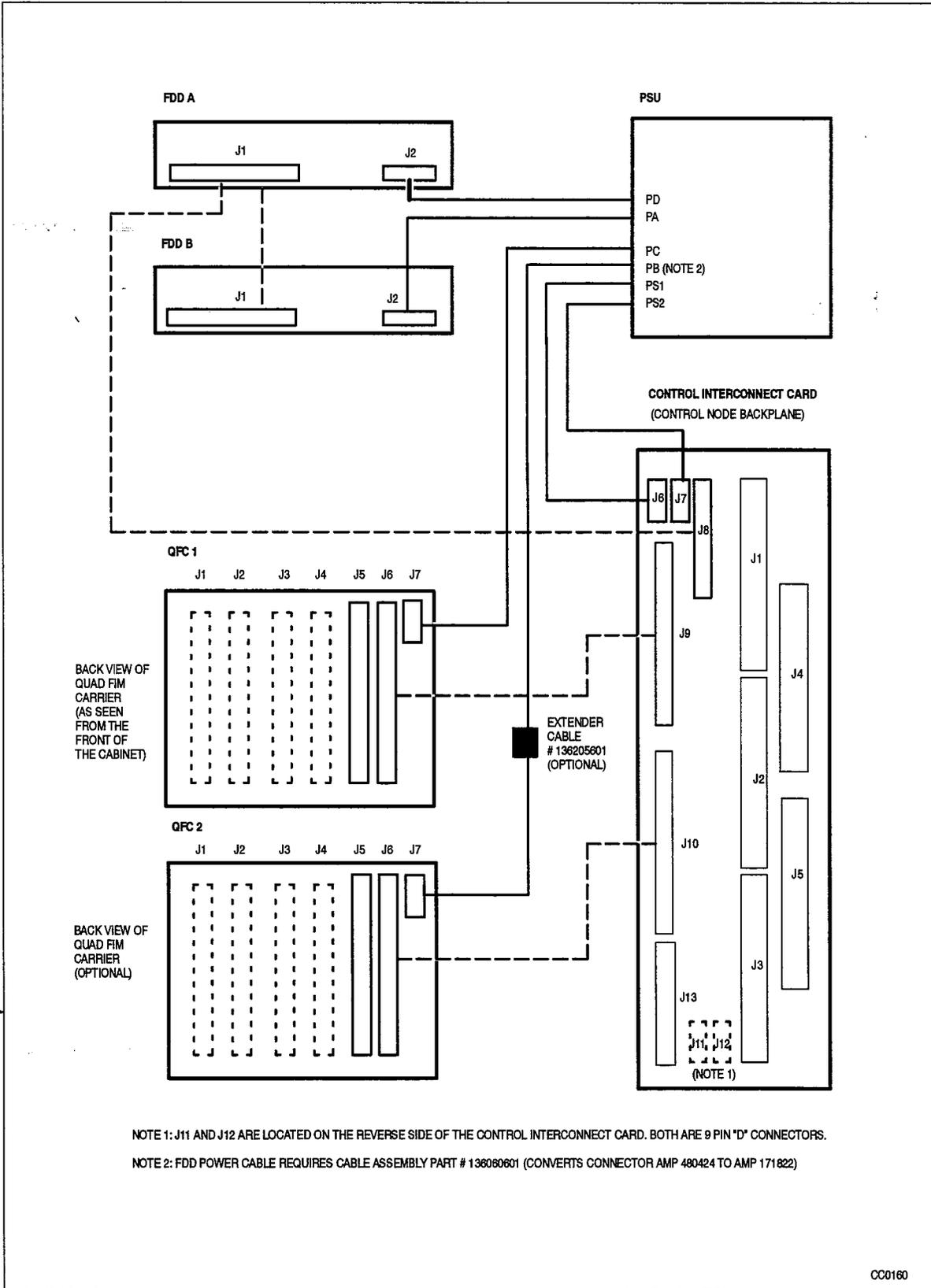


Figure 3-6 Cable Connections for the Second (Optional) FIM Carrier

## Install Peripheral Cabinets

### Unpack and Inspect the 672-port Peripheral Cabinet

3.2 When you have completed Chart 3-7:

- The 672-port digital peripheral cabinet will be inspected and ready to install.
- Defective equipment will be repacked for return.

**Chart 3-7 Unpack and Inspect 672-Port Peripheral Cabinet**

Step	Action	Comments
<b>Receive Peripheral Cabinet</b>		
1.	Identify the peripheral cabinet.	The cabinet is shipped in a triwall carton held by retaining straps.
2.	Set aside all other packaged items for later unpacking and installation.	
<b>Unpack</b>		
3.	Cut and remove retaining straps.	Shown in Figure 3-1.
4.	Open and remove triwall carton and other packing material.	
5.	Remove the cabinet from the shipping pallet.	
6.	Remove the plastic sheet from the cabinet.	Foam pads are glued to the pallet under the cabinet.
<b>Inspect Peripheral Cabinet</b>		
7.	Remove keys.	Keys are taped to top of cabinet.
8.	Unlock and open cabinet front and rear doors. Check that doors open and close easily.	The shelf and backplane for digital Bay 4 are shipped installed.
9.	Check shelves and other components for damage.	
10.	Make sure that all connector contacts are free of foreign matter.	
11.	Close and lock cabinet front door.	
12.	Check that all cable connectors are seated firmly and undamaged.	
13.	Inspect backplane for damage.	
14.	Close and lock rear door.	

---

**Chart 3-7 Unpack and Inspect 672-Port Peripheral Cabinet  
(continued)**

Step	Action	Comments
	<b>Repack Defective Items</b>	
15.	Inspect all items; tag defective items.	
16.	Fill in relevant portion of damage report.	
17.	Repack tagged items and return according to local procedures.	

### Install 672-port Peripheral Cabinet

When you have completed Chart 3-8:

- The peripheral cabinet will be in its assigned position.
- Power requirements will be checked.
- Shelf screws will be tightened.
- Bays will be numbered
- The cabinet will not be plugged in.

**Notes:** 1. When positioning the Control cabinet, allow room for any PABX accessories, such as a UPS or ac surge suppressor, or peripherals such as a maintenance terminal.

2. Arrange for the power requirements for these peripherals and accessories. These power requirements are described in the documentation provided with the items.

**Chart 3-8 Install 672-Port Digital Peripheral Cabinet**

Step	Action	Comments
1.	<p><b>Position Cabinet</b></p> <p>Roll the peripheral cabinet into its assigned position.</p>	<p><b>Equipment Location:</b> The cabinet has a fan assembly mounted in the rear door for cooling. Therefore, the bottom area of the cabinet must be unobstructed and not too close to a wall or other equipment so the air vents are clear.</p> <p>The location <b>MUST</b> be:</p> <ul style="list-style-type: none"> <li>- Dry, clean, well ventilated</li> <li>- Well lit</li> <li>- Readily accessible</li> </ul> <p>The location <b>MUST NOT</b> be:</p> <ul style="list-style-type: none"> <li>- Near a sprinkler, sweating pipes, steam pipes, or steam vents.</li> <li>- In temperatures less than 10° C or greater than 40° C (50° F to 104° F).</li> <li>- Near corrosive fumes or machinery from exhaust.</li> <li>- Near a copying machine or power transformer. Minimum 3 m (10 ft) a copying machine without a filtering system. The room should be ventilated by an exhaust fan.</li> </ul>
2.	<p>Make sure there is adequate room for access.</p>	<p>The minimum floor space is 75 cm (30 in.) front and rear, 60 cm (24 in.) at one side, and 5 cm (2 in.) at the other side.</p>

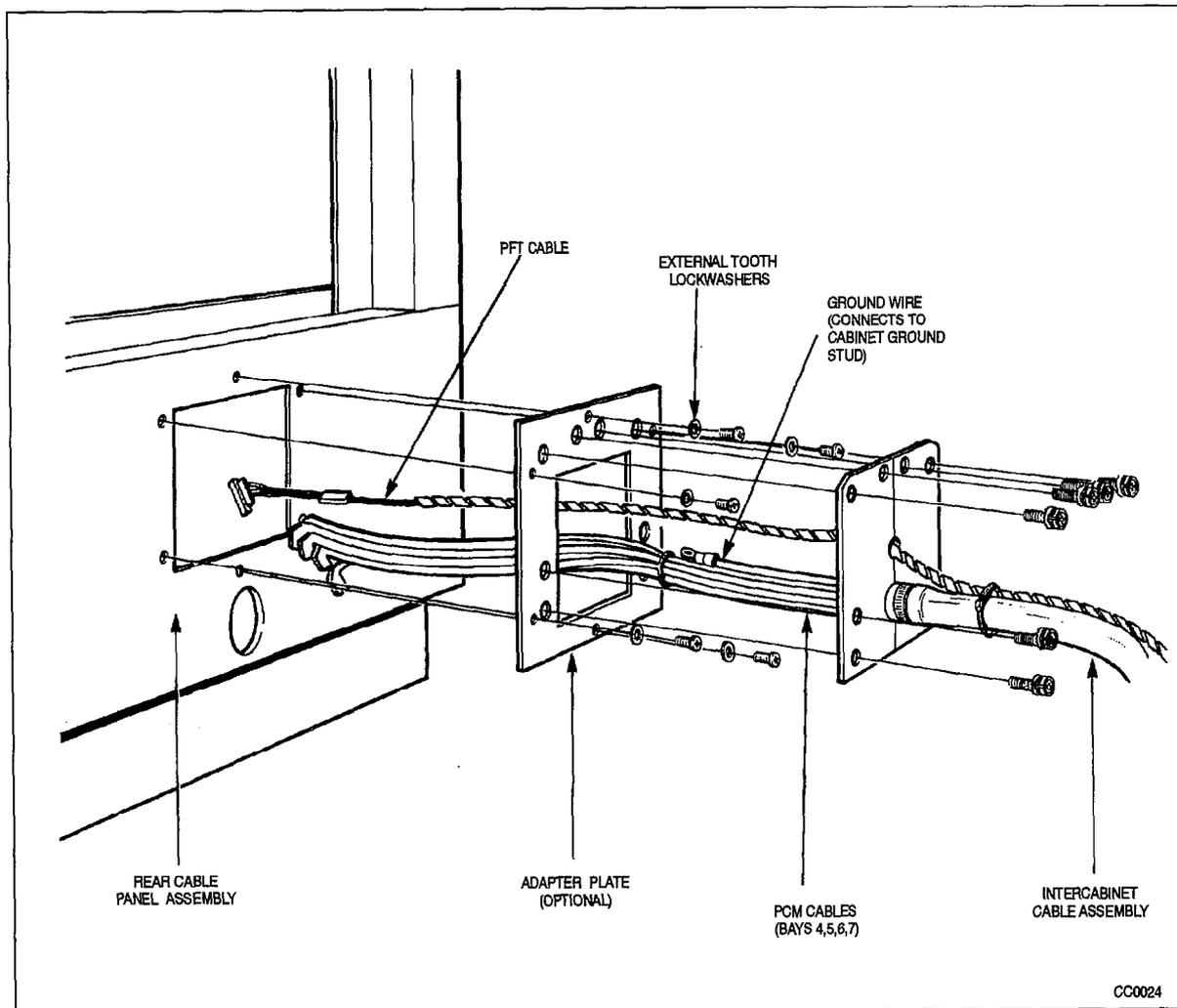
**Chart 3–8 Install 672–Port Digital Peripheral Cabinet  
(continued)**

Step	Action	Comments
3.	Allow enough room for cables to enter the rear base of the cabinet.	
4.	Make sure the cabinet is within reach of the cross-connect block.	
5.	Make sure it is within reach of the ac receptacle.	The plug should be accessible enough so you can unplug the cabinet for maintenance. However, you shouldn't be able to unplug the cabinet accidentally.
6.	Check the power and power receptacle provided.	<p>The cabinet has a line cord with a three-prong plug.</p> <p><b>Power Requirements:</b></p> <p>There must be one single-phase power receptacle for the cabinet, as follows:</p> <ul style="list-style-type: none"> <li>– The cabinet should have its own 120 V, 60 Hz, 15 A branch circuit (or 230 V, 50 Hz, 8 A circuit).</li> <li>– The power receptacle must be a three-wire type, with the ground wire connected to the ground of the electrical system.</li> <li>– There must be no attempt to defeat the grounding conductor.</li> <li>– The power receptacle must not be controlled by a switch.</li> <li>– A split receptacle is recommended for two-cabinet installations.</li> </ul>
7.	Attach a warning tag to the plug end of the power cord to prevent its accidental removal.	
8.	Attach a warning tag to circuit breakers to prevent unauthorized manual operation.	
	<b>Install Intercabinet Cable</b>	
9.	Route 672-port intercabinet cable assembly between the two cabinets.	Shown in Figure 3–7.
10.	Run the intercabinet cable through the rear power distribution panel of each cabinet.	The adapter plate that comes with the intercabinet cable assembly kit is not used if the cable flange matches the panel opening.
11.	Screw the intercabinet cable assembly (672-port) flange (and the adapter plate, if required) to each cabinet.	
12.	Connect only the ground lead to the ground stud in each cabinet.	
13.	Tighten all shelf retaining screws.	

**Chart 3-8 Install 672-Port Digital Peripheral Cabinet  
(continued)**

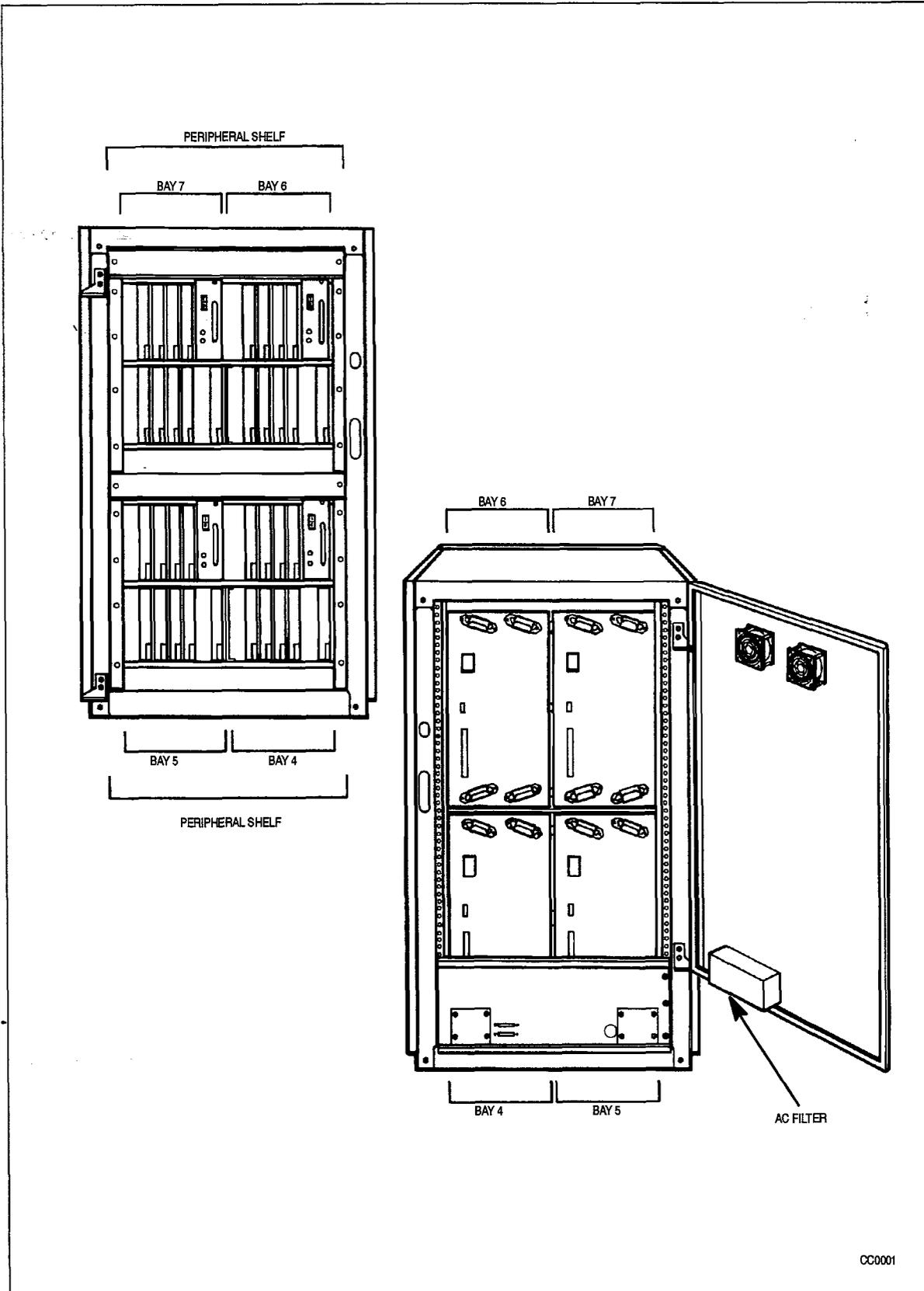
Step	Action	Comments
	<b>Label Bays</b>	
14.	Remove the bay numbering labels from inside the front door of the 672-port Control cabinet.	
15.	Stick the appropriate label onto the inside of each cardfile at the back.	Bay numbering is shown in Figure 3-8.
16.	Keep unused numbers for new bays as the PABX is expanded.	Numbers are supplied for two cabinets.

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**Figure 3-7 Installation of Intercabinet Cable Assembly**



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Figure 3-8 672-Port Peripheral Cabinet

### Unpack and Inspect SX-200 FD Peripheral Cabinet

Chart 3-9 presents the procedures required to unpack and inspect for damage the SX-200 FD Peripheral cabinet. The SX-200 FD system consists of one Control Node and one to seven Peripheral Nodes/Bays.

When you have completed Chart 3-9:

- The SX-200 FD peripheral cabinet will be ready to install.
- Other items will be set aside to be unpacked later.
- Defective items will be repacked for return.

<b>CAUTION</b>
----------------

**Do not open or unpack any printed circuit board cartons at this time.**

**Chart 3-9 Unpack and Inspect an SX-200 FD Peripheral Cabinet**

Step	Action	Comments
	<b>Open Carton and Remove Node from Carton</b>	
1.	Identify the node cabinet. Set aside all other packaged items for later unpacking and installation.	
2.	Unpack carton(s) and check contents against packing list. Retain some packing material in case any items are to be returned.	
3.	Remove the cabinet from the carton.	
	<b>Inspect for Transit Damage</b>	
4.	Visually check that the cabinet and all attached equipment is undamaged.	
5.	Open the peripheral cabinet front door panel.	See Chart 3-4.
6.	Make sure that all connector contacts are free of foreign matter.	
7.	Check that all cable connectors are seated firmly and are undamaged.	
8.	Inspect backplane for damage.	
	<b>Repack Defective Items</b>	
9.	Tag defective items, and fill in relevant portion of damage report.	
10.	Repack tagged items and return according to local procedures.	

**Install SX-200 FD Peripheral Cabinets**

When you have completed Chart 3-10:

- The peripheral cabinet will be in its assigned position.
- Power requirements will be checked.
- The cabinet will not be plugged in.

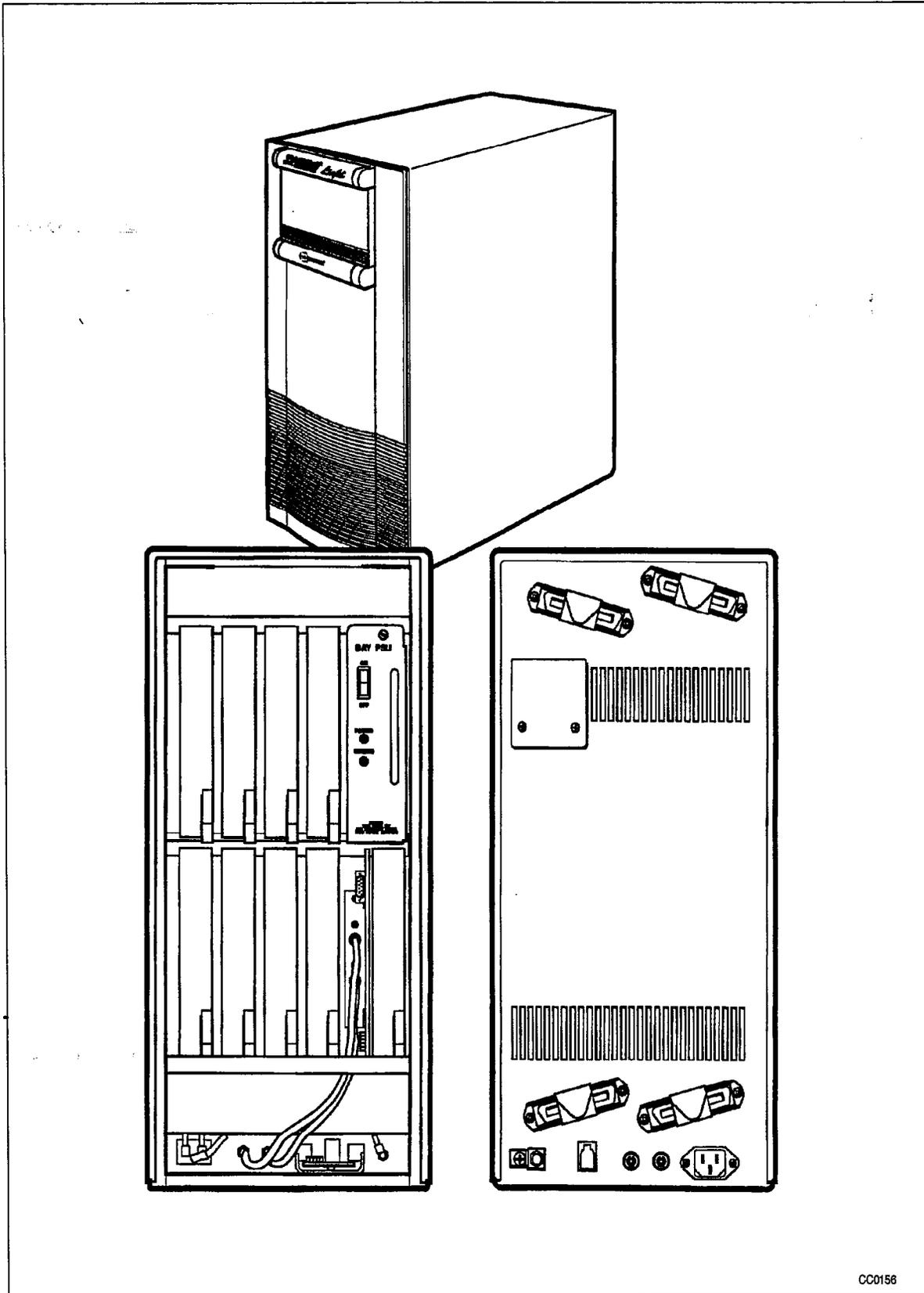
- Notes:**
1. When positioning node cabinets, allow room for any PABX accessories, such as a UPS, or peripherals such as a maintenance terminal.
  2. Arrange for the power requirements for these peripherals and accessories. These power requirements are described in the documentation provided with the items.

**Chart 3-10 Install an SX-200 FD Peripheral Cabinet**

Step	Action	Comments
	<p><b>Position Cabinet</b></p>	
1.	<p>Put the peripheral cabinet in its assigned position.</p> <p>Optical fiber cabling allows a peripheral cabinet to be located up to 1 km away from the Control Node.</p>	<p><b>Equipment Location:</b></p> <p>The location MUST be:</p> <ul style="list-style-type: none"> <li>- Dry, clean, well ventilated</li> <li>- Well lit</li> <li>- Readily accessible</li> </ul> <p>The location MUST NOT be:</p> <ul style="list-style-type: none"> <li>- Near a sprinkler, sweating pipes, steam pipes, or steam vents.</li> <li>- In temperatures less than 0° C or greater than 40° C (32° F to 104° F).</li> <li>- Near corrosive fumes or machinery exhaust.</li> <li>- Near a copying machine or power transformer. Minimum 3 m (10 ft) from a copying machine without a filtering system.</li> </ul> <p>It is recommended that:</p> <ul style="list-style-type: none"> <li>- all trunking connections be placed in one peripheral cabinet</li> <li>- that cabinet be located next to the cross-connect block.</li> </ul>
2.	<p>Make sure there is adequate room for access and cabinet ventilation.</p>	<p>The rear and sides of the cabinet must be unobstructed and not too close to a wall or other equipment so that the air vents are clear.</p>
3.	<p>Make sure it is within reach of the ac receptacle.</p>	<p>The plug should be accessible enough so you can unplug the cabinet for maintenance. However, you shouldn't be able to unplug the cabinet accidentally.</p>

**Chart 3-10 Install an SX-200 FD Peripheral Cabinet  
(continued)**

Step	Action	Comments
4.	<p><b>Check Power Requirements</b></p> <p>Check the power and power receptacles provided.</p>	<p><b>System Power Requirements:</b></p> <p>The power requirements of the SX-200 FD system are as follows:</p> <ul style="list-style-type: none"> <li>- The cabinets of an SX-200 FD system may share a branch circuit dedicated to that one system only.</li> <li>- Each receptacle of the branch circuit should have ratings of 120 V, 60 Hz, 15 A (or 230 V, 50 Hz, 8 A circuit for 230V systems).</li> <li>- More than one receptacle may be installed on the branch circuit if more power rating or plugs are required.</li> <li>- If the total power requirements of the entire system exceed the rating of one branch circuit, individual dedicated branch circuits may be installed per cabinet.</li> </ul> <p><b>Cabinet Power Requirements:</b></p> <p>Each cabinet has a line cord with a three-prong plug. There must be one single-phase power receptacle for each cabinet, as follows:</p> <ul style="list-style-type: none"> <li>- The power receptacle must be a three-wire type, with the ground wire connected to the ground of the electrical system.</li> <li>- There must be no attempt to defeat the grounding conductor.</li> <li>- The power receptacle must not be controlled by a switch.</li> </ul>
5.	<p>Attach a warning tag to the plug end of the power cord to prevent its accidental removal.</p>	



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Figure 3-9 SX-200 FD Peripheral Cabinet

## Verify Ground Connections

### 3.3 When you have completed Chart 3–11:

- Ground requirements will be checked.
- Voltage and resistance between the ground lug and the ground wire will be within acceptable limits.
- On the *SX–200* DIGITAL PABX, the ground wire will be connected to the common stud in the Control cabinet.
- In the 672–port configuration with a peripheral cabinet, the ground wire will be connected to the common stud in both cabinets.
- On the *SX–200* FD PABX, the ground wire will be connected to the common ground terminal in the peripheral cabinet.

**Notes:** 1. Before installation, an insulated #6 AWG green ground wire must be connected between the equipment location and an approved ground (metallic cold water pipe where it enters the building, or equivalent).

2. ***SX–200* FD PABX:** A ground connection to the Peripheral cabinet is only required for Outside Plant Interfaces (i.e., trunks, OPS lines). Cabinets supporting only on–premise equipment do not require #6 ground wire.

**Chart 3–11 Verify Ground Connections**

Step	Action	Comments
1.	<p><b>Check Ground Requirements</b></p> <p>Make sure ground requirements have been met. The ground wire shall be installed in accordance with national and local regulations and/or regulations of other authorities having jurisdiction.</p> <p>References:            United States of America: NEC – NFPA/ANSI 70 National Electrical Code Article 250            Canada: CEC – CSA C22.1 – Canadian Electrical Code, Section 10.</p>	<p><b>All Systems:</b></p> <p>All circuit commons in the cabinet, and all system hardware, must derive ground from a single ground concentration point in one of the cabinets. This point must derive ground from a cold water pipe or other equally grounded point, using a #6 AWG insulated green wire connected directly to both points only.</p> <p>The cabinet and associated ducting hardware must not be exposed to any ground source other than that described above.</p> <p>AC service wires bringing ac to the cabinet must not share an enclosure or raceway with other system grounds, dc power distribution wires, or signaling wires.</p>

**Chart 3-11 Verify Ground Connections  
(continued)**

Step	Action	Comments
		<p>All sources of external ground (eg, system signaling ground to the approved ground source) must connect only to the system single point ground.</p> <p><b>SX-200 DIGITAL PABX:</b></p> <p>A separate grounding conductor (minimum size 14 AWG) must be run from the system single point ground to the communications ground system on the cross-connect field.</p> <p>All doors, shelves, and similar assemblies are to be connected by straps to their designated connection points on the cabinet.</p>
	<p><b>Measure Voltage</b></p>	
2.	<p><b>SX-200 DIGITAL PABX:</b> Turn off equipment circuit breakers.</p>	
3.	<p>Verify the wiring of the ac outlet.</p>	<p>Use a locally approved plugin circuit tester, to confirm that the ground connection is good.</p>
4.	<p><b>SX-200 FD PABX:</b> If this is an <i>SX-200</i> FD Control Node, or peripheral cabinet with no Outside Plant Interfaces, no further ground verification is necessary. Proceed to the next cabinet in the system.</p>	
5.	<p>Plug the ac line cord into the building ac receptacle.</p>	<p>Ensure that the ac ground is good.</p>
6.	<p>Measure the ac voltage between the PABX ground lug and the "approved" ground wire.</p>	<p>The #6 AWG green ground wire should be connected to an approved ground but not to the PABX.</p>
7.	<p>If the voltage is greater than 1.0 V, locate another approved ground.</p>	<p>The customer's engineering support group is responsible for providing the approved ground.</p>
8.	<p>If the voltage is less than 1.0 V, measure the resistance.</p>	
9.	<p>If the resistance is greater than 5 ohms, take corrective action to reduce it to less than 5 ohms.</p>	<p>Resistance should be less than 5 ohms.</p> <p>The customer's engineering support group is responsible for providing the approved ground.</p>
10.	<p>Unplug ac line cord.</p>	

**Chart 3-11 Verify Ground Connections  
(continued)**

Step	Action	Comments
11.	<p><b>Connect Ground</b></p> <p><b>SX-200 DIGITAL PABX:</b> Connect the verified ground wire to the common ground stud in the cabinet.</p> <p><b>SX-200 FD PABX:</b> Connect the verified ground wire to the common ground terminal on the rear of the peripheral cabinet.</p>	
	<p align="center"><b>Verify Ground Connection in All Cabinets</b></p>	
12.	<p><b>SX-200 DIGITAL 672-port configuration:</b> Perform steps 1. to 11. for each cabinet.</p> <p><b>SX-200 FD PABX:</b> Perform steps 1. to 3. for every cabinet, and steps 5. to 11. for each peripheral cabinet with Outside Plant Interfaces.</p>	

**Installation Information**

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## 4.

## INSTALL DIGITAL PERIPHERAL BAYS IN *SX-200* DIGITAL CABINETS

### Install Digital Peripheral Bay With Shelf

- 4.1 In the 336-port configuration, the first bay in the upper shelf of the Control Cabinet is Bay 3, and in the 672-port configuration, it is Bay 2. Chart 4-1 describes the installation of a Digital Peripheral Shelf with Bay in a 336-port configuration or a 672-port configuration. Where there are differences in the installation procedures it will be noted.

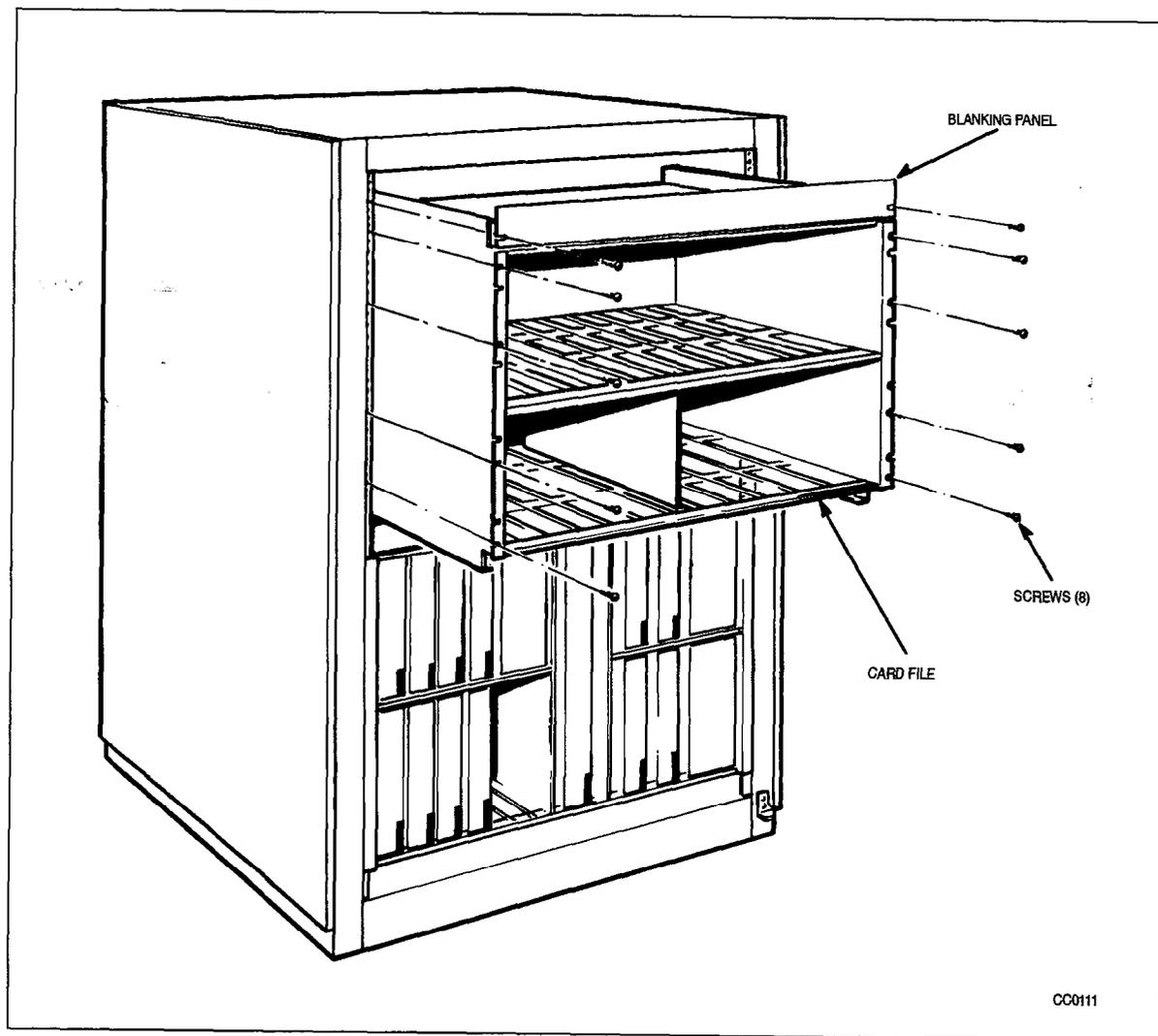
In a 672-port configuration, a digital peripheral shelf with bay may also be installed in the peripheral cabinet. The Peripheral cabinet is delivered with the lower peripheral shelf and one bay (Bay 4) already installed. The following instructions apply to the installation of the upper peripheral shelf and Bay 6 in the peripheral cabinet. See Figure 3-8 for peripheral cabinet bay numbering.

When you have completed Chart 4-1:

- The equipment to be installed as digital peripheral Bay 3 in the 336-port configuration, or Bay 2 or 6 in the 672-port configuration, will be inventoried, unpacked, and inspected.
- The Bay Control Card and the Bay Power Supply will be set aside, not unpacked.
- The shelf and backplane will be installed.
- Shelf grounds will be connected.
- PCM cables will be connected.

**Note:** The Digital Peripheral Bay With Shelf kit contains:

- peripheral shelf
- digital peripheral backplane
- blanking panel
- PCM cable
- ground wires
- hardware kit
- bay control card
- bay power supply



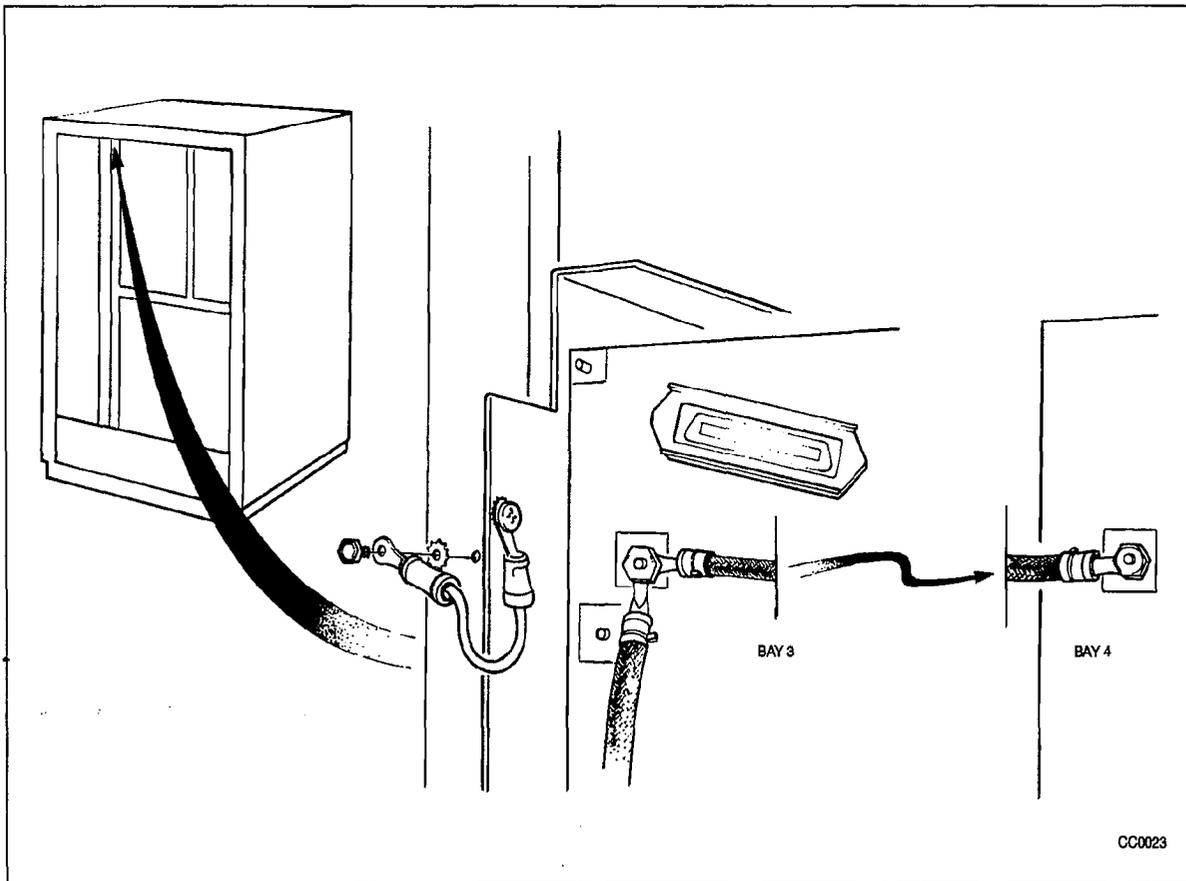
**Figure 4-1 Installation of Digital Peripheral Shelf and Panel**

Chart 4-1 Install Digital Peripheral Bay with Shelf

Step	Action	Comments
	<b>Unpack, Inspect</b>	
1.	Check off received items against packing list and equipment list, above.	
2.	Do not unpack the Bay Control Card or the Bay Power Supply at this time. Set these boxes aside.	
3.	Unpack the remaining cartons.	
4.	Tag defective items.	
5.	Fill in the relevant portion of damage report.	
6.	Repack tagged items and return according to local procedures.	
	<b>Install Shelf</b>	
7.	Open the front door of the Control (or Peripheral) cabinet.	
8.	Slide the digital peripheral shelf onto top of existing shelf, and fasten it to the front rails with eight 10-32 x 0.5 in. screws.	Shown in Figure 4-1.
9.	Install the blanking panel above the shelf, and fasten it to the front rails with two 10-32 x 0.5 in. screws.	Shown in Figure 4-1.
10.	Close the front door.	
	<b>Connect Shelf Ground Wires</b>	
11.	Open the rear door.	
12.	Connect the ground wires from the new shelf to the cabinet frame using a 10-32 x 0.5 in. screw and external tooth lock washer.	<p><b>336-port Configuration:</b> Details of ground connections are shown in Figure 4-2.</p> <p><b>672-port Configuration:</b> Details of ground connections are shown in Figure 4-3, and Figure 4-4 for the Control cabinet, and Figure 4-5 for the Peripheral cabinet.</p>
	<b>Connect PCM Cables</b>	
13.	<b>Control Cabinet:</b> Connect PCM cable to J17A on the backplane of the control shelf, and J17A on the backplane of Bay 3 in the 336-port configuration, Bay 2 in the 672-port configuration.	<p><b>CAUTION:</b> The connector plug must be positioned so the cable hangs downwards from it. If a connector plug is reversed, equipment function will be impaired.</p> <p>Shown in Figure 4-6 for the 336-port configuration, and Figure 4-7 for the 672-port configuration.</p>

**Chart 4-1 Install Digital Peripheral Bay with Shelf  
(continued)**

Step	Action	Comments
	<p><b>Peripheral Cabinet:</b> At the rear of the 672-port configuration peripheral cabinet, connect PCM cable to J17A on the backplane of Bay 6 and to J42B on the backplane of Bay 0, in the control cabinet.</p>	<p>Shown in Figure 4-8. PCM cables come from Bay 0 through the 672-port intercabinet cable assembly and are an integral part of the cabinet assembly.</p>
14.	Connect PCM ground leads to associated Faston connectors.	
15.	Close rear door.	



**Figure 4-2 Backplane and Cardfile Ground Connection Details  
(336-port configuration)**

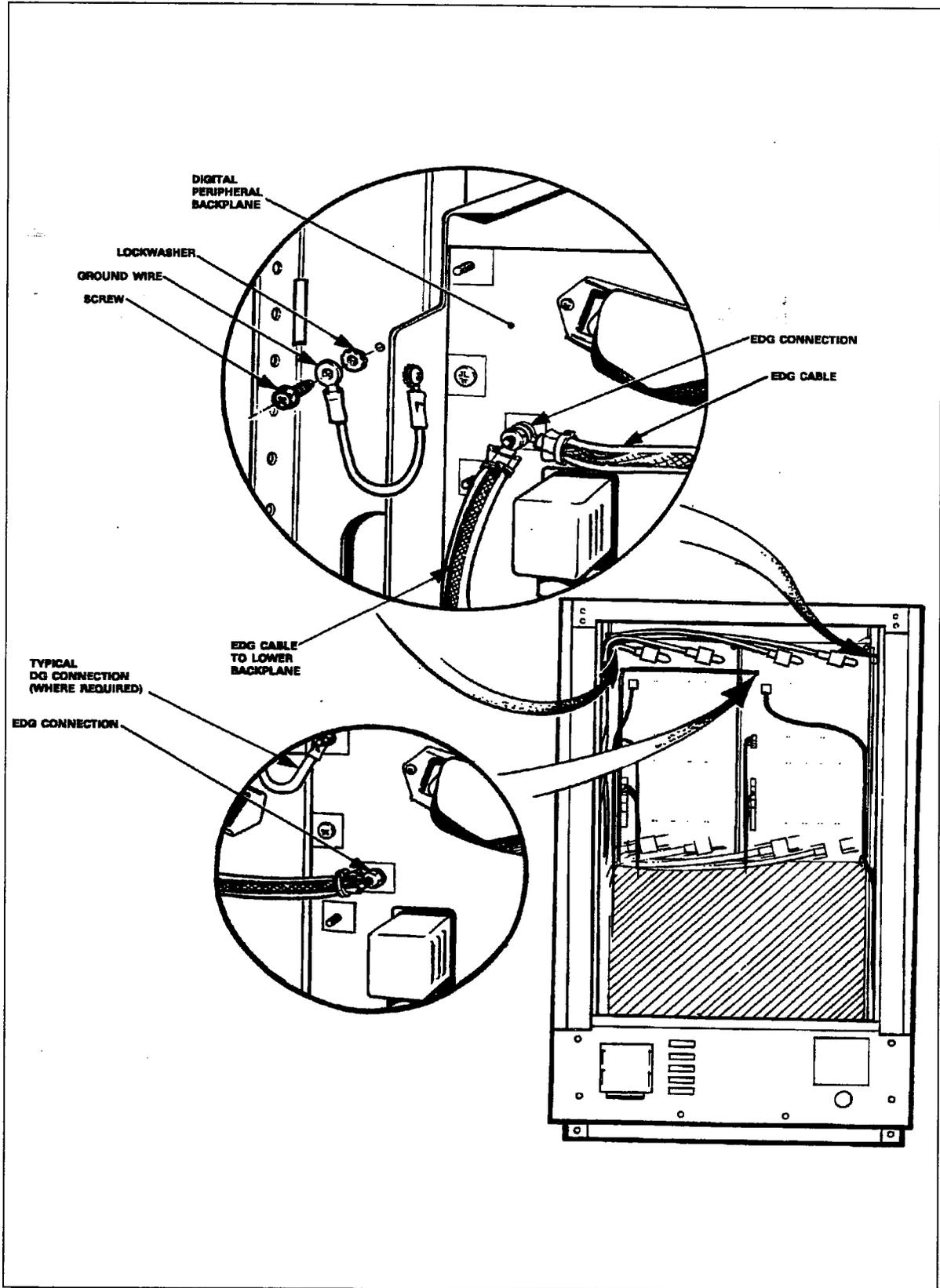


Figure 4-3 Backplane and Cardfile Ground Connection Details (672-port configuration)

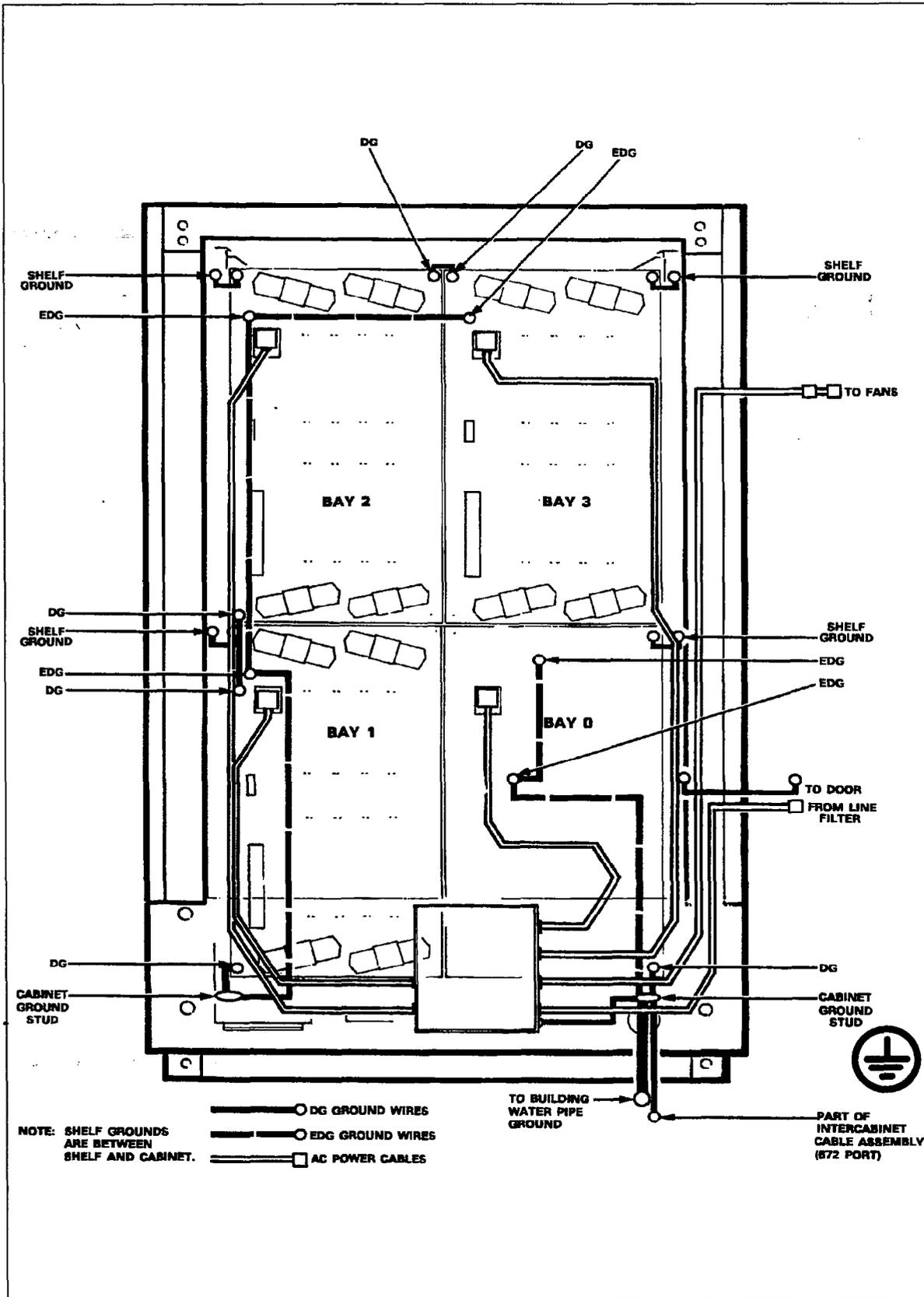


Figure 4-4 Power and Grounding - 672-port Control Cabinet

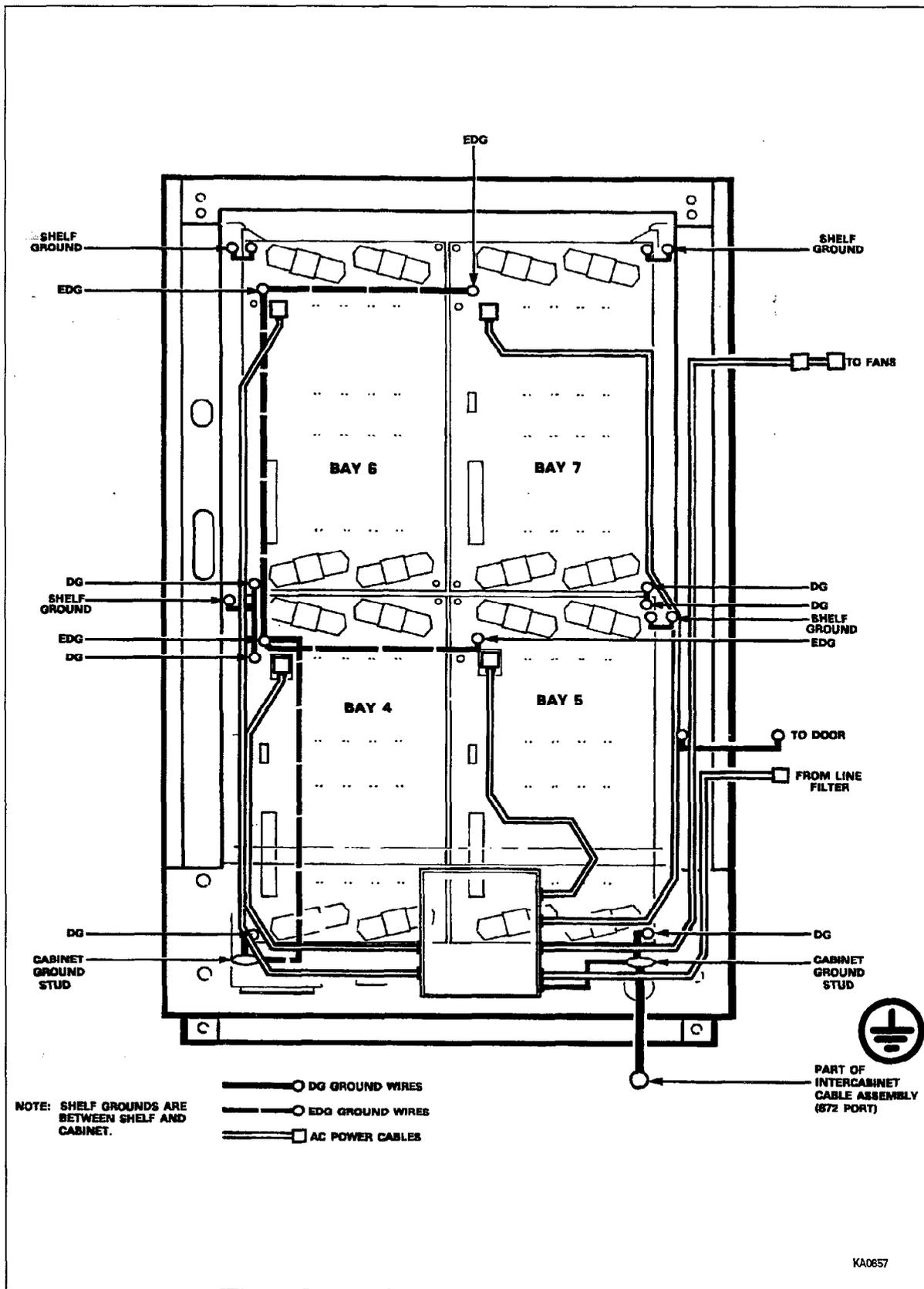


Figure 4-5 Power and Grounding - 672-port Peripheral Cabinet

## Install Digital Peripheral Bay without Shelf

4.2 In the 336-port configuration, the second bay in the upper shelf of the Control Cabinet is Bay 4, and in the 672-port configuration, it is Bay 3. This bay is installed in an already installed digital peripheral shelf. Chart 4-2 describes the installation of a Digital Peripheral Bay without a Shelf in a 336-port configuration or a 672-port configuration. Where there are differences in the installation procedures it will be noted.

In a 672-port configuration, a second bay may also be installed in either shelf of the peripheral cabinet. The following instructions apply to the installation of the Bay 5 (lower shelf) or Bay 7 (upper shelf) in the peripheral cabinet. See Figure 3-8 for peripheral cabinet bay numbering.

When you have completed Chart 4-2:

- The equipment to be installed as digital peripheral Bay 4 in the 336-port configuration or Bay 3,5 or 7 in the 672-port configuration, will be inventoried, unpacked, and inspected.
- The Bay Control Card and Bay Power Supply will be set aside, not unpacked.
- The backplane, shelf grounds, and PCM cables will be installed.

**Note:** The Digital Peripheral Bay Without Shelf kit contains:

- digital peripheral backplane
- PCM cable
- ground wires
- hardware kit
- Bay Control Card
- Bay Power Supply

**Chart 4-2 Install Digital Peripheral Bay without Shelf**

Step	Action	Comments
<b>Inventory, Unpack, Inspect</b>		
1.	Check off received items against packing list and equipment list, above.	
2.	Do not unpack the Bay Control Card or the Bay Power Supply at this time. Set these boxes aside.	
3.	Unpack remaining cartons, and tag defective items.	
4.	Fill in relevant portion of damage report.	

**Chart 4-2 Install Digital Peripheral Bay without Shelf  
(continued)**

Step	Action	Comments
5.	Repack tagged items and return according to local procedures.	
	<b>Attach Backplane</b>	
6.	Attach backplane to cardfile with six screws, flat washers, and lock washers (as existing bay)	The double tab Faston connector goes at the lower left corner instead of a flat washer.
	<b>Connect Ground Wires</b>	
7.	Connect ground wires between bays, using hex nuts and split lock washers.	<p><b>336-port Configuration:</b> Shown in Figure 4-2.</p> <p><b>672-port Configuration:</b> Shown in Figure 4-3, and Figure 4-4 for the Control cabinet and Figure 4-5 for the Peripheral cabinet.</p>
	<b>Connect PCM Cable</b>	<p><b>CAUTION:</b> The connector plug must be positioned so the cable hangs downwards from it. If a connector plug is reversed, equipment function will be impaired.</p>
8.	<p><b>336-port Configuration:</b>  <i>Bay 4:</i> At the rear of the cabinet, connect PCM cable from J17A of digital peripheral bay backplane to J17B on the control bay backplane.</p>	Shown in Figure 4-6.
	<p><b>672-port Configuration:</b>  <i>Bay 3:</i> At the rear of the Control cabinet, connect the Bay 3 PCM cable from J17A on the backplane of Bay 3 to J40C on the backplane of Bay 0 (control bay backplane).</p>	Shown in Figure 4-7.
	<p><i>Bay 5:</i> At the rear of the Peripheral cabinet, connect the Bay 5 PCM cable from J17A on the backplane of Bay 5 to J42A on the backplane of Bay 0 in the Control cabinet.</p>	Shown in Figure 4-8.
	<p><i>Bay 7:</i> At the rear of the Peripheral cabinet, connect the Bay 7 PCM cable from J17A on the backplane of Bay 7 to J42C on the backplane of Bay 0 in the Control cabinet.</p>	Shown in Figure 4-8.
9.	Connect the ground lead to the double tab Faston connector at the lower left corner of the backplane.	
10.	On the control shelf backplane, connect the PCM ground leads to nearby associated Faston connectors.	
11.	Close rear door.	

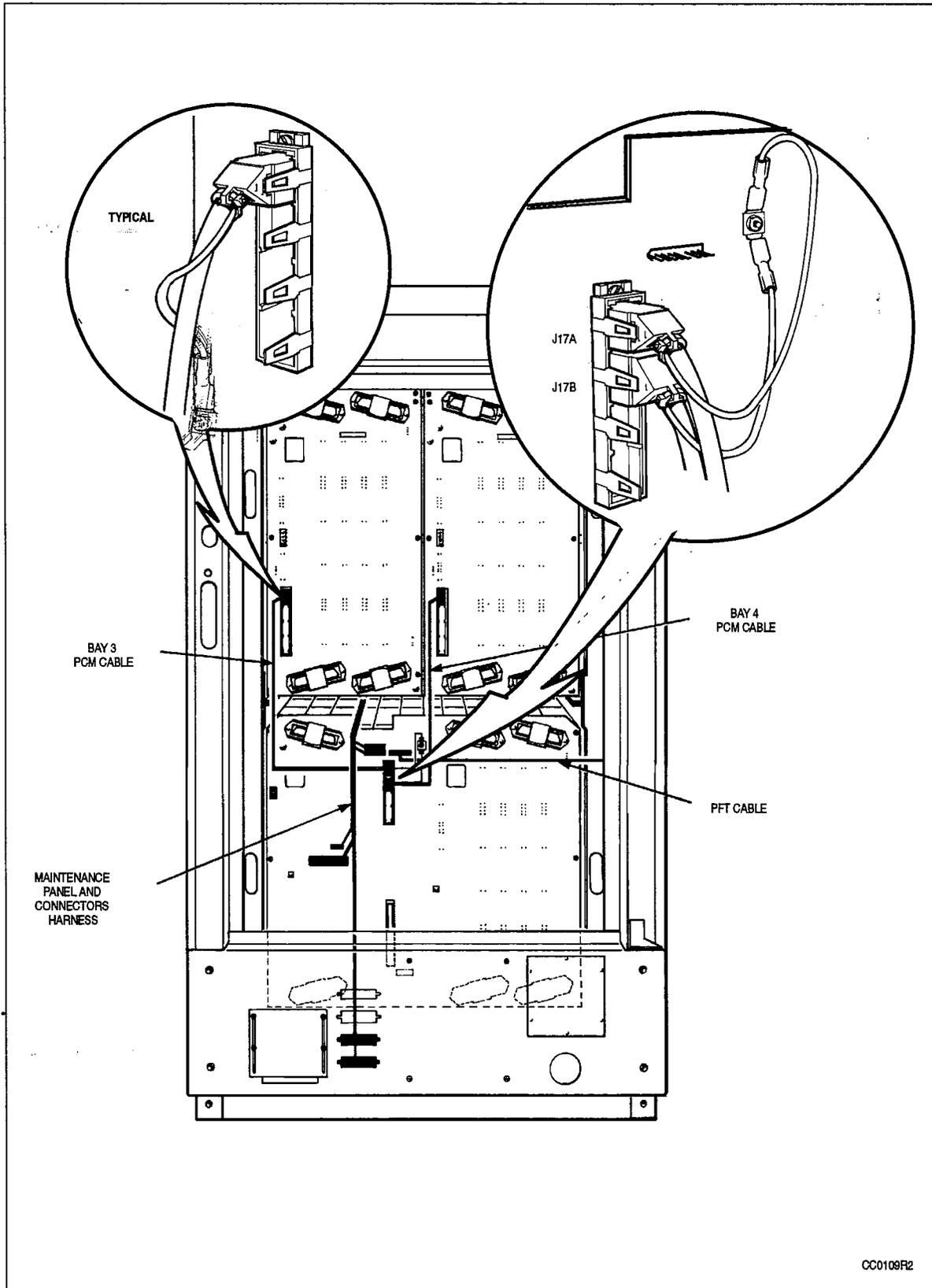
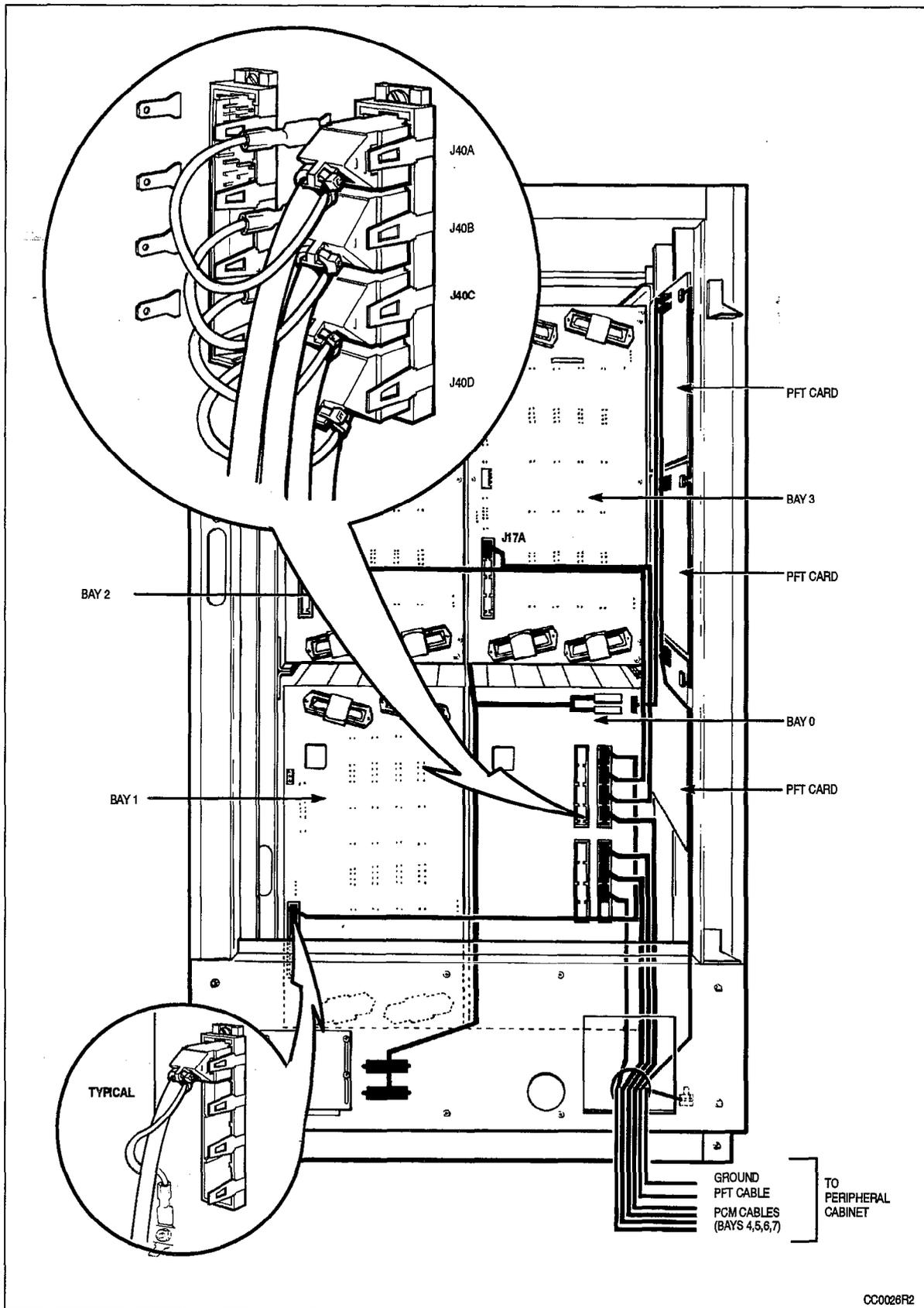


Figure 4-6 PCM Cables – 336-port Control Cabinet



CC0026R2

Figure 4-7 PCM Cables – 672-port Control Cabinet

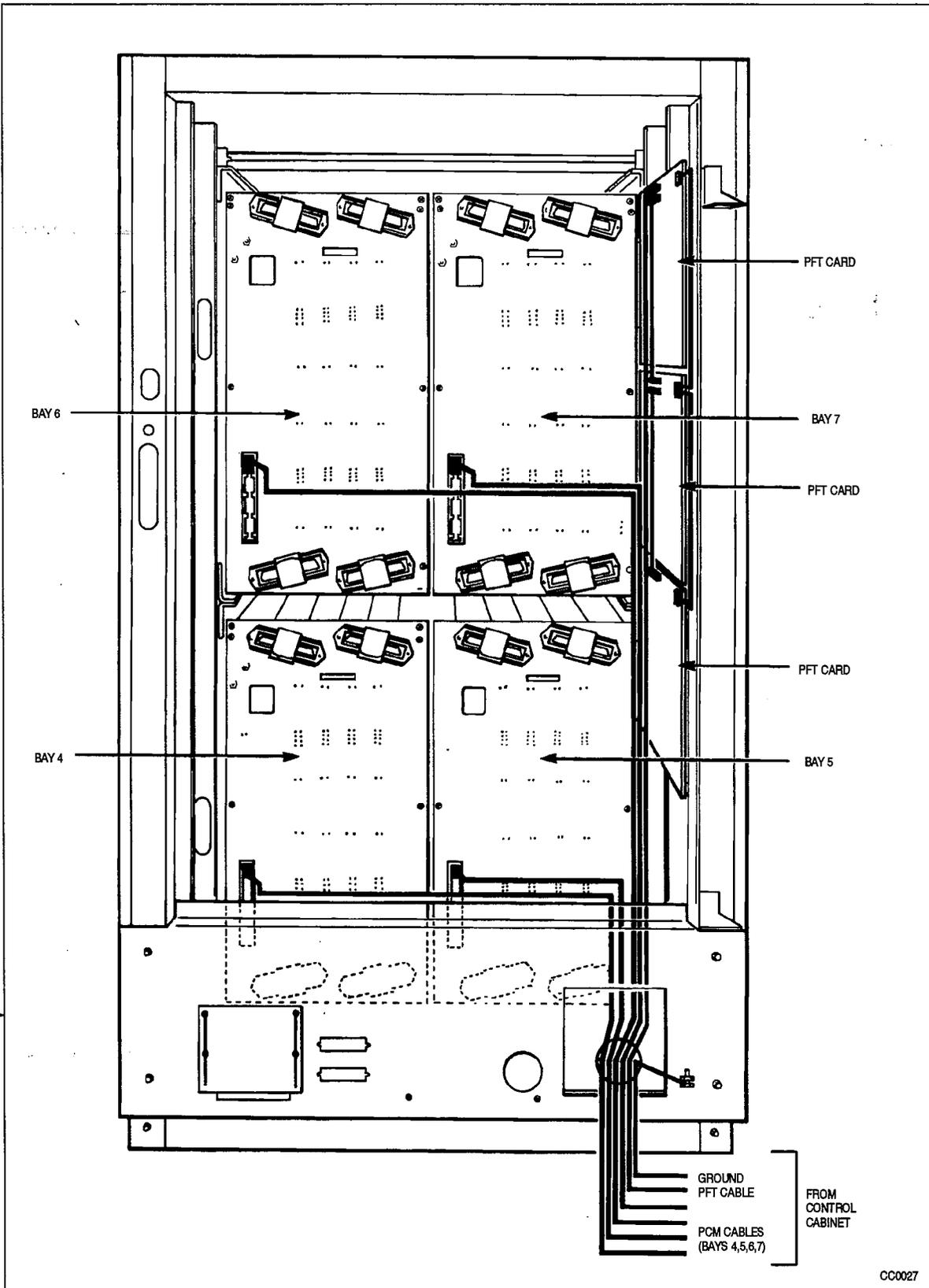


Figure 4-8 PCM Cables - 672-port Peripheral Cabinet

## 5.

## HANDLING PRINTED CIRCUIT CARDS

### Unpack and Handle Printed Circuit Cards

#### 5.1 When you have completed Chart 5-1:

- You will know how to unpack printed circuit cards safely.
- You will know how to handle printed circuit cards without damaging them.

#### Notes: 1. Circuit Cards in the 336-port Configuration:

The basic 336-port system with Bay 2 has a Main Control Card, a Bay Power Supply, and a Floppy Disk Drive (drive A). Bay 2 has 4 digital peripheral cards (2 rows of 2).

Digital peripheral Bay 1 has a Bay Power Supply and 8 digital peripheral cards (2 rows of 4). Bay 1 includes the second Floppy Disk Drive (drive B); however, this drive is powered by the Bay 2 Bay Power Supply.

Digital peripheral Bay 3 has a Bay Control Card, a Bay Power Supply, and 8 digital peripheral cards (2 rows of 4).

Digital peripheral Bay 4 has a Bay Control Card, a Bay Power Supply, and 8 digital peripheral cards (2 rows of 4).

#### 2. Circuit Cards in the 672-port Configuration:

Digital Bay 0 contains a Main Control Card, a Bay Control Card, a Bay Power Supply, a Switch Matrix Card, and 2 Floppy Disk Drives, but no peripheral cards.

Digital Bays 1 to 7 each have a Bay Control Card, a Bay Power Supply, and up to 8 peripheral cards (2 rows of 4).

#### 3. Circuit Cards in the SX-200 FD PABX:

The SX-200 FD system Control Node has a Main Control Card with a 4 Meg memory module and a Switch Matrix module, a Control Resource Card, 2 Floppy Disk Drives, and up to 7 FIMs.

The peripheral bay has a Bay Control Card, a Peripheral FIM Carrier, a FIM, a Bay Power Supply, and up to 8 digital peripheral cards. There may be up to 7 peripheral bays.

#### 4. Circuit Card Packaging

All printed circuit cards are packed separately. Each card is packed in an antistatic bag. Any accessories such as battery packs or hardware are packed in

zip-lock bags. The cards and accessories are packed in a cushioned box with the name of the card on it. Packaged cards are shipped in cartons, usually 5 or 10 to a carton. Packaging is shown in Figure 5-1.

**CAUTION**

Read these instructions carefully, and follow them when performing procedures described in Chart 6-1 to Chart 8-4.

**Chart 5-1 Unpack and Handle Printed Circuit Cards**

Step	Action	Comments
<b>When Unpacking</b>		
1.	Make sure the PABX ground is connected.	
2.	Put on the antistatic wrist strap when unpacking and handling cards.	The antistatic wrist strap must be connected to the PABX chassis, which must be connected to an approved ground to provide protection from static discharges.
3.	Remove the card from its MITEL packing sleeve.	The card is packed in an antistatic bag.
4.	Momentarily touch the antistatic bag to a known good ground.	
5.	<i>When you are ready to put the card in its slot, open the antistatic bag, and remove the card.</i>	The card should stay protected in the bag until it is installed.
6.	Keep the sleeve, foam packing, and antistatic bag in case the card has to be returned.	Shown in Figure 5-1.
<b>When Handling Cards</b>		
7.	Handle printed circuit cards by their edges only, except when seating connectors.	Handling the card faces or components may cause damage.
8.	Do not touch the gold edge connectors.	
9.	Avoid contact with any exposed electrical connections.	
<b>Identifying Digital Card Positions</b>		
10.	<p>Identify the appropriate slots for digital control cards in the control shelf and the digital peripheral bay.</p> <p>The system configuration and/or the Tip and Ring forms identify which card type goes into each slot.</p> <p><b>Symbols on the face of each card show which slot it should be installed in.</b></p>	<p><b>CAUTION:</b> Do not install cards yet. Card installation is described in Chart 6-1 to Chart 8-4.</p> <p>Control cards have symbols that match symbols on the appropriate slots in the Control cabinet.</p> <p><b>Main Control Card:</b> star  <b>Bay Control Card:</b> semicircle  <b>Bay Power Supply:</b> right triangle  <b>Floppy Disk Drive:</b> equilateral triangle  <b>Switch Matrix Card:</b> equilateral triangle (672-port configuration only)  <b>Control Resource Card:</b> (SX-200 FD system only)</p>

**Chart 5-1 Unpack and Handle Printed Circuit Cards  
(continued)**

Step	Action	Comments
11.	<p>Identify the appropriate card slot for digital peripheral cards in the control shelf and the digital peripheral bay.</p> <p><b>When Installing Cards</b></p>	<p>Cards with a square on their faceplates are high-power digital peripheral cards and are installed only in upper slots:</p> <ul style="list-style-type: none"> <li>- COV Line card</li> <li>- OPS Line card</li> <li>- DID Line card</li> <li>- Universal card</li> <li>- T1-DS1 Trunk card</li> </ul> <p>Cards with a circle on their faceplates are low-power digital peripheral cards and are installed in upper or lower slots:</p> <ul style="list-style-type: none"> <li>- LS/GS Trunk card</li> <li>- Digital Line card</li> <li>- ONS Line card</li> </ul> <p><b>CAUTION:</b> Do not install cards yet. Card installation is described in Chart 6-1 to Chart 8-4.</p>
12.	<p><i>If installing control cards, make sure power is off.</i></p> <p><i>If installing peripheral cards in an operating system, power may be left on.</i></p>	<p><b>CAUTION:</b> Power must be off when inserting the Main Control Card, Switch Matrix Card, Control Resource Card, Bay Control Card, Bay Power Supply, and Floppy Disk Drive.</p> <p>The cards that must not be inserted while the system power is on carry a Caution notice.</p>
13.	<p>Set switches on circuit cards requiring it.</p>	<p>Instructions for setting switches are included in card installation charts for:</p> <ul style="list-style-type: none"> <li>- Main Control card</li> <li>- Control Resource card</li> <li>- Bay Control card</li> <li>- Universal card</li> <li>- T1-DS1 Trunk card</li> </ul>
14.	<p>Lift the card extractor, and slide the card into the slot. Press on the extractor after it mates with the notch in the shelf to seat the card firmly.</p>	<p>Each digital peripheral card has one card extractor. The extractor helps seat the card firmly in the backplane.</p> <p>The extractor is also used to provide leverage to pull the card free of the backplane connector.</p>
15.	<p>When finished, replace the antistatic wrist strap in the cabinet.</p>	

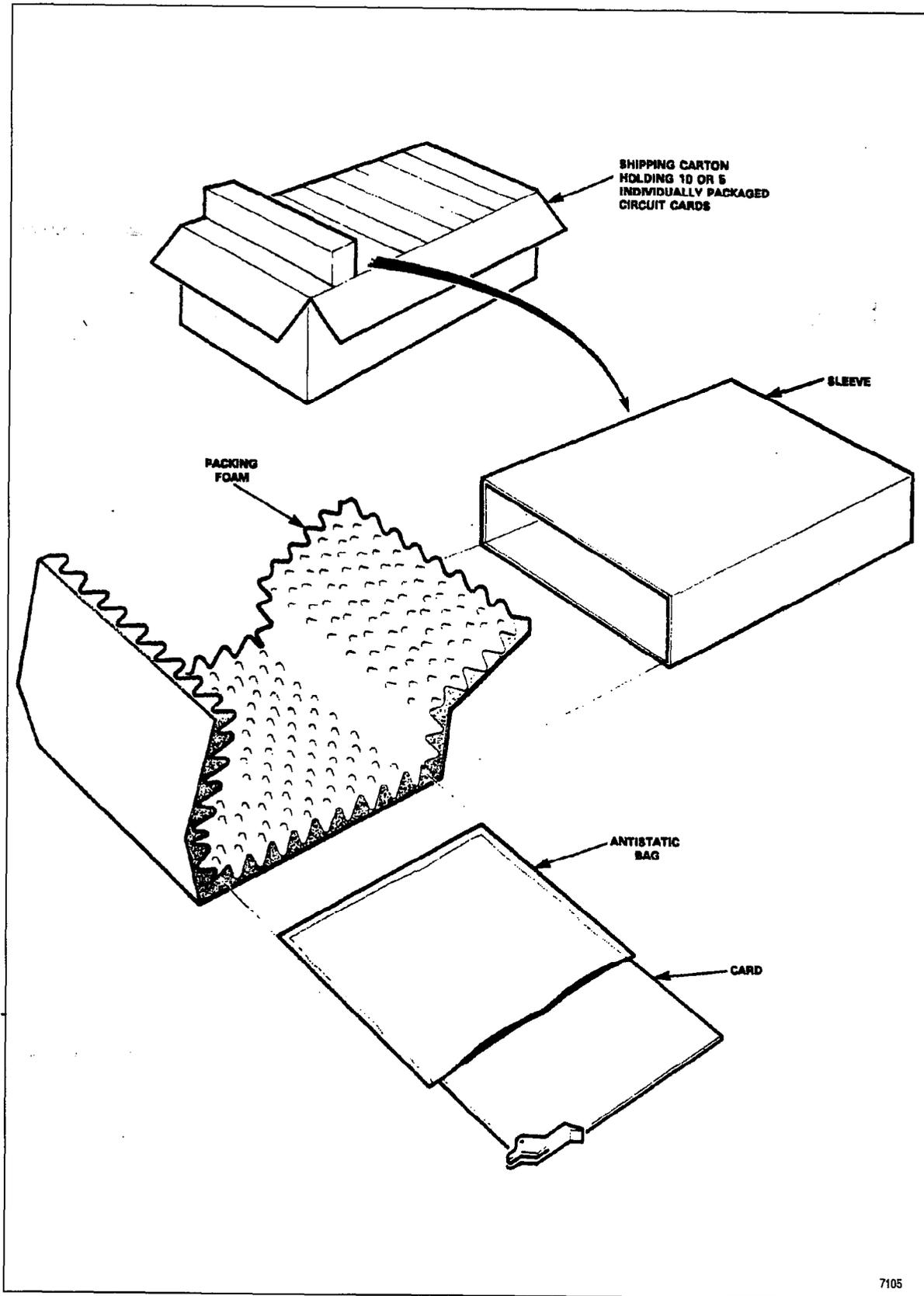


Figure 5-1 Printed Circuit Card Packaging

## Remove and Return Printed Circuit Cards

5.2 When you have completed Chart 5-2:

- You will know how to remove circuit cards from the PABX.
- You will know how to repack printed circuit cards for return.

**WARNING**

Power must be off when the main control card, control resource card, switch matrix card, bay control card, bay power supply, and floppy disk drive are being removed.

**CAUTION**

Read these instructions carefully, and follow them when performing procedures described in Chart 6-1 to Chart 8-4.

Cards that are not correctly packed in antistatic bags and foam packing when returned will not be covered by any warranty.

Chart 5-2 Remove and Return Printed Circuit Cards

Step	Action	Comments
	<b>Removing Cards</b>	
1.	<i>If you are removing cards from an operating system, turn power off, if possible.</i>	<b>CAUTION:</b> The cards that must not be removed while the system power is on carry a Caution notice. These cards are: <b>Main Control Card, Control Resource Card, Switch Matrix Card, Bay Control Card, Bay Power Supply, and Floppy Disk Drive.</b>
2.	Make sure the PABX ground is connected.	
3.	Put on the antistatic wrist strap when removing and repacking cards.	The antistatic wrist strap must be connected to the PABX chassis, which must be connected to an approved ground to provide protection from static discharges.
4.	Remove the card by using the extractor as a lever and pulling the card towards you.	Each digital peripheral card has one card extractor. The extractor helps seat the card firmly in the backplane. The extractor is used to provide leverage to pull the card free of the backplane connector.
	<b>Repacking Cards</b>	Packaging is shown in Figure 5-1.
5.	Follow the steps in Chart 5-1 to handle the cards properly.	
6.	Use the sleeve, foam packing, and antistatic bag kept after unpacking.	The original, or similar, packaging material should be used.

**Chart 5-2 Remove and Return Printed Circuit Cards  
(continued)**

Step	Action	Comments
7.	Momentarily touch the antistatic bag to a known good ground, before putting a card into it.	
8.	Put a card in an antistatic bag as soon as you remove it from its slot.	Suspected faulty cards should be placed in antistatic bags to prevent further possible damage. <b>CAUTION:</b> Cards that are not correctly packed in antistatic bags and foam packing when returned will not be covered by any warranty.
9.	When you are finished, replace the antistatic wrist strap in the cabinet.	
10.	<i>If you have powered down the system, power it up again.</i>	
	<b>Return Card</b>	
11.	Return a damaged card according to local procedures.	

## 6.

## INSTALLING DIGITAL CONTROL CARDS

### Install the Main Control Card

- 6.1 The Main Control Card (MCC) controls PABX operation. It has a digital interface through the backplane to the cards in the control shelf, and through the PCM cables to each peripheral bay. It can control up to six 6-circuit PFT cards.

When you have completed Chart 6-1:

- The Main Control Card (MCC) will be unpacked and inspected.
- The memory module will be installed on the MCC.
- The DX module will be installed on the MCC (336-port configuration only).
- The Switch Matrix module will be installed on the MCC (SX-200 FD system only).
- The Decryption module will be installed on the MCC.
- The T1 clock module will be installed on the MCC (optional).
- The MCC will be installed.

**Notes:** 1. **336-port Configuration:** The MCC is located in the control shelf in Bay 2. It is powered by the Bay 2 power supply unit.

2. **672-port Configuration:** The MCC is located in the control shelf in Bay 0.

3. **SX-200 FD PABX:** The MCC is located in slot 1 of the Control Node.

4. The MCC contains alarm LEDs, a reset switch, and other system indicators. The MCC can carry up to four modules:

**Memory Module:** has a dynamic RAM that system software and customer data resides on when the system is started. This module is provided with the system software diskettes.

**DX Module:** links incoming and outgoing channels. This module is only used in the 336-port configuration.

or

**Switch Matrix Module:** links incoming and outgoing channels. This module is only used in the SX-200 FD system.

**Decryption Module:** allows the loading of specific system software and customer data to the memory module. This module is provided with the system software diskettes.

**T1 Clock Module:** synchronizes the system clock to incoming T1 trunks. It is only necessary if a T1 trunk is installed.

**CAUTION**

Remove conductive articles such as rings and watches before handling the Main Control Card.

**Chart 6-1 Install The Main Control Card**

Step	Action	Comments
	<b>Follow General Procedures</b>	
1.	Follow the general procedures for handling circuit cards.	Given in Chart 5-1 and Chart 5-2.
	<b>Unpack and Inspect MCC</b>	
2.	Attach the antistatic wrist strap.	
3.	Unpack the Main Control Card (MCC) from its MITEL packing box and antistatic bag, and inspect the MCC for damage.	
4.	Complete repair tag, repack, and return any damaged or incorrect items.	
5.	Put the MCC, component side up, onto the bag on top of the PABX or any nearby firm surface. Do not put it on a deformable surface.	<b>CAUTION:</b> The card may bend as pressure is applied to seat the connectors.
6.	Make sure that the jumpers (if applicable) are correctly positioned on the MCC and that the S3 switches are set to the OFF or OPEN position.	Shown in Figure 6-1. <b>Note:</b> Only Revision 3 and 4 MCCs require properly installed jumpers. There are no jumpers on Revision A MCCs. The revision number is printed on the card.
	<b>Install Standoffs</b>	
7.	Install the plastic standoffs on the MCC (where required to mate with the modules). Do not attempt to install standoffs into holes that are obstructed by components or wire.	Shown in Figure 6-2.
	<b>Install Memory Module</b>	
8.	Position the memory module over the J3 connector on the MCC.	Shown in Figure 6-2 and Figure 6-3.
9.	Press its connector into place with the palm of your hand.	
10.	Press the standoffs into place.	
11.	Reseat the connector.	
	<b>Install DX Module (336-port Configuration only)</b>	
12.	Unpack the DX module.	
13.	Position the DX module over the J1 and J2 connectors on the MCC.	Shown in Figure 6-2.

**Chart 6-1 Install The Main Control Card  
(continued)**

Step	Action	Comments
14.	Press its connector into place with the palm of your hand.	
15.	Press the standoffs into place.	
	<b>Install Switch Matrix Module (SX-200 FD System only)</b>	
16.	Unpack the Switch Matrix module.	
17.	Position the Switch Matrix module over the J1 and J2 connectors on the MCC.	Shown in Figure 6-4.
18.	Press its connector into place with the palm of your hand.	
19.	Press the standoffs into place.	
	<b>Install Decryption Module</b>	
20.	Unpack the Decryption module.	It is packaged with the system software diskette. Each software release has a unique Decryption module.
21.	Position the Decryption module over the J5 connector on the MCC.	Shown in Figure 6-5.
22.	Press its connector into place with the palm of your hand.	There are no standoffs for it.
	<b>Install T1 Clock Module (optional)</b>	This module is used only for T1 trunks, Generics1003 and 1004.
23.	At the top front of the card, locate connector J4.	Shown in Figure 6-6.
24.	Remove the jumper clip from within the connector.	
25.	Position the module over J4 and the standoff mounting holes.	
26.	Press into place with the palm of your hand.	
27.	Press standoffs into place.	
28.	Reseat the connectors.	
	<b>Install MCC</b>	
29.	Slide the MCC into its slot.	The MCC and its card slot are each marked with a star.

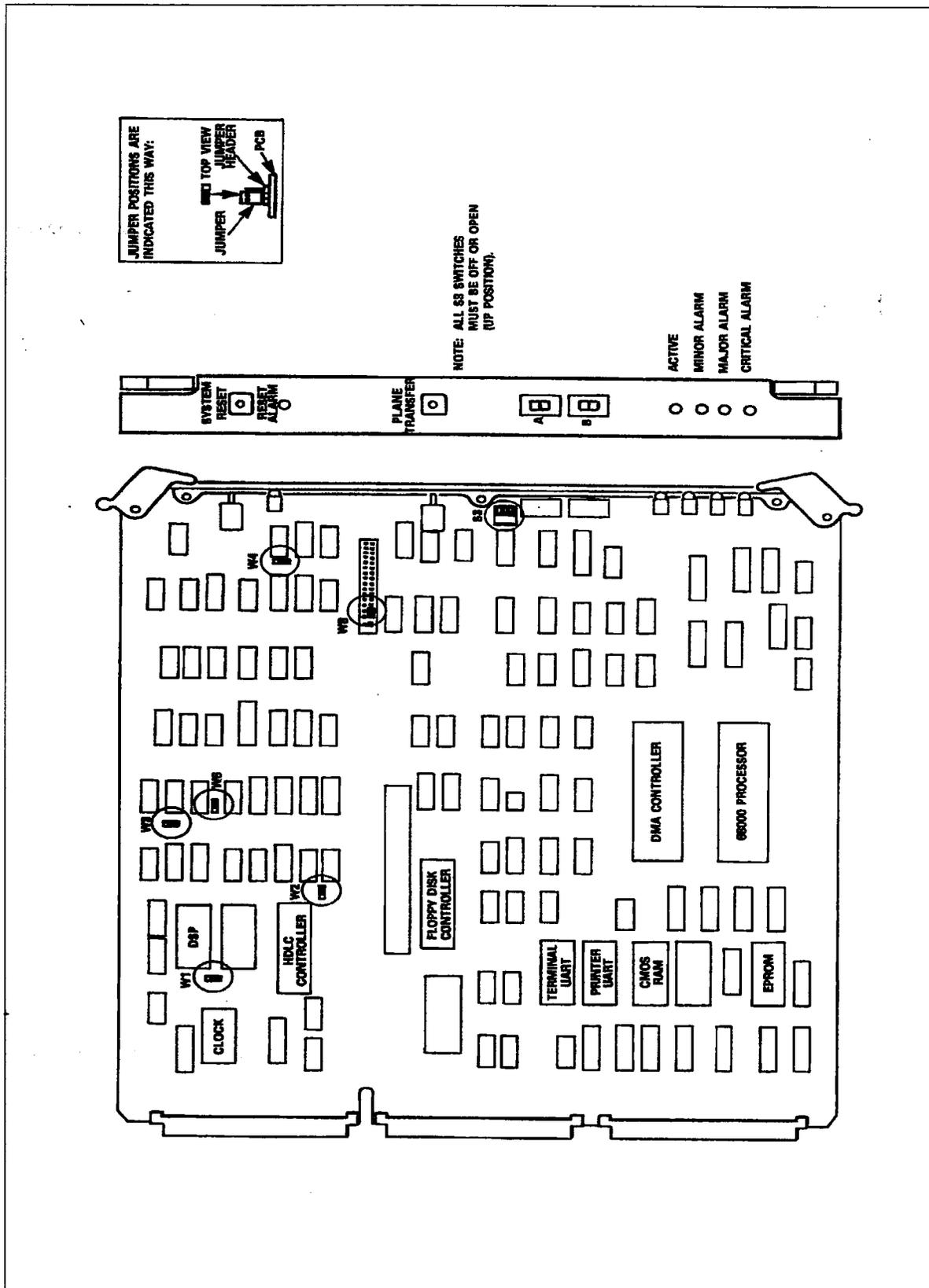


Figure 6-1 Main Control Card Jumpers and Switches

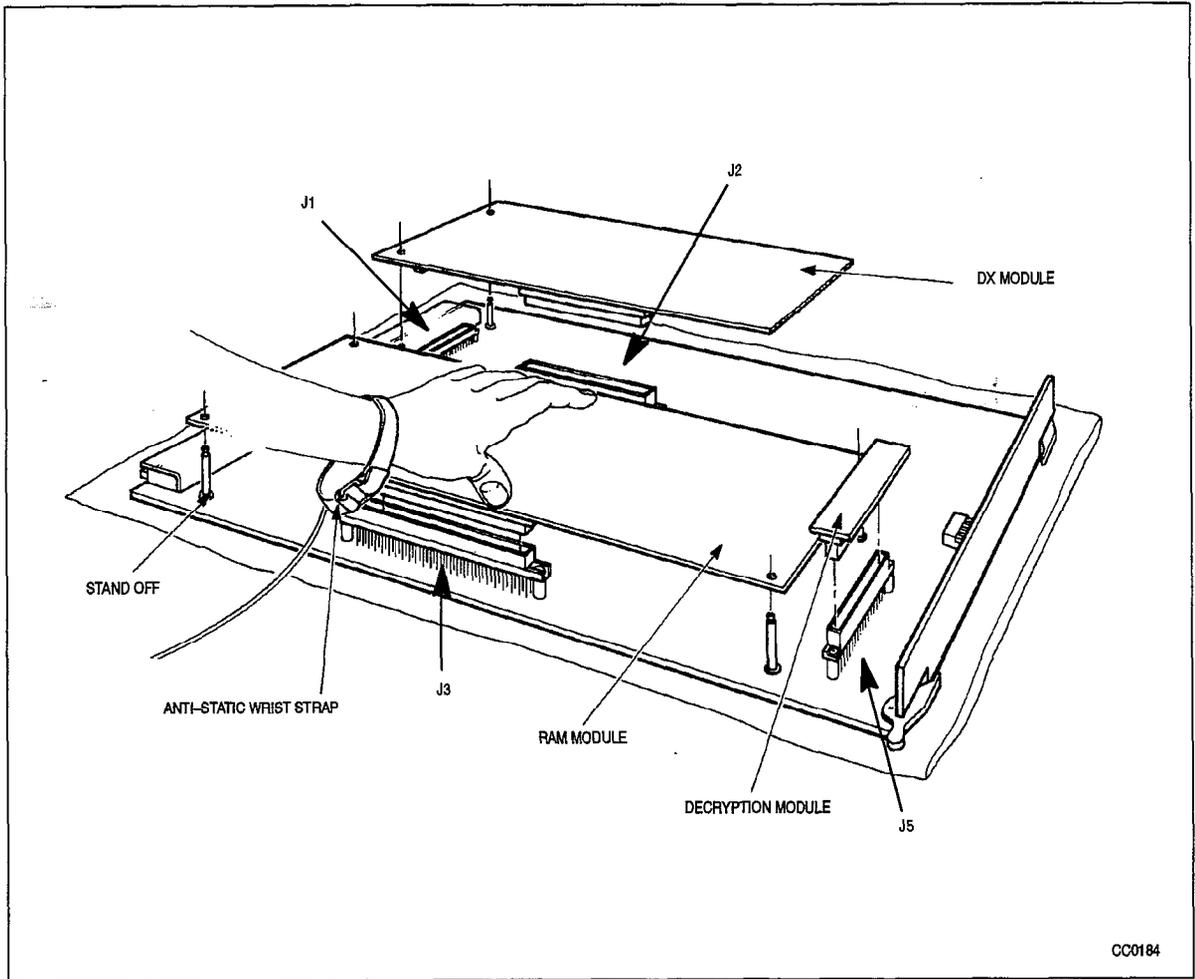


Figure 6-2 Installation of Modules (336-port Configuration)

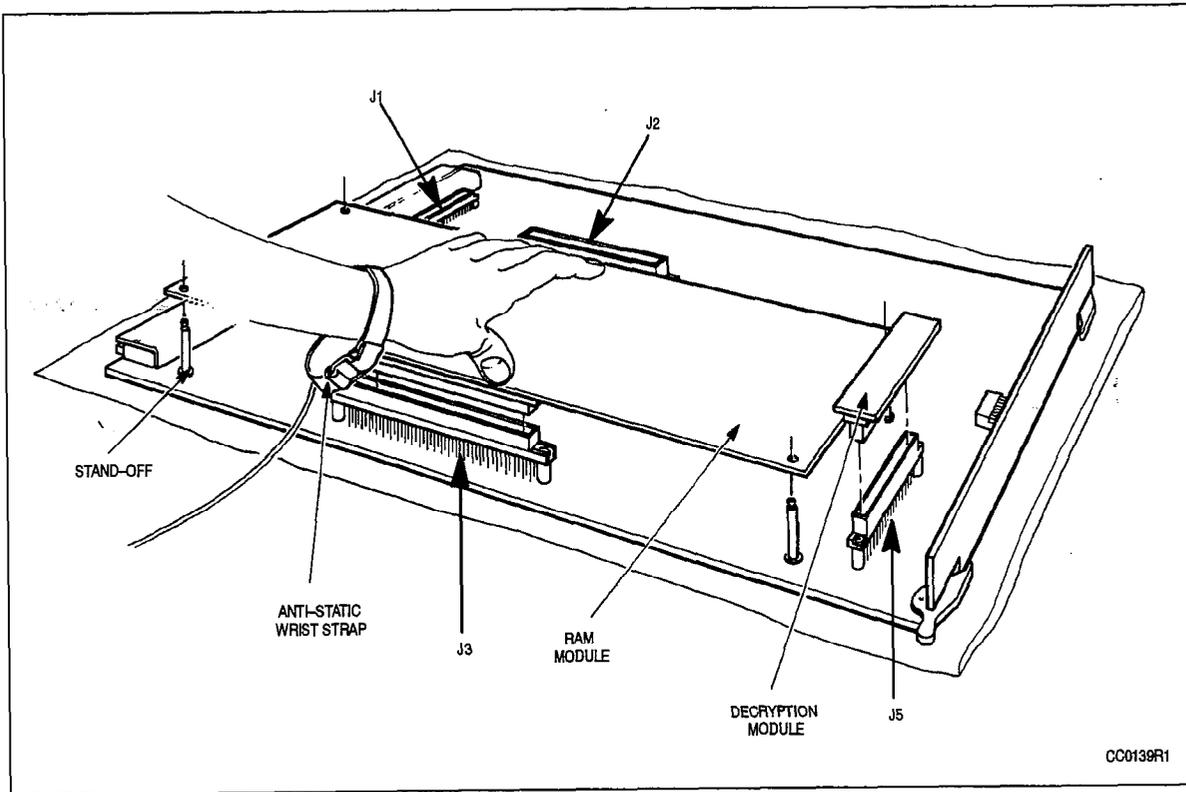


Figure 6-3 Installation of Modules (672-port Configuration)

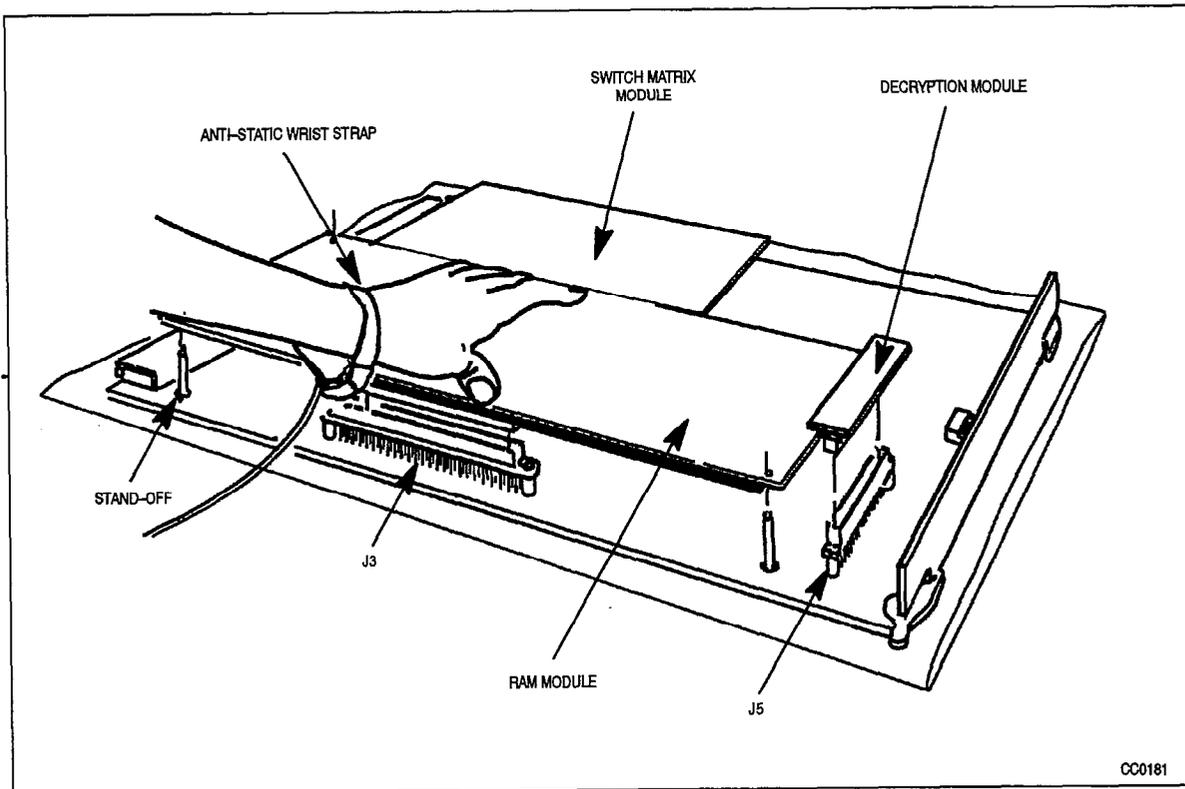


Figure 6-4 Installation of Modules (SX-200 FD System)

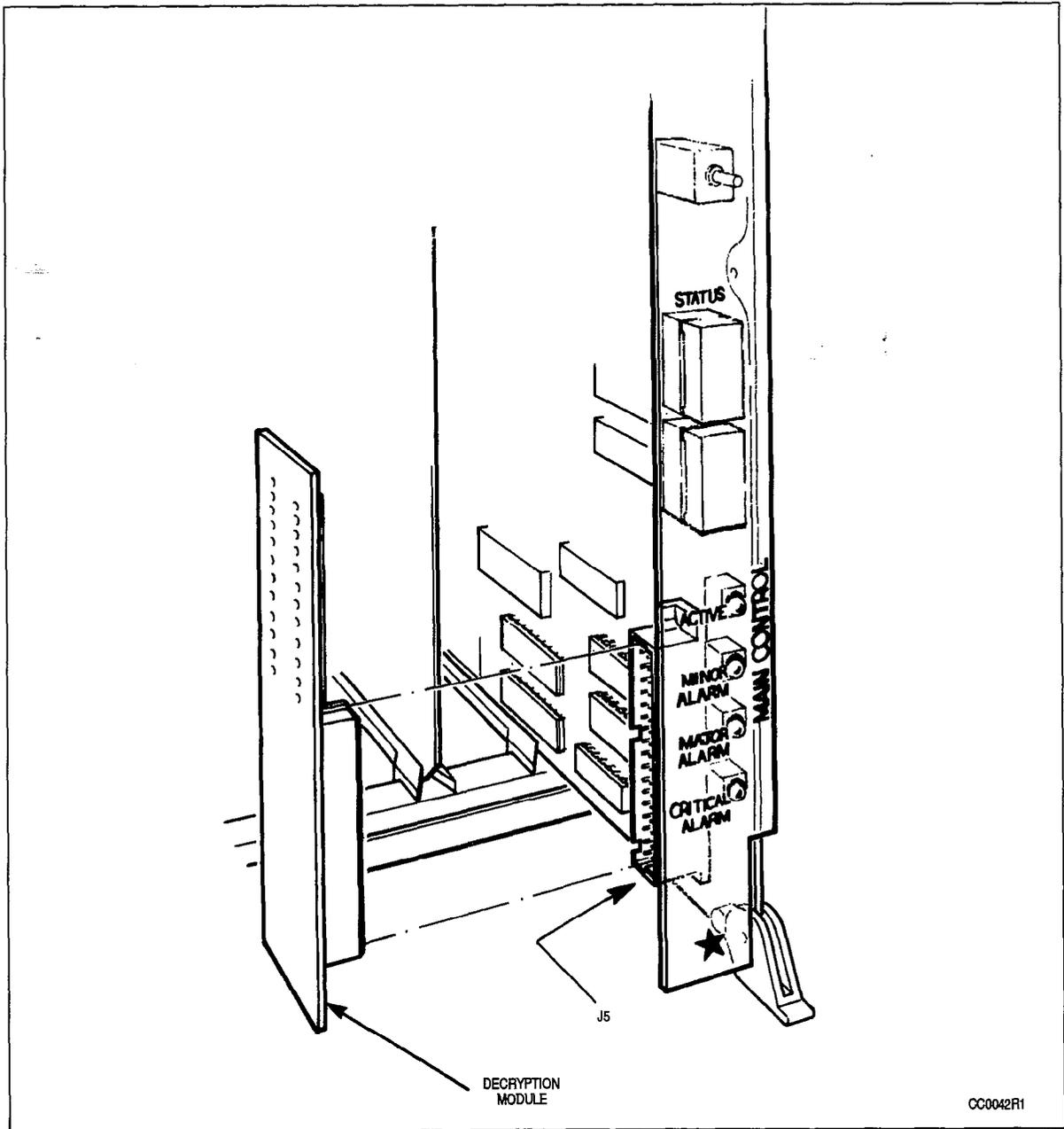


Figure 6-5 Main Control Card and Decryption Module

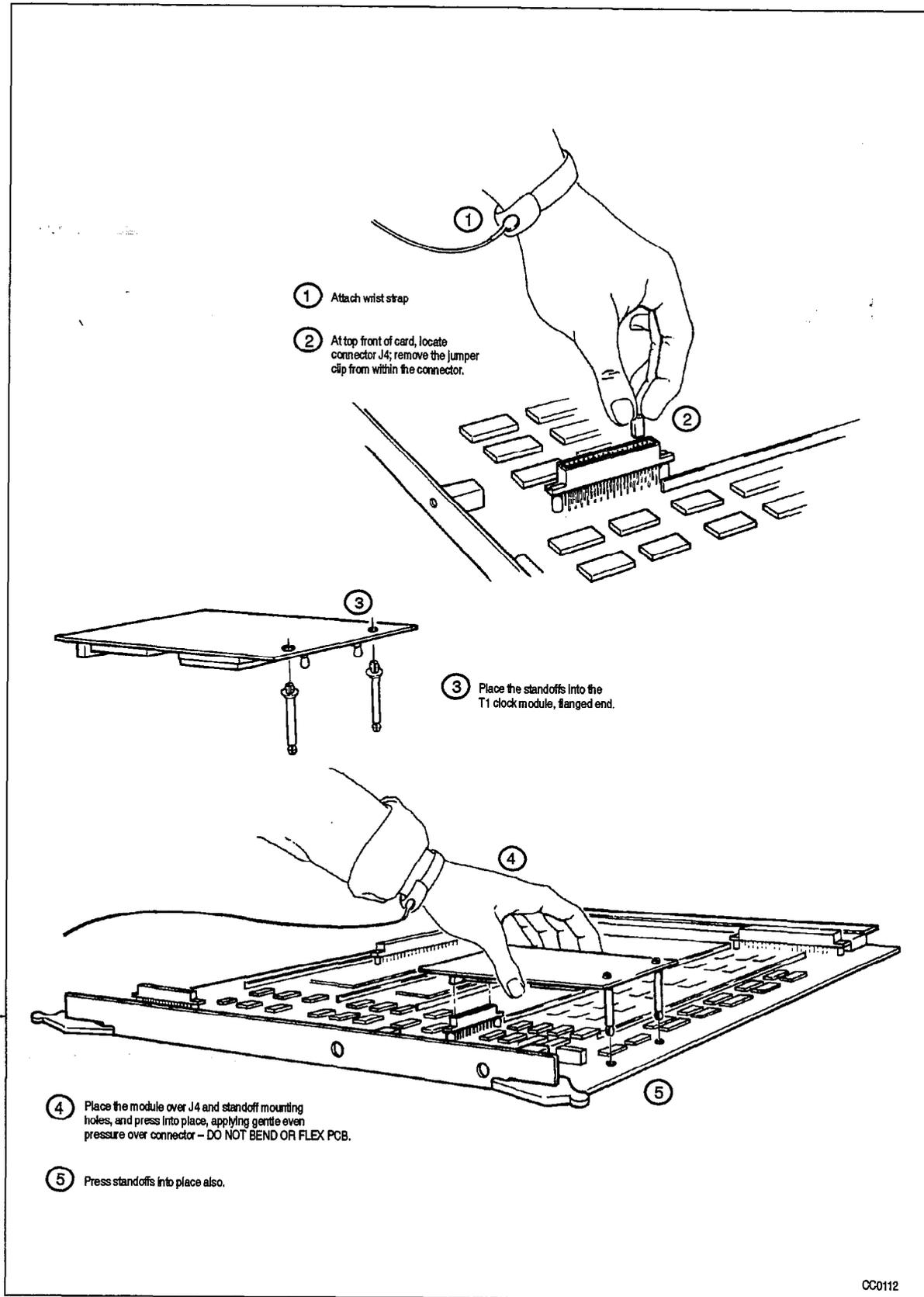


Figure 6-6 Installation of a T1 Clock Module onto an MCC

## Remove a Module from the Main Control Card

6.2 When you have completed Chart 6-2:

- A module will be safely removed from the MCC.

**CAUTION**

**Remove conductive articles such as rings and watches before handling the Main Control Card.**

**Do not use a screwdriver or any similar object to pry the modules away from the Main Control Card. Damage to components or circuit card tracks may result.**

**Chart 6-2 Remove a Module from the Main Control Card**

Step	Action	Comments
	<b>Follow General Procedures</b>	
1.	Follow the general procedures for handling circuit cards.	Given in Chart 5-1 and Chart 5-2.
	<b>Remove the Module</b>	
2.	Pop the module from the standoffs by applying pressure with your thumb onto the short portion of the standoff projecting through the hole in the module, while pinching with one or two fingers on the opposite side of the module right near the standoff.	This "pinching action" avoids bending the circuit card any more than is necessary to release it from the standoff.
3.	Carefully separate the connectors by applying pressure at each end of connector.	
4.	Lift the module from the MCC. <b>DO NOT BEND OR FLEX</b> the module by pulling up on the corners.	

### Install Switch Matrix Card (672-port Configuration)

6.3 The Switch Matrix Card is only installed in a 672-port configuration Control cabinet.

When you have completed Chart 6-3:

- The Switch Matrix Card (SMC) will be unpacked and inspected.
- The Switch Matrix Card will be installed in the Control cabinet.

**Notes:** 1.The SMC provides the DX switching matrix and the resources of the digital signal processor.

2.The SMC takes the place of the DX module which is used on the MCC in the 336- and 456-port configurations.

---

**Chart 6-3 Install Switch Matrix Card in a 672-port Control Cabinet**

Step	Action	Comments
	<b>Follow General Procedures</b>	
1.	Follow the general procedures for handling circuit cards.	Given in Chart 5-1 and Chart 5-2.
	<b>Unpack and Inspect</b>	
2.	Wearing the antistatic wrist strap, unpack and inspect the SMC.	
3.	Return damaged or defective items, and report missing items according to local procedures.	
	<b>Install Switch Matrix Card</b>	
4.	Slide the SMC into its slot in Bay 0.	The SMC and its slot are each marked with an equilateral triangle.

## Install a Control Resource Card (SX-200 FD PABX)

6.4 The Control Resource Card (CRC) is only installed in the SX-200 FD PABX. When you have completed Chart 6-4:

- The Control Resource Card (CRC) will be unpacked and inspected.
- The CRC will be installed in the SX-200 FD PABX Control Node.

**CAUTION**

Remove conductive articles such as rings and watches before handling the Control Resource Card.

**Chart 6-4 Install Control Resource Card in the SX-200 FD Control Node**

Step	Action	Comments
	<b>Follow General Procedures</b>	
1.	Follow the general procedures for opening the Control Node front door and handling circuit cards.	Given in Chart 3-4, Chart 5-1 and Chart 5-2.
	<b>Unpack and Inspect CRC</b>	
2.	Attach the antistatic wrist strap.	
3.	Unpack the Control Resource Card (CRC) from its MITEL packing box and antistatic bag, and inspect the CRC for damage.	
4.	Complete repair tag, repack, and return any damaged or incorrect items.	
5.	Put the CRC, component side up, onto the bag on top of the PABX or any nearby firm surface. Do not put it on a deformable surface.	<b>CAUTION:</b> The card may bend as pressure is applied to seat the connectors.
	<b>Install CRC</b>	
6.	Set the 4 dip switches on the CRC faceplate as described for Forced Maintenance to Control in Table 6-1.	The dip switches allow a maintenance person to switch connectivity to either the Control or Peripheral Cabinet. The default position is to the Control Cabinet.
7.	Slide the CRC into slot 2 of the Control Node.	

**Table 6-1 Control Resource Card Switch Settings**

	Switch Settings			
	S1	S2	S3	S4
Forced Maintenance to Control	Open or Closed	Open	Not Used	Not Used
Forced Maintenance to Peripheral	Open	Closed	Not Used	Not Used

## Install Fiber Interface Modules (SX-200 FD PABX)

6.5 Fiber Interface Modules (FIMs) are only installed in the SX-200 FD PABX. When you have completed Chart 6-5:

- The Fiber Interface Modules (FIMs) will be unpacked and inspected.
- One FIM for each peripheral bay will be installed in the SX-200 FD PABX Control Node.

**Chart 6-5 Install Fiber Interface Modules in the SX-200 FD Control Node**

Step	Action	Comments
	<p><b>Follow General Procedures</b></p>	
1.	Follow the general procedures for opening the Control Node front door and handling circuit cards.	Given in Chart 3-4, Chart 5-1 and Chart 5-2.
	<p><b>Unpack and Inspect FIM</b></p>	
2.	Attach the antistatic wrist strap.	
3.	Unpack the Fiber Interface Module (FIM) from its MITEL packing box and antistatic bag, and inspect the FIM for damage.	
4.	Complete repair tag, repack, and return any damaged or incorrect items.	
5.	Put the FIM, component side up, onto the bag on top of the PABX or any nearby firm surface. Do not put it on a deformable surface.	<p><b>CAUTION:</b> The card may bend as pressure is applied to seat the connectors.</p>
	<p><b>Install FIMs in FIM Carrier</b></p>	
6.	On the rear of the Control Node, remove the filler plate from the FIM slot opening, by unscrewing the 2 screws holding it in place.	
7.	Slide the FIM into the empty slot to mount on the appropriate DIN connector on the FIM Carrier backplane. The screw holes on the FIM should align with the screw holes on the node rear panel. Fasten the faceplate to the panel using the screws removed in step 6.	

## Install Floppy Disk Drive

6.6 Floppy Disk Drives must be installed in the *SX-200* DIGITAL PABX 336- and 672-port configurations. The *SX-200* FD PABX has two 3 1/2" Floppy Disk Drives already installed in the Control Node. When you have completed Chart 6-6:

- The Floppy Disk Drive(s) will be unpacked and inspected.
- The Floppy Disk Drive(s) will be installed.

**Notes:** 1. The *SX-200* DIGITAL PABX with Generic 1002, 1003, 1004, or 1005 software requires two disk drives (Generic 1001 software requires only Drive A in Bay 2).

2. One or two 5 1/4" floppy disk drives are required with Generic 1001 through 1004 software, and two 3 1/2" floppy disk drives are required for Generic 1005 software. The installation procedure for both disk drive types is the same, and they are installed in the same slots.

3. **336-port Configuration:** Disk drive A is installed in Bay 2. It receives power from the BPS in Bay 2. Disk drive B is installed in Bay 1. It also receives power from the BPS in Bay 2.

4. **672-port Configuration:** The Floppy Disk Drives are both installed in Bay 0, and powered from the Bay 0 Bay Power Supply.

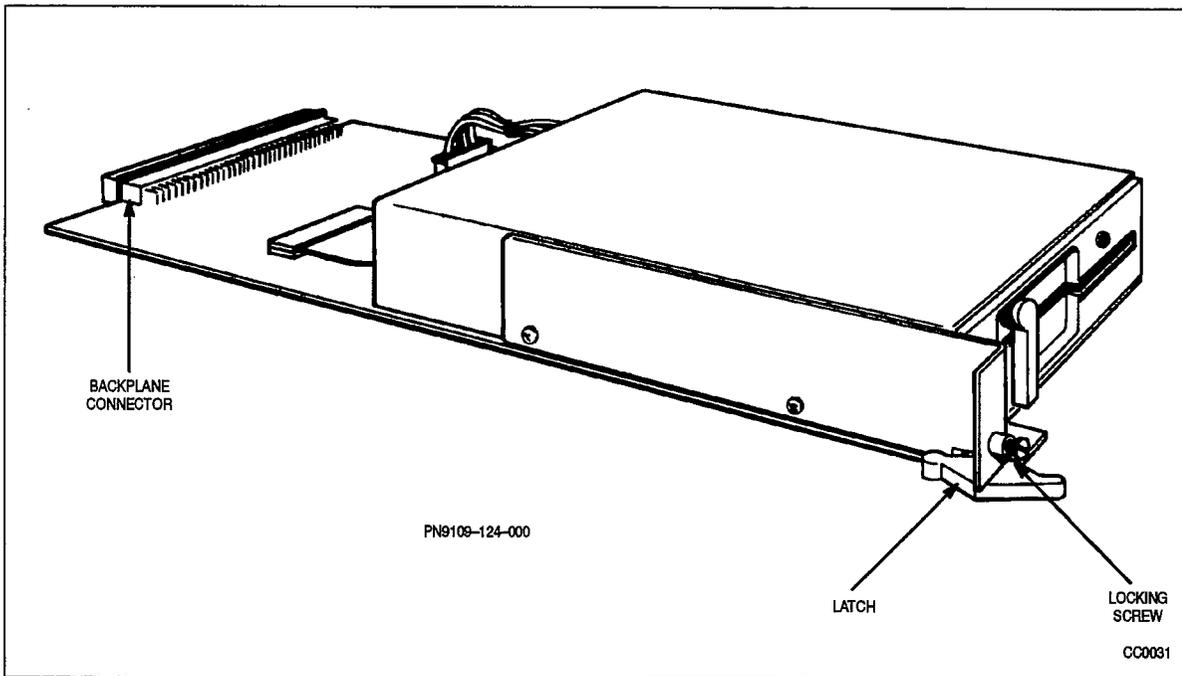
**Chart 6-6 Install Floppy Disk Drives In the *SX-200* DIGITAL PABX**

Step	Action	Comments
	<b>Follow General Procedures</b>	
1.	Follow the general procedures for handling circuit cards.	Given in Chart 5-1 and Chart 5-2.
	<b>Unpack and Inspect</b>	
2.	While wearing antistatic wrist strap, unpack and inspect disk drive(s).	Shown in Figure 6-7 (5 1/4" drive) and Figure 6-8 (3 1/2" drive).
	<b>Install Floppy Disk Drive A</b>	
3.	<b>336-port Configuration:</b> Install disk drive A into its slot in Bay 2. <b>672-port Configuration:</b> Install disk drive A into its slot in Bay 0 (right hand position).	The disk drive and its slot are each marked with an equilateral triangle. The disk drive plugs directly into the backplane.
4.	Secure it with its extractor and locking screw.	

Page 1 of 2

**Chart 6-6 Install Floppy Disk Drives in the SX-200 DIGITAL PABX  
(continued)**

Step	Action	Comments
5.	<p><b>Install Floppy Disk Drive B</b></p> <p><b>336-port Configuration:</b> Install disk drive B (if present) in Bay 1.</p> <p><b>672-port Configuration:</b> Install disk drive A into its slot in Bay 0 (left hand position).</p>	<p>The disk drive and its slot are each marked with an equilateral triangle.</p> <p>The disk drive plugs directly into the backplane.</p>
6.	Secure it with its extractor and locking screw.	



**Figure 6-7 5 1/4" Floppy Disk Drive (SX-200 DIGITAL PABX)**

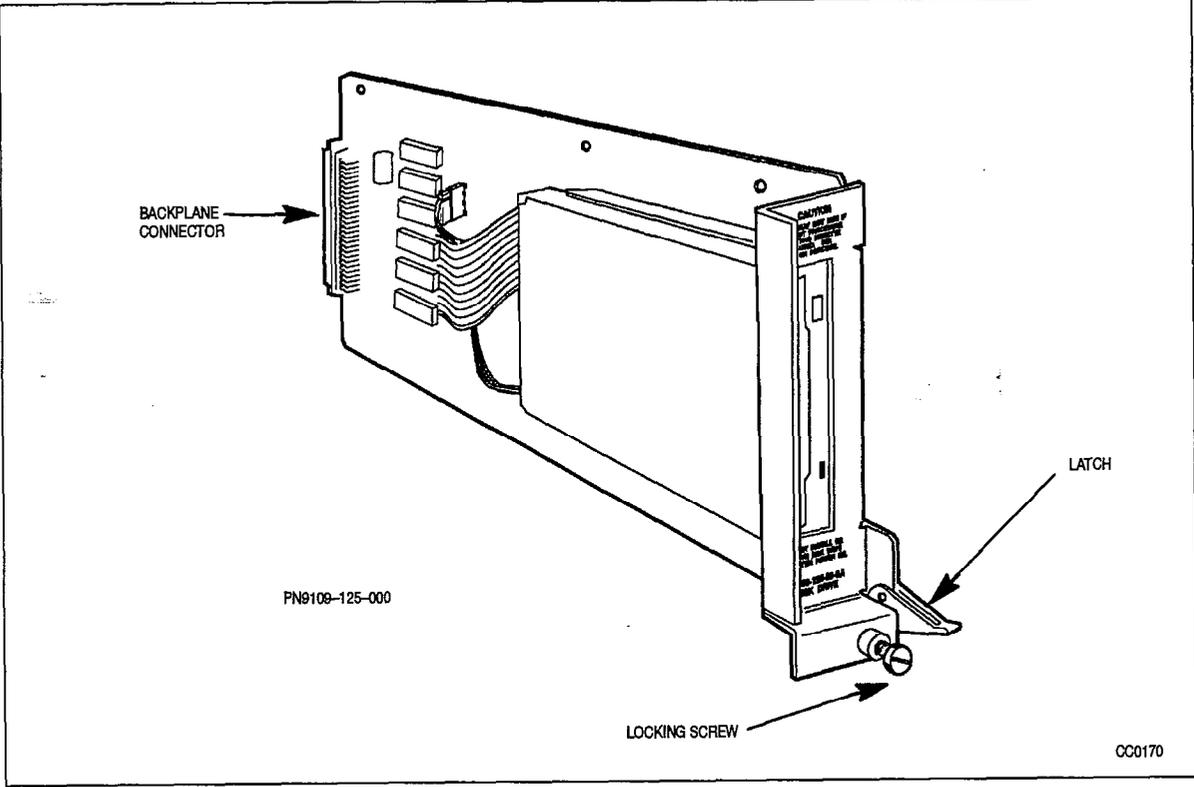


Figure 6-8 3 1/2" Floppy Disk Drive (SX-200 DIGITAL PABX)

## Install Bay Power Supply

6.7 When you have completed Chart 6-7:

- The Bay Power Supply (BPS) will be unpacked and inspected.
- In the 336-port configuration, the BPS will be installed in the control shelf and in digital peripheral Bays 3 and 4.
- In the 672-port configuration, the BPS will be installed in the control bay (Bay 0) and in digital peripheral Bays 1 through 7.
- In the SX-200 FD PABX, The BPS will be installed in the each peripheral cabinet.
- The power cable will be plugged into the unit.

- Notes:**
1. The BPS is an ac-to-dc converter. The BPS faceplate is labeled "Bay PSU". It has a ringing voltage generator used by the card slots it supports. There should be one BPS for each digital peripheral bay.
  2. In the 336-port configuration, a BPS is not needed in Bay 1 when only a Floppy Disk Drive is installed in Bay 1. The Bay 1 Floppy Disk Drive is powered by the BPS in Bay 2.
  3. In the SX-200 FD PABX, a BPS must be installed in each Peripheral cabinet. A BPS is not required in the Control Node.

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**Chart 6-7 Install Bay Power Supply**

Step	Action	Comments
	<b>Follow General Procedures</b>	
1.	Follow the general procedures for handling circuit cards.	Given in Chart 5-1 and Chart 5-2.
	<b>Unpack and Inspect</b>	
2.	Wearing the antistatic wrist strap, unpack and inspect the BPS.	
3.	Complete repair tag, repack, and return any damaged or incorrect items.	

**Chart 6-7 Install Bay Power Supply  
(continued)**

Step	Action	Comments
	<p><b>Install BPS</b></p>	
4.	Insert the BPS into its slot, and tighten the thumbscrew at the upper front of the BPS to secure it to the cardfile.	The BPS and its slot are each marked with a right triangle. The slot is located in the upper right corner of each bay.
		<p><b>336-port Configuration:</b> The first BPS must be installed in Bay 2. If any cards are to be installed in any other digital bay, a BPS must also be installed in that bay.</p>
		<p><b>672-port Configuration:</b> The first BPS must be installed in Bay 0. If any cards are to be installed in any other digital bay, a BPS must also be installed in that bay.</p>
		<p><b>SX-200 FD PABX:</b> A BPS must be installed in each peripheral bay.</p>
5.	Make sure that the BPS I/O (on/off) switch is in the O (off) position.	
6.	If this is an SX-200 FD system, then go to step 11.	
	<p><b>Route Power Cable – upper digital bays</b></p>	
7.	At rear of the cabinet, cut off the cable ties securing the power cable to the bottom of cabinet.	The power supply cables to the upper digital bays are long cables that are coiled in the bottom of the cabinet.
8.	Route the power cable from ac distribution along the inside of the cardfile side plates.	
9.	Tie the power cable and the braided ground cable to the cardfile.	
	<p><b>Connect Power – upper and lower bays</b></p>	
10.	Connect the plug to the BPS.	
	<p><b>Route Power Cable – SX-200 FD PABX</b></p>	
11.	Remove the cover plate from the internal ac power cord access cutout on the node backplate.	
12.	Plug the internal ac power cord into the back of the Bay Power Supply, directly under the access cutout.	
13.	Replace the access cover plate over the cutout and attach with the 2 screws removed in step 11.	

## Install a Bay Control Card

6.8 When you have completed Chart 6-8:

- The Bay Control Card (BCC) will be unpacked and inspected.
- The Bay Control Card will be installed each peripheral bay.
- In the *SX-200* FD PABX, the Peripheral FIM Carrier and Fiber Interface Module will be installed on the Bay Control Card.

- Notes:**
1. A Bay Control Card performs such lower-level real-time control tasks for a digital peripheral bay as scanning for activity on ONS ports, controlling CO trunks and E&M trunks, tone cadencing, and communicating to consoles.
  2. In the 336-port configuration, one BCC is installed in digital peripheral Bay 3, and one BCC is installed in digital peripheral Bay 4.
  3. In the 672-port configuration, one BCC is installed in digital peripheral Bays 1 through 7.
  4. In the *SX-200* FD PABX, one BCC is installed in each digital peripheral bay (1 through 7).

**Chart 6-8 Install a Bay Control Card**

Step	Action	Comments
	<b>Follow General Procedures</b>	
1.	Follow the general procedures for handling circuit cards.	Given in Chart 5-1 and Chart 5-2.
	<b>Unpack and Inspect</b>	
2.	Wearing the antistatic wrist strap, unpack and inspect the BCC.	
3.	Complete repair tag, repack, and return any damaged or incorrect items.	
4.	Set all 4 switches (2 pairs) on the circuit card to the closed position, for normal operation.	See Figure 6-9 for switch locations
5.	If this is a 336-port or 672-port configuration, go to step 7.	
	<b>Install BCC in Digital Bays</b>	
6.	<b><i>SX-200</i> FD PABX:</b> Install the Peripheral FIM Carrier and Fiber Interface Module on the BCC, as described in Chart 6-9.	
7.	Slide the BCC into its slot in each digital peripheral bay.	The BCC and its slot are each marked with a semicircle.

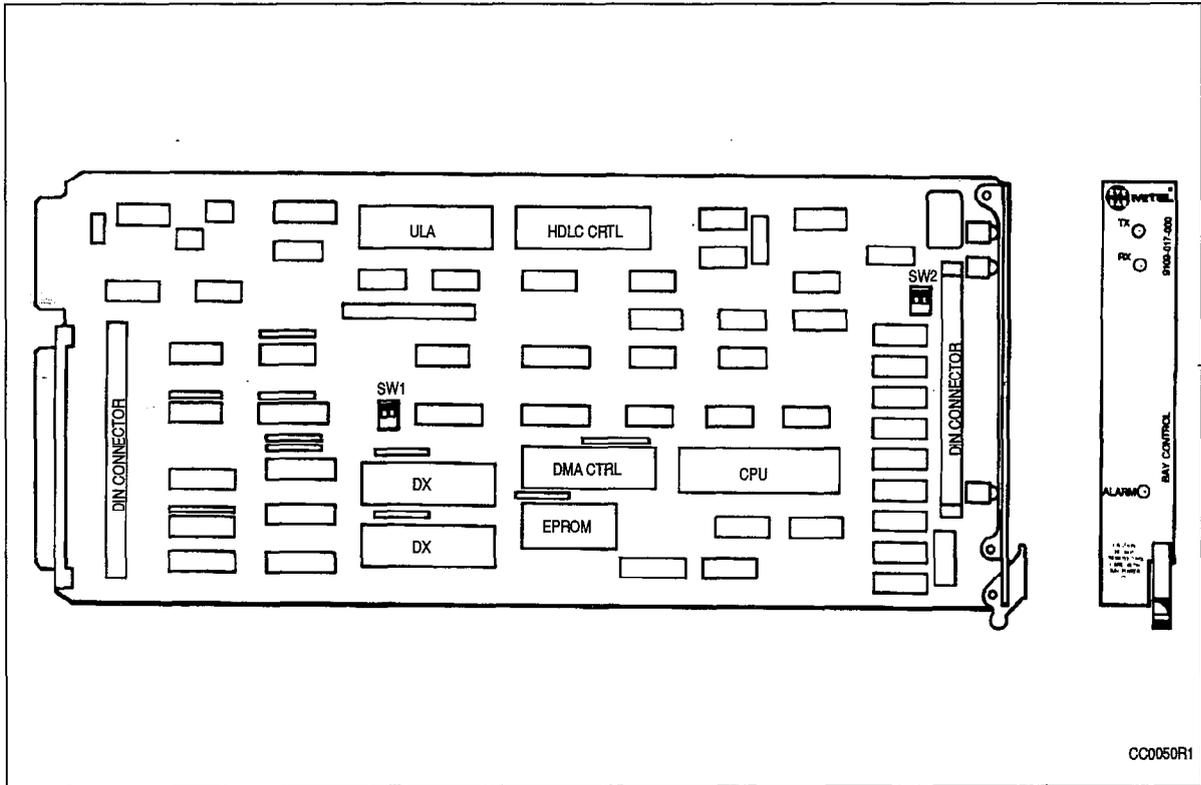


Figure 6-9 Bay Control Card – Switch Locations

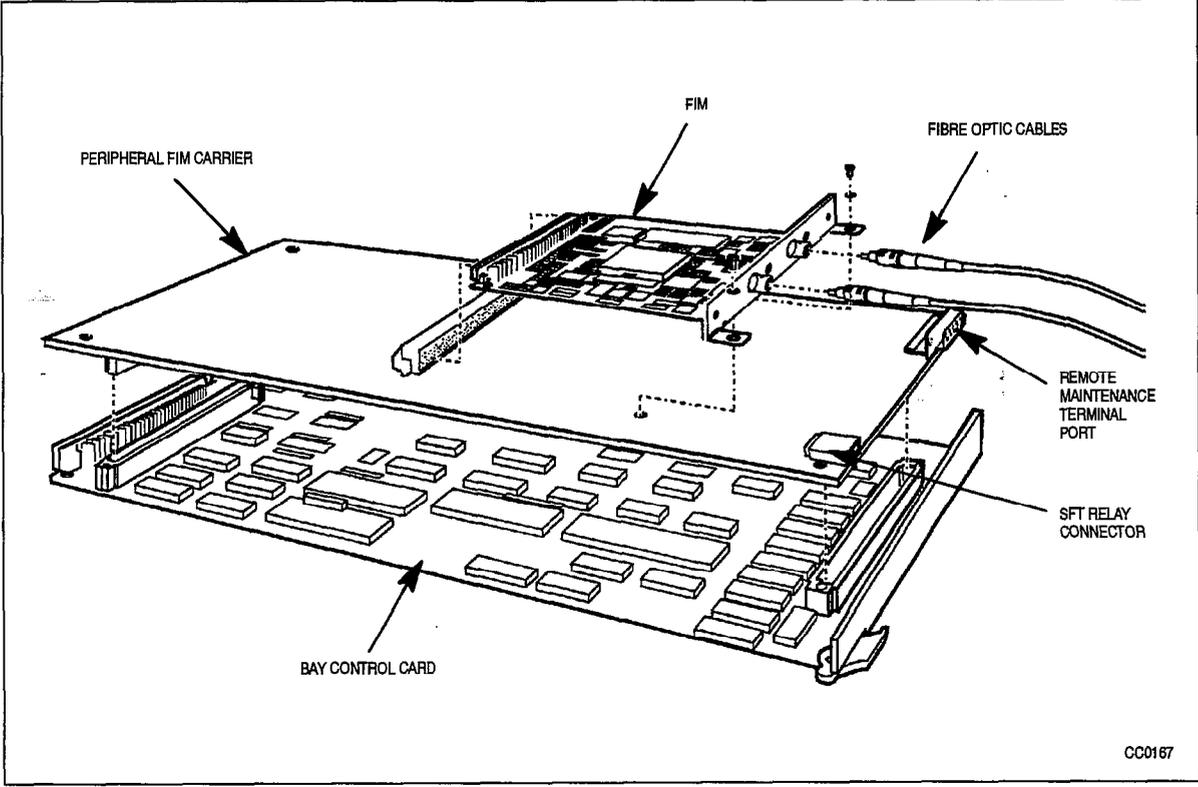
**Install Peripheral FIM Carrier and FIM (SX-200 FD PABX)**

6.9 A Peripheral FIM Carrier and a Fiber Interface Module are only required in the SX-200 FD PABX. When you have completed Chart 6-9:

- The Peripheral FIM Carrier will be installed on the Bay Control Card.
- The Fiber Interface Module will be installed in the Peripheral FIM Carrier.
- The Bay Control Card will be ready to install in the peripheral bay.

**Chart 6-9 Install Peripheral FIM Carrier and FIM in an SX-200 FD Peripheral Cabinet**

Step	Action	Comments
<b>Follow General Procedures</b>		
1.	Follow the general procedures for opening the cabinet front door and handling circuit cards.	Given in Chart 3-4, Chart 5-1 and Chart 5-2.
<b>Unpack and Inspect</b>		
2.	Wearing the antistatic wrist strap, unpack and inspect the Peripheral FIM Carrier and the Fiber Interface Module.	
3.	Complete repair tag, repack, and return any damaged or incorrect items.	
4.	Ensure that steps 1. through 3. of Chart 6-8 have been completed.	
<b>Install Peripheral FIM Carrier on the BCC</b>		
5.	Position the Peripheral FIM Carrier on the component side of the BCC so that the connectors are properly aligned.	See Figure 6-10.
6.	Snap the Peripheral FIM Carrier into place on the BCC.	
<b>Install Fiber Interface Module</b>		
7.	Slide the FIM into the Peripheral FIM Carrier until it connects firmly with the DIN connector on the Carrier.	
8.	Fasten the FIM faceplate to the FIM Carrier with 2 screws.	
<b>Connect Fiber Cable to FIM</b>		
9.	Unstrap the 2 internal optical fiber cables from the inside panel of the Peripheral cabinet. Remove the protective caps from the cable connectors on the cables, and from the TX and RX connectors on the FIM faceplate.	
10.	Connect the internal optical fiber cable from the RX connector on the cabinet backplate to the RX connector on the FIM faceplate, and the cable from the TX connector on the backplate to the TX connector on the FIM faceplate.	



**Figure 6-10 Installation of the Peripheral FIM Carrier and FIM on the BCC (SX-200 FD PABX)**

## Installation Information

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## 7.

## INSTALLING POWER FAIL TRANSFER

### Introduction

- 7.1 In the event of a temporary power failure to the PABX, certain station lines and central office trunks may be directly connected, so that some telephone service can be maintained. In the *SX-200* DIGITAL PABX, this function is facilitated by the Power Fail Transfer card. In the *SX-200* FD PABX, a System Fail Transfer Unit containing up to 5 System Fail Transfer cards serves the same purpose.

### Install Power Fail Transfer Card In *SX-200* DIGITAL PABX

- 7.2 The Power Fail Transfer card is installed in an *SX-200* DIGITAL PABX according to the procedures outlined in Chart 7-1. When you have completed Chart 7-1:
- A loop start/ground start (LS to GS) module will be installed on each Power Fail Transfer (PFT) card.
  - The PFT card(s) will be installed.
  - An alarm will be connected (optional).

- Notes:**
1. The PFT card connects central office trunks to selected station lines when there is a power failure. Each PFT card can connect a maximum of six telephone lines to six trunk lines. Dial pulse trunks must connect to rotary dial telephones. DTMF trunks can connect to either DTMF or rotary dial telephones.
  2. During a power failure, calls in progress are dropped. Calls made in PFT mode and in progress when the system returns to normal operation are not dropped and end normally when the call ends.
  3. The PFT relays are controlled from Bay 2 in the 336-port configuration, and Bay 0 (control backplane) in the 672-port configuration.
  4. The basic 336-port system is delivered with a six-circuit PFT card installed. Two more six-circuit PFT cards can be added in the Control cabinet.
  5. The basic 672-port configuration with digital Bays 0 and 1 is delivered with one six-circuit PFT card installed. Two more cards may be added to the Control cabinet. The peripheral cabinet is delivered with one six-circuit PFT card installed. Two more cards may be added to the cabinet. The PFTs in the peripheral cabinet can be connected to the optional PFT alarm.

**Chart 7-1 Install Power Fail Transfer Card in the SX-200 DIGITAL PABX**

Step	Action	Comments
<b>Unpack, Inspect</b>		
1.	Open rear door of cabinet.	
2.	Attach antistatic wrist strap.	
3.	Carefully unpack PFT card and LS/GS Conversion Module.	A PFT card and LS/GS Conversion Module is shown in Figure 7-1.
<b>Install LS to GS Conversion Module</b>		
4.	Position an LS to GS conversion module (as required) on each card and attach it to the standoffs with the screws supplied.	
<b>Install Card</b>		
5.	Position the PFT card immediately under the already installed PFT card, line up with holes, and screw on with the two self-tapping screws.	Shown in Figure 7-2. The PFT card is already installed.
6.	Repeat to install a third PFT card (if required).	
<b>Connect Wiring Harness in all Configurations</b>		
7.	Make sure the wiring harness from J13 of the control shelf backplane is connected to J3 of the upper PFT card.	Shown in Figure 7-3 for the 336-port configuration, and Figure 7-4 for the 672-port configuration. <b>CAUTION:</b> <i>If installing PFT card in an operating system:</i> Do not disconnect the connector from J13. This could cause damage while the system is powered up.
8.	Connect the wiring harness from J2 of the upper card to J3 of the second card.	
9.	<i>Connect the wiring harness from J2 of the second card to J3 of the third card.</i>	
10.	If this is a 336-port configuration, go to step 15.	
<b>Connect Wiring Harness in 672-port Configuration</b>		
11.	<b>Control Cabinet:</b> Connect the PFT cable of the 672-port intercabinet cable assembly to J2 of the lower (third) PFT card in the Control cabinet.	<b>CAUTION:</b> The PFT cable of the intercabinet assembly should not be connected to J2 if there are no PFT cards in the peripheral cabinet.
12.	<b>Peripheral Cabinet:</b> Connect the PFT cable of the 672-port intercabinet cable assembly to J2 of the upper (first) PFT card in the peripheral cabinet.	

**Chart 7-1 Install Power Fail Transfer Card in the SX-200 DIGITAL PABX  
(continued)**

Step	Action	Comments
13.	Connect the wiring harness from J2 of the upper card to J3 of the middle card (if present).	
14.	Connect the wiring harness from J2 of the upper card to J3 of the bottom card (if present).	
	<b>Connect Optional Alarm</b>	The PFT card supplies a closed contact signal when in PFT mode.
15.	For the first (upper) PFT card: connect the ALARM pair TB1-2/red and TB1-4/black of the upper PFT card to the optional remote alarm (customer-supplied).	Shown in Figure 7-3 for the 336-port configuration, and Figure 7-4 for the 672-port configuration.
16.	For the remaining PFT cards: connect the ALARM pair from TB1-1/red and TB1-3/black of the upper card to TB1-2/red and TB1-4/black respectively, of the card below it.	Maximum contact ratings are: 110 vac:       0.3 A 24 vdc:        1.0 A

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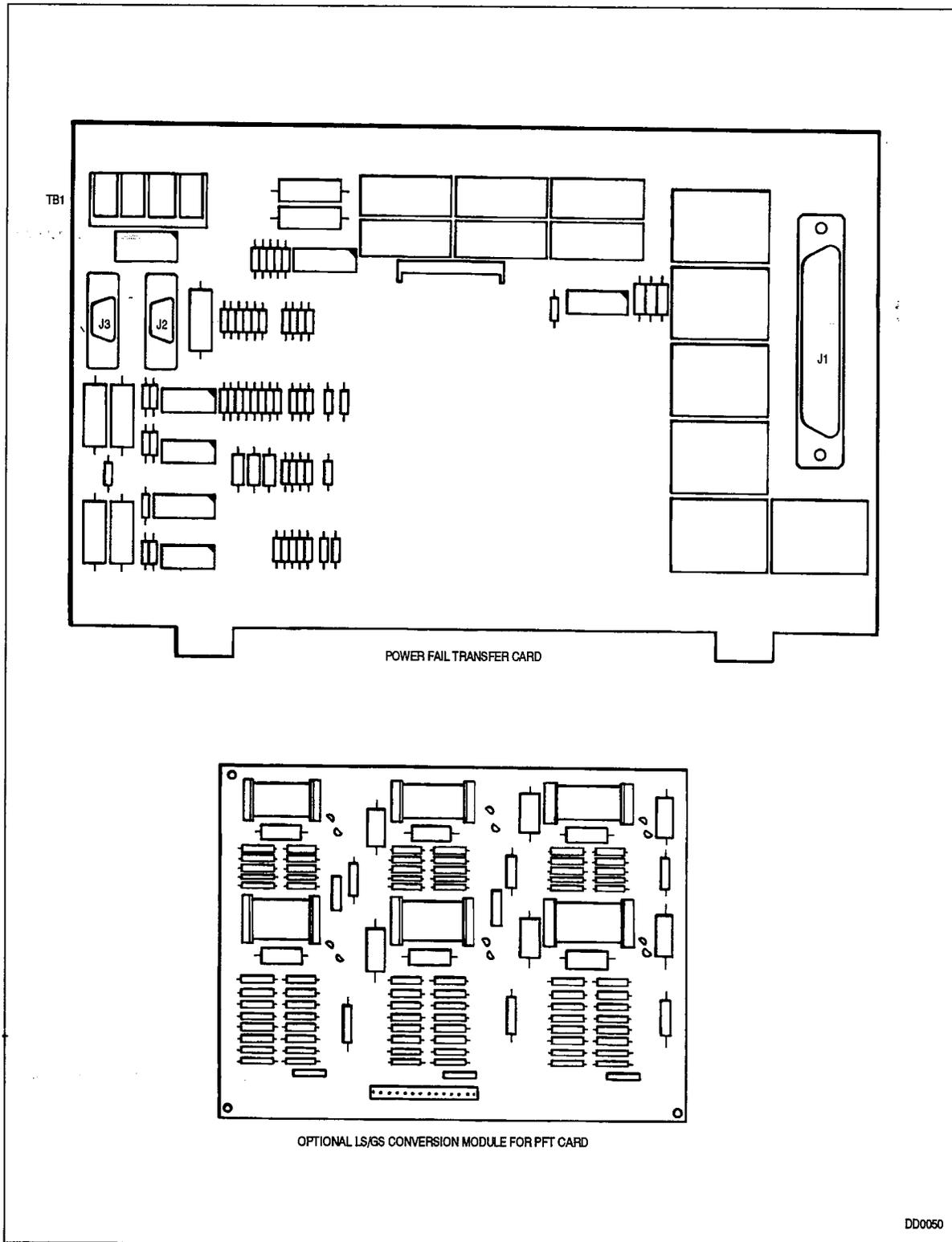


Figure 7-1 PFT Card and LS-to-GS Module

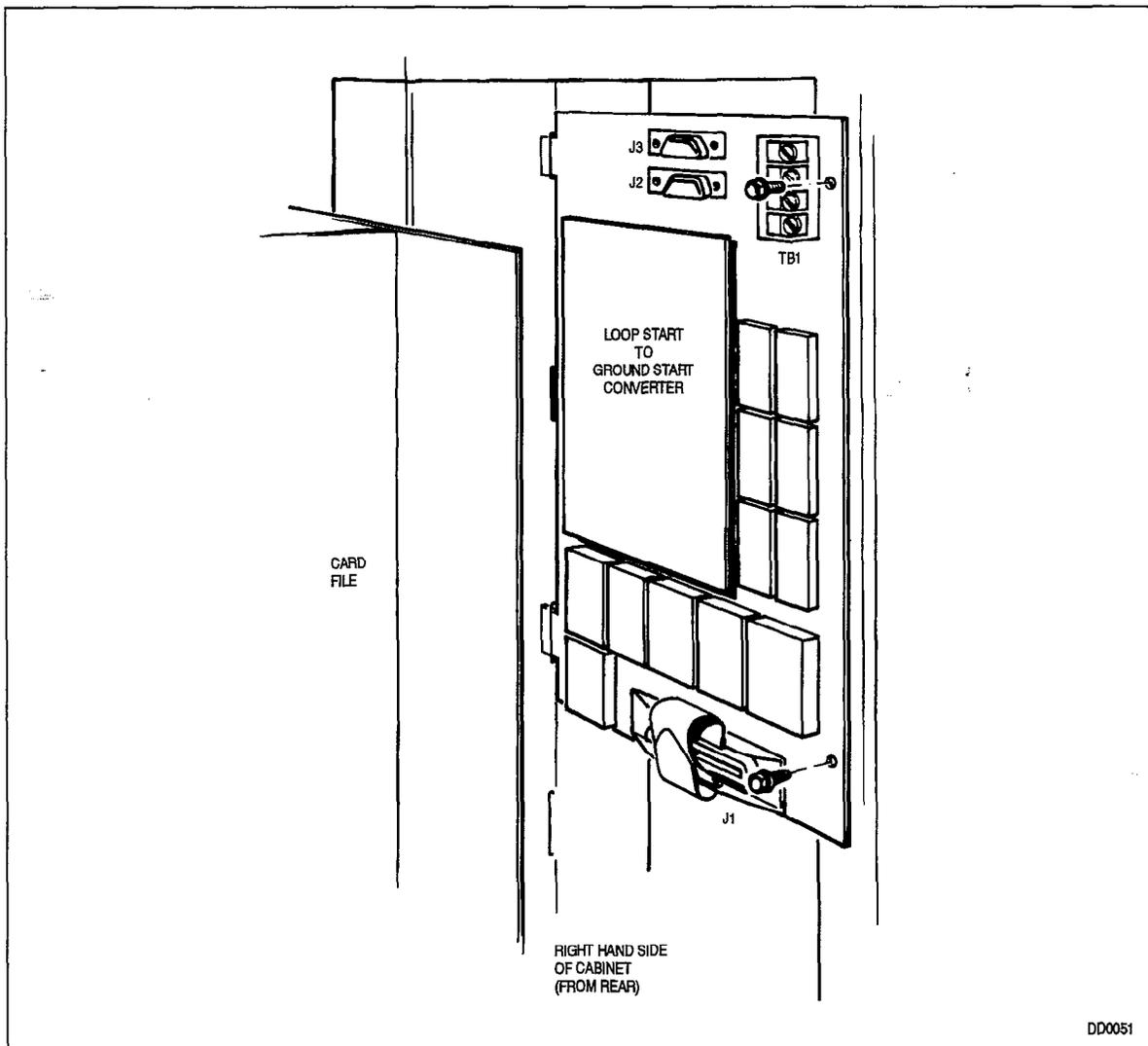
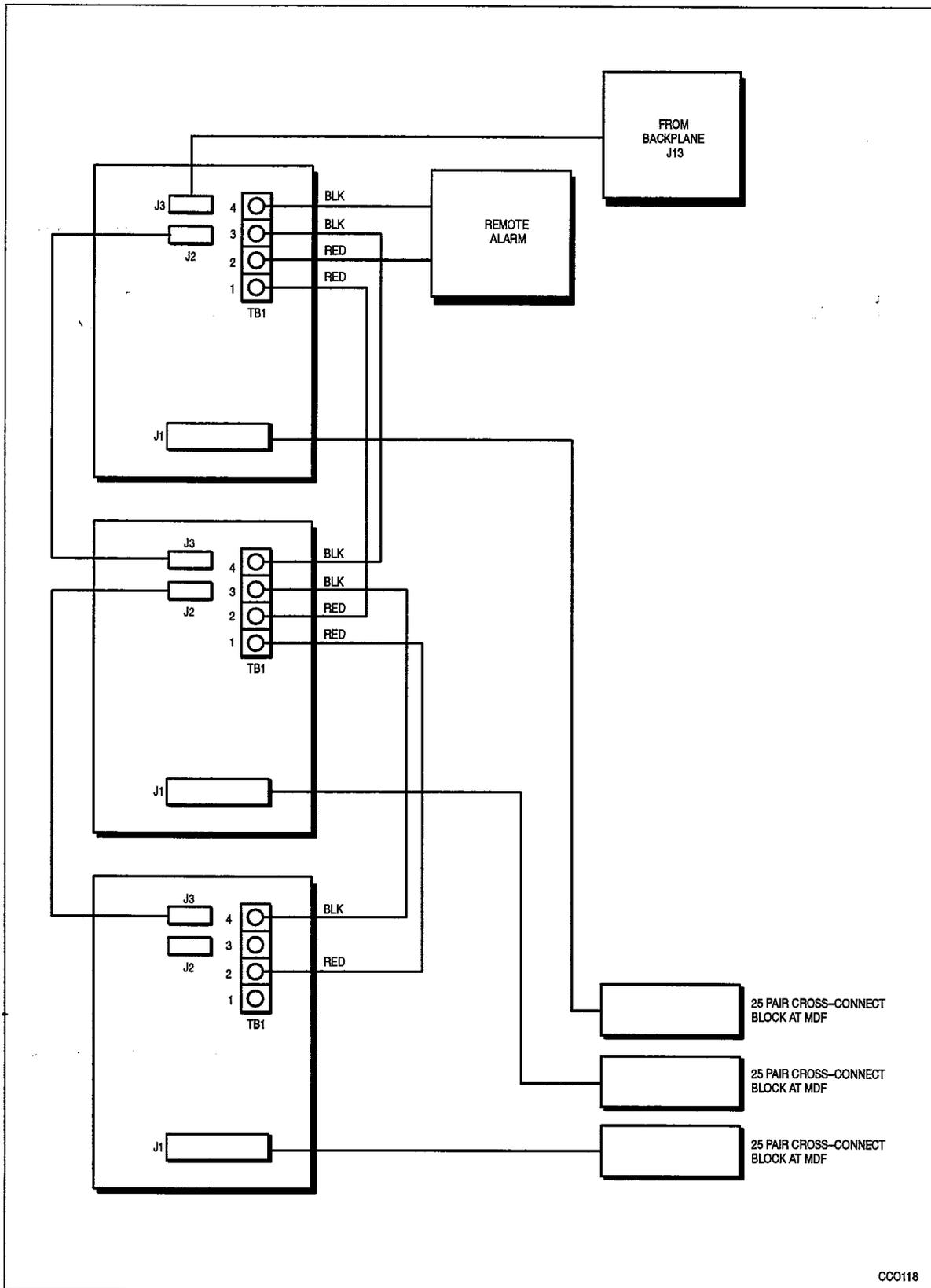


Figure 7-2 PFT Card Location in the Control Cabinet



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**Figure 7-3 PFT Card Connections (336-port Configuration)**

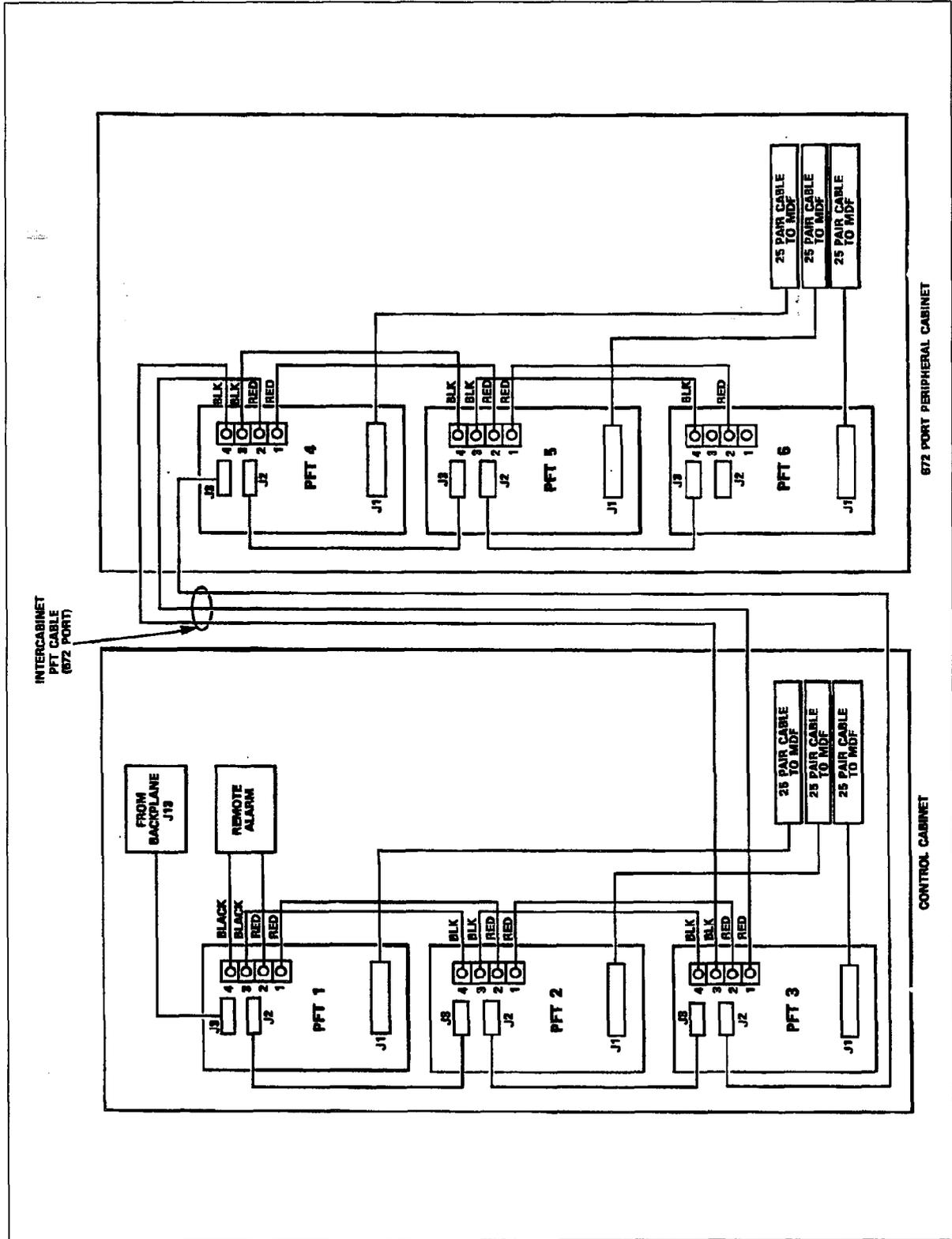


Figure 7-4 PFT Card Connections (672-port Configuration)

## Install System Fail Transfer Unit for SX-200 FD PABX

7.3 The System Fail Transfer Unit is installed for an SX-200 FD PABX according to the procedures outlined in Practice 9109-096-201-NA. Each System Fail Transfer (SFT) card provides system fail transfer functionality for one peripheral cabinet. Up to 7 SFT cards may be installed, in as many SFT Units as required. The SFT unit connects central office trunks to selected station lines when there is a power failure. Calls in progress are dropped. Calls made in SFT mode and in progress when the system returns to normal operation are not dropped and end normally when the call ends. Dial pulse trunks must connect to rotary dial telephones. DTMF trunks can connect to either DTMF or rotary dial telephones.

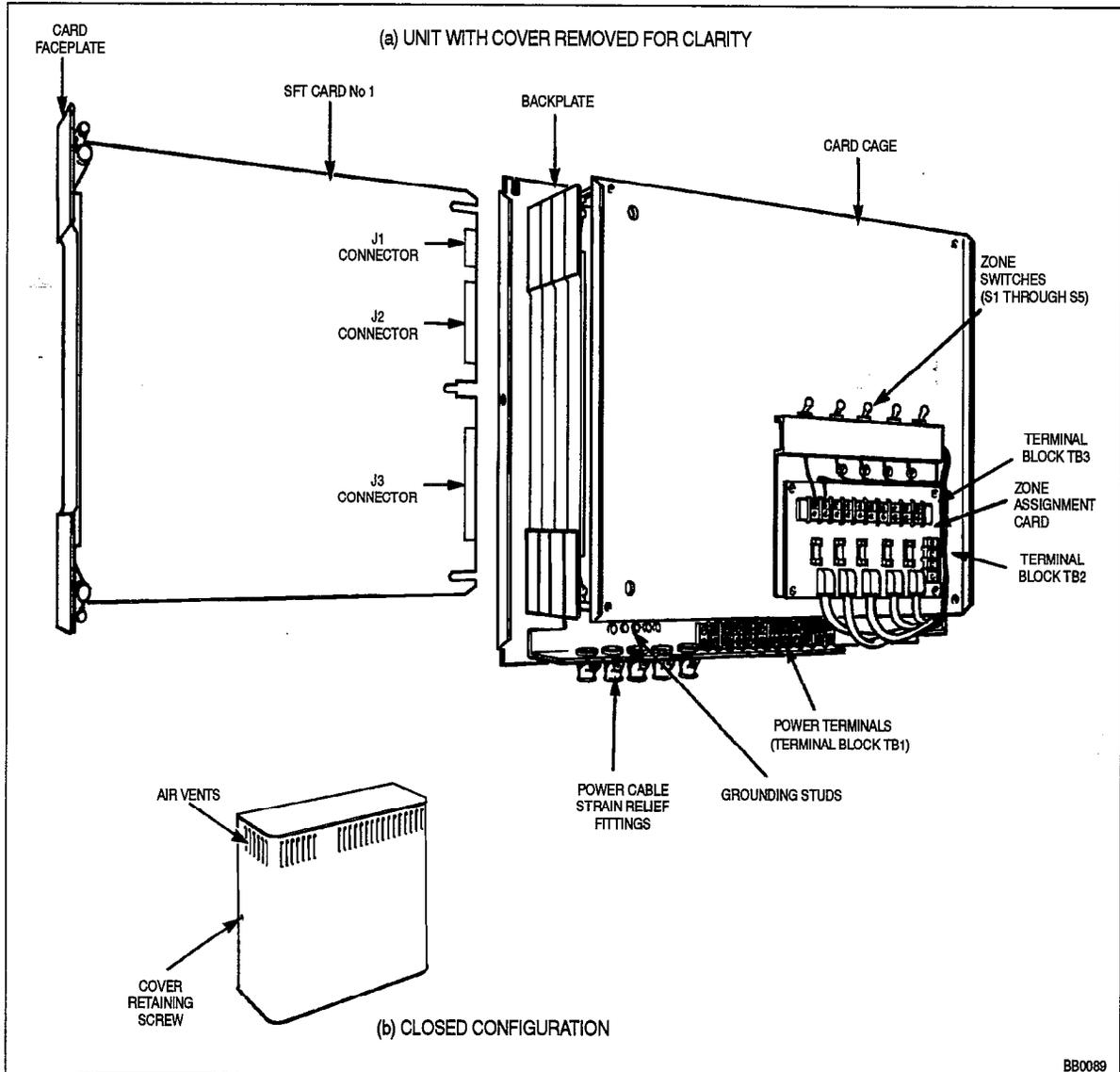
When you have completed Chart 7-2, each Peripheral Cabinet will be cabled to an SFT card in the wall-mounted SFT Unit.

The pinouts for the SFT Relay Connector on the Peripheral FIM Carrier are shown in Table 7-1.

- Notes:**
1. Up to 5 Peripheral bays can be connected to SFT cards in one SFT Unit; normally only one Peripheral bay of trunk cards is required.
  2. Each SFT Unit contains a maximum of 5 SFT cards, each with 12 circuits. A maximum of 60 station lines can be directly connected to 60 trunk lines, provided there are 5 SFT cards installed and the appropriate number of trunk lines connected.

**Chart 7-2 Connect System Fail Transfer to the SX-200 FD Peripheral Cabinet**

Step	Action	Comments
	<b>Connect SFT Relay Cable to SFT Connector on Peripheral Backplate</b>	
1.	Set all zone switches on the SFT unit to 0.	See Figure 7-5.
2.	Plug the SFT relay cable from the MDF into the System Fail Transfer RJ11 modular jack on the lower Peripheral cabinet backplate.	See Figure 7-6.
	<b>Connect SFT Internal Cable to SFT Relay Connector</b>	
3.	Unstrap the internal SFT cable from the inside panel of the Peripheral cabinet.	
4.	Connect the internal SFT cable from the SFT Connector Assembly on the cabinet backplate, to the SFT Relay Connector on the bottom front of the Peripheral FIM Carrier.	See Figure 7-7. Pinouts for the SFT Relay Connector shown in Table 7-1.



BB0089

Figure 7-5 System Fail Transfer Unit General View

Pin No.	Wire Color	Signal	Comment
2	Yellow	-48	Voltage source for the external SFT Transfer Equipment. Note, this is limited to 250 mA.
3	Green	-48 return (GND)	Ground reference (return) for the external SFT Transfer Equipment
4	Red	SFT Relay (A)	First side of "normally closed" SFT control relay
5	Black	SFT Relay return (B)	Second side of "normally closed" SFT control relay

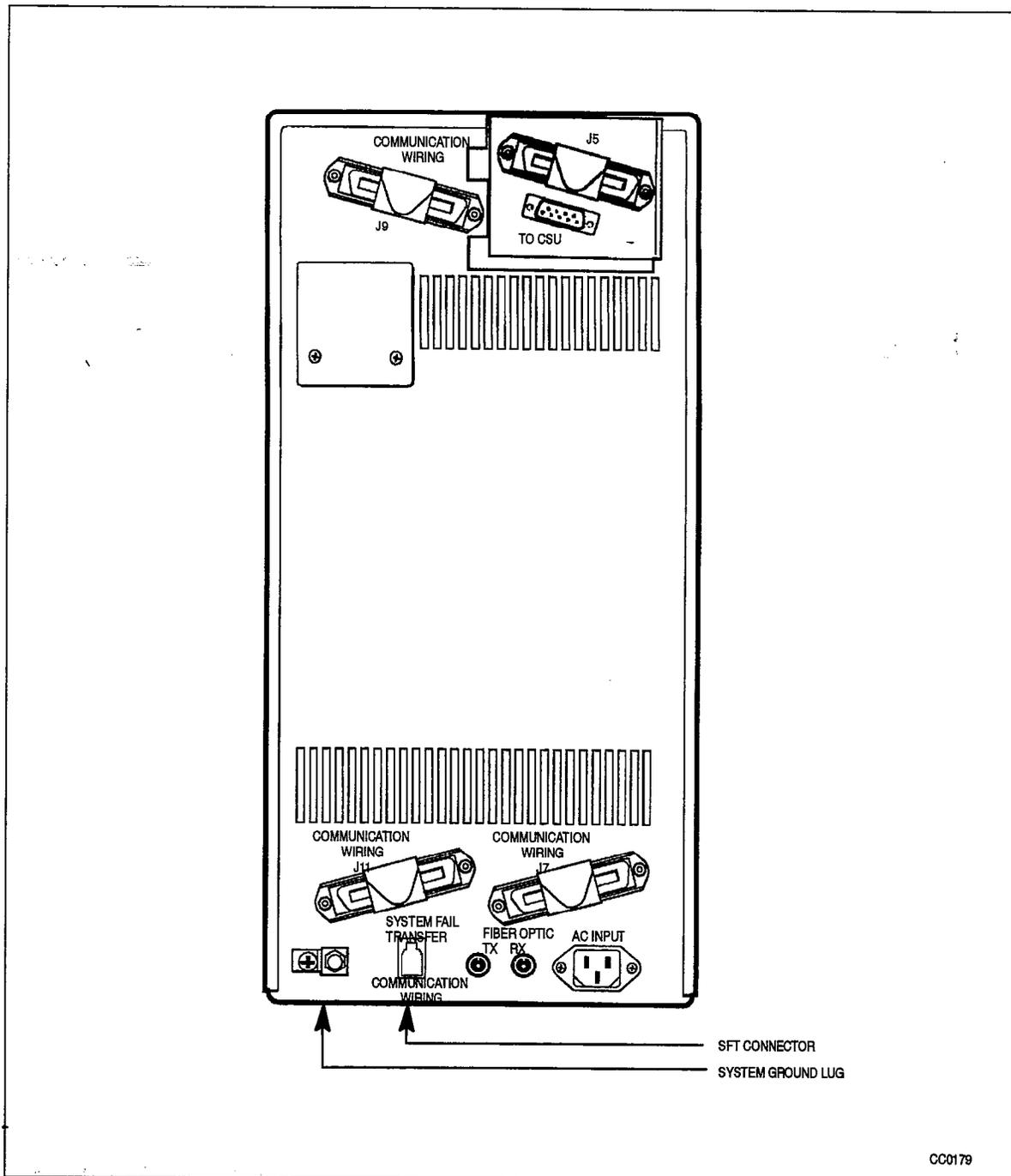


Figure 7-6 SFT Connector on SX-200 FD Peripheral Cabinet Backplate

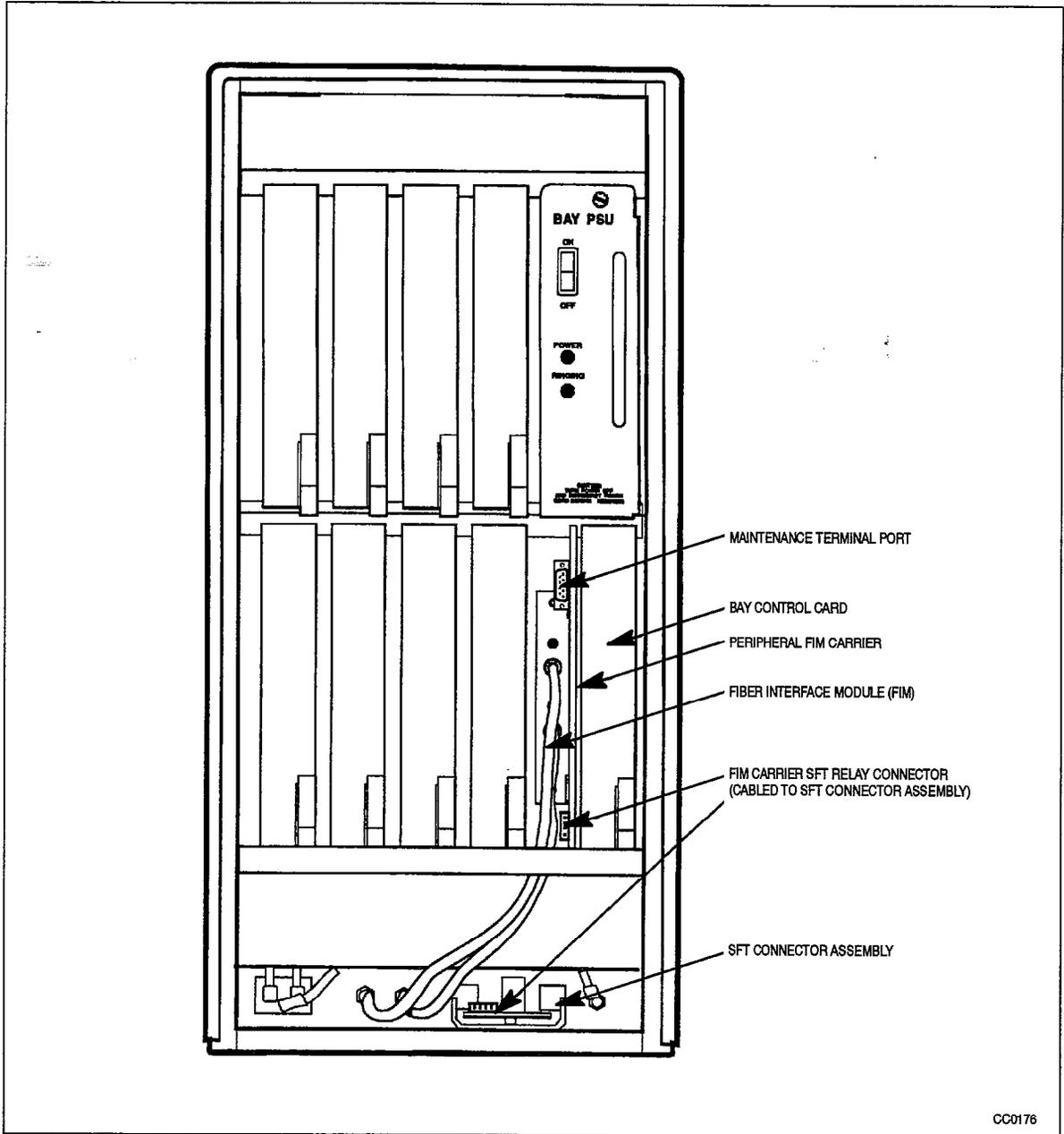


Figure 7-7 SFT Connectors in the SX-200 FD Peripheral Cabinet

## Installation Information

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## 8.

## INSTALL DIGITAL PERIPHERAL CARDS

### Install Universal Card and Modules

8.1 When you have completed Chart 8-1:

- The Universal Card will be unpacked and inspected.
- The modules to be installed will be unpacked and inspected.
- The modules will be installed on the card.
- The card will be installed.

**Notes:** 1. The Universal Card carries up to four plug-in modules:

**Console Module** – provides the digital interface to an LCD console.

**DTMF Receiver/Relay Module** – has four dual-tone multi-frequency (DTMF) receiver circuits, and two relays for night bells, or alarms.

**Music/Paging Module** – provides one 600-ohm balanced audio (music) input, a 200-ohm output to a paging amplifier, and one relay contact for controlling an amplifier.

**E&M Trunk Module** – Interfaces the PABX to one standard E&M trunk.

2. Up to four modules can be mounted on a Universal Card as long as the total power rating is 10 or less. See Table 2-5.

Module	Power Rating	Maximum/Card
Console	5	2
Receiver/Relay	2	4
Music on Hold/Paging	1	4
E & M Trunk	3	3

3. **Night Bell Connection:** On the 672-port configuration, the night bell connection must be made from the ringing voltage connector on the control shelf backplane. A DTMF receiver/relay module must be installed on the Universal Card. The card must be installed in Bay 1 or 2. Refer to Section 4.

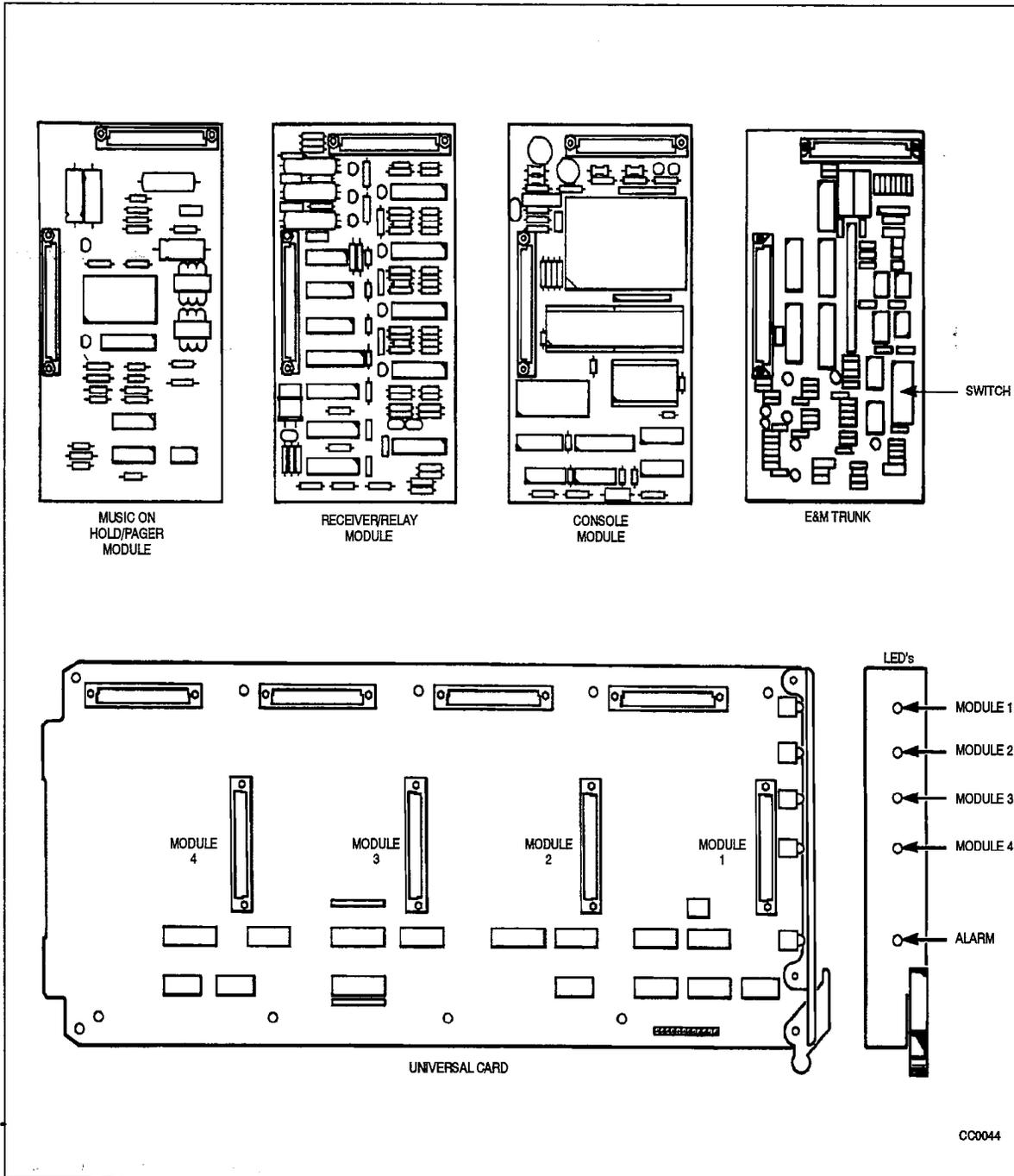


Figure 8-1 Universal Card and Modules

Chart 8-1 Install Universal Card and Modules

Step	Action	Comments
	<b>Follow General Procedures</b>	
1.	Follow the general procedures for handling circuit cards.	Given in Chart 5-1 and Chart 5-2.
	<b>Unpack and Inspect</b>	
2.	While wearing the antistatic wrist strap, unpack the Universal Card(s) and its modules.	Figure 8-1 shows a Universal Card and modules.
3.	Inspect for loose or missing components, and for damage.	
4.	Complete repair tag, repack, and return any damaged or incorrect items.	
	<b>Verify Power Ratings</b>	
5.	Verify the power ratings for each Universal Card.	Total power rating per Universal Card cannot exceed 10. If it exceeds 10, the system indicates an alarm and ignores the Universal Card when it is powered up. Shown in Table 8-1.
	<b>Install Console Module(s)</b>	
6.	Insert each console module into its assigned location (optional).	Typical installation is shown in Figure 8-2. <b>336-port Configuration:</b> The default location is Bay 2, slot 3, circuit 1. <b>672-port Configuration:</b> The default location is Bay 1, slot 5, circuit 1. <b>SX-200 FD System:</b> The default location is Bay 1, slot 5, circuit 1. The system maximum is 11 consoles (including DNIC consoles).
7.	Press it until it snaps into its standoffs. Make sure that connectors are properly seated.	Figure 8-1 shows a Universal Card and modules.
	<b>Install DTMF/Receiver Module</b>	
8.	Insert each DTMF/receiver module (optional) into its assigned location.	Typical installation is shown in Figure 8-2. The number of modules is determined by calculations in 9109-096-180-NA, Engineering Information.

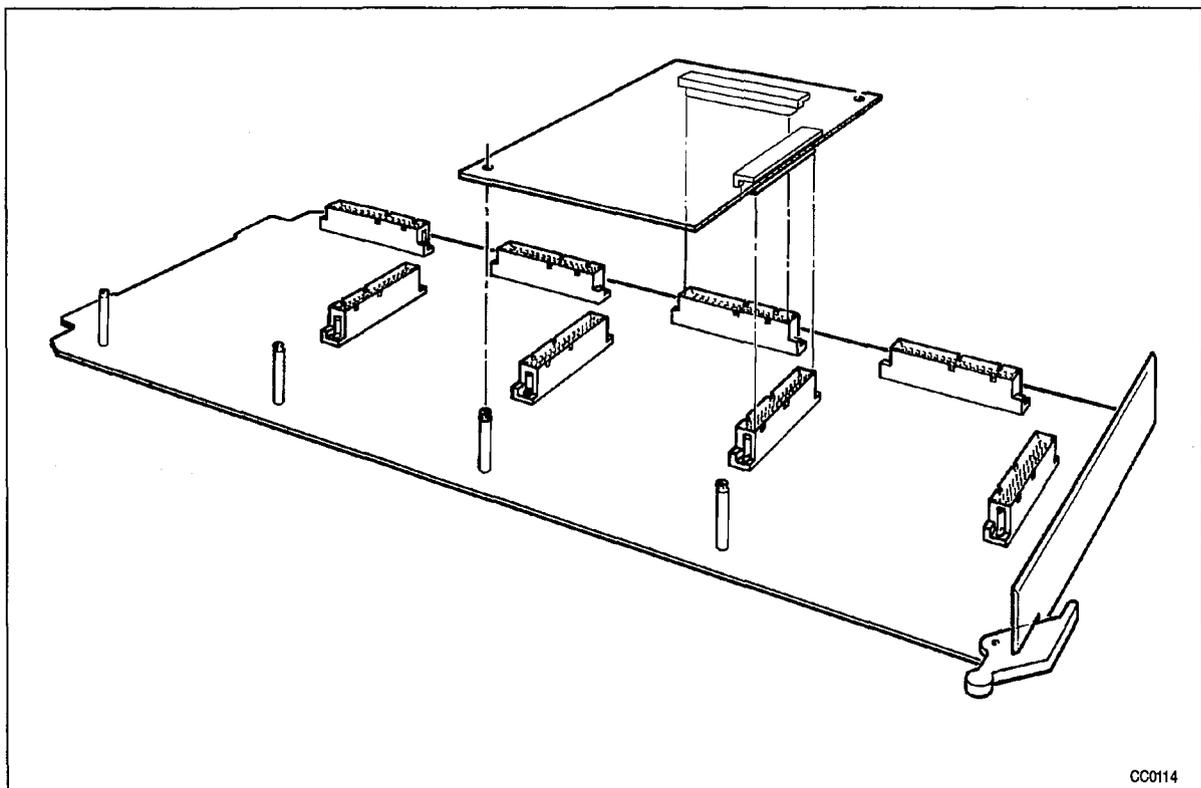
**Chart 8-1 Install Universal Card and Modules  
(continued)**

Step	Action	Comments
		<p>Two relays (not associated with the DTMF receivers) can be used to control system functions such as night bells or alarms. Each relay provides a contact closure across a Tip-Ring pair.</p> <p><b>Ratings:</b> 90 Vrms at 0.1 48 Vdc at 0.5 A</p> <p><b>CAUTION:</b> The relay contact is only used to control the paging amplifier. It may be connected only to a secondary circuit that has no direct connection to a primary circuit, and receives its power from a transformer, converter, or equivalent isolation device situated within the equipment.</p>
9.	<p>Press it until it snaps into its standoffs. Make sure that connectors are properly seated.</p> <p><b>Install Music/Paging Module</b></p>	<p>Module specifications are shown in Table 8-2.</p>
10.	<p>Insert each music/paging module (optional) into its assigned location.</p>	<p>Typical installation is shown in Figure 8-2.</p> <p>Music/paging equipment is:</p> <ul style="list-style-type: none"> <li>- Outside the PABX.</li> <li>- Should be in an environment specified by the suppliers.</li> <li>- Connected to the PABX through the cross-connect field.</li> </ul> <p><b>CAUTION:</b> This relay contact may be connected only to a secondary circuit that has no direct connection to a primary circuit, and receives its power from a transformer, converter, or equivalent isolation device situated within the equipment.</p>
11.	<p>Press it until it snaps into its standoffs. Make sure that connectors are properly seated.</p> <p><b>Install E &amp; M Trunk Module</b></p>	<p>Typical installation is shown in Figure 8-2.</p>
12.	<p>Set the eight DIP switches for the type of trunk in use.</p>	<p>Shown in Table 2-7.</p>
13.	<p>Insert the trunk module (optional) into its assigned location.</p>	<p>Interfaces to Type 1 and Type 5 E&amp;M trunks.</p>

**Chart 8-1 Install Universal Card and Modules  
(continued)**

Step	Action	Comments
14.	Press it until it snaps into its standoffs. Make sure that connectors are properly seated.  <b>Install Universal Card</b>	
15.	Insert the Universal Card into its assigned slot in the card shelf.	A Universal Card can plug into any of the upper peripheral slots in a digital shelf. The card has a square on the faceplate. It can be matched to any slot with a square.  If a night bell is to be installed, the Universal Card must be in peripheral Bay 1 or 2 (in the 336-port configuration) only.
16.	If a console module is not being installed as in step 6., remove the maintenance panel cable from J27 of the backplane.	Applies to 336-port and 672-port configurations only.

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**Figure 8-2 Installation of Module onto Universal Card**

Table 8-2 Music on Hold/Paging Module Specifications		
Music on Hold Input	input impedance	600 ohms
	input level	-6 dBm
Paging Output	output impedance (low)	200 ohms
	output level into 600 ohms	-6 dBm
Relay Contact	maximums	90 Vrms at 0.1 A 48 Vdc at 0.5 A

Table 8-3 E & M Trunk Module Switch Settings								
Function	Switches							
	1	2	3	4	5	6	7	8
<b>PABX to Line Gain</b>								
3 dB	0	X	X	X	X	X	X	X
-13 dB	1	X	X	X	X	X	X	X
<b>Line to PABX Gain</b>								
-4 dB	X	0	X	X	X	X	X	X
-11dB	X	1	X	X	X	X	X	X
<b>Termination</b>								
600 ohm	X	X	1	0	X	X	X	X
Complex	X	X	0	1	X	X	X	X
<b>Transmission</b>								
2-wire	X	X	X	X	1	X	X	X
4-wire	X	X	X	X	0	X	X	X
<b>Signaling</b>								
Type 1	X	X	X	X	X	1	X	X
Type 5	X	X	X	X	X	0	X	X

0 = open, 1 = closed, X = not applicable

## Install Line (ONS, OPS, COV, and Digital) and DID Trunk Cards

8.2 The following chart applies to the ONS, COV, OPS, and Digital Line cards, and the DID Trunk card. When you have completed Chart 8-2:

- The line or trunk card will be unpacked and inspected.
- The line or trunk card will be installed.

- Notes:**
1. The ONS line card interfaces up to 12 standard telephone sets (rotary or DTMF). The ONS line card ports can interface alternate music sources for the Automatic Call Distribution feature. An alternate music source must be either an FCC Part 68- and DOC-approved recorded announcement device connected to an ONS circuit, or another source connected through an FCC Part 68- and DOC-approved voice coupler or voice connecting arrangement to an ONS circuit.
  2. The COV line card provides six interface circuits for either *SUPERSET 3* or *SUPERSET 4* telephones.
  3. The OPS line card contains six off-premises line circuits used for lines going outside the building housing the PABX.
  4. The Digital Line Card is a 12-circuit card that interfaces the PABX to the following peripherals: *SUPERSET 3DN*, *SUPERSET 4DN*, *SUPERSET 401*, *SUPERSET 410*, *SUPERSET 420*, and *SUPERSET 430* telephones, *SUPERCONSOLE 1000™* attendant console, *SUPERSET™ DSS* Module, and the DATASET 1100 and 2100 series of products. See Appendix B for the loop length rules applying to the installation of the above listed peripheral devices.
  5. The DID trunk card interfaces to six one-way direct inward dial circuits.

**WARNING**

Any connection of an ONS, COV, or digital line card to an off-premise application, an out-of-plant application, or to any other exposed plant application, may result in a safety hazard, and/or defective operation, and/or equipment damage.

**Chart 8-2 Install Line or DID Trunk Cards**

Step	Action	Comments
<p>1.</p> <p>2.</p> <p>3.</p> <p>4.</p>	<p><b>Follow General Procedures</b></p> <p>Follow the general procedures for handling circuit cards.</p> <p><b>Unpack and Inspect</b></p> <p>Wearing the antistatic wrist strap, unpack and inspect the line or trunk card.</p> <p>Complete repair tag, repack, and return any damaged or incorrect items.</p> <p><b>Install the Line or Trunk Card</b></p> <p>Slide the line or trunk card into its slot(s).</p> <p>Cards with squares on their faceplates are high-power digital peripheral cards and are installed only in upper slots in the digital peripheral bays. The COV and OPS line cards, and the DID trunk card are high-power digital peripheral cards.</p> <p>Cards with circles on their faceplates are low-power digital peripheral cards and can be installed in any upper or lower slot in a digital peripheral bay. The ONS and Digital line cards are low-power digital peripheral cards.</p>	<p>Given in Chart 5-1 and Chart 5-2.</p> <p><b>336-port Configuration:</b> Up to six COV, OPS, or DID cards can be installed in the control shelf (Bays 1 and 2), and up to four COV, OPS, or DID cards in each digital peripheral bay.</p> <p><b>672-port Configuration:</b> Up to four COV, OPS, or DID cards can be installed in each digital peripheral bay.</p> <p><b>SX-200 FD System:</b> Up to four COV, OPS, or DID cards can be installed in each digital peripheral bay.</p> <p>The Digital Line Card must be installed in an upper (high-power) slot if used with a <i>SUPERCONSOLE 1000</i> attendant console.</p>

## Install an LS/GS Trunk Card

8.3 When you have completed Chart 8-3:

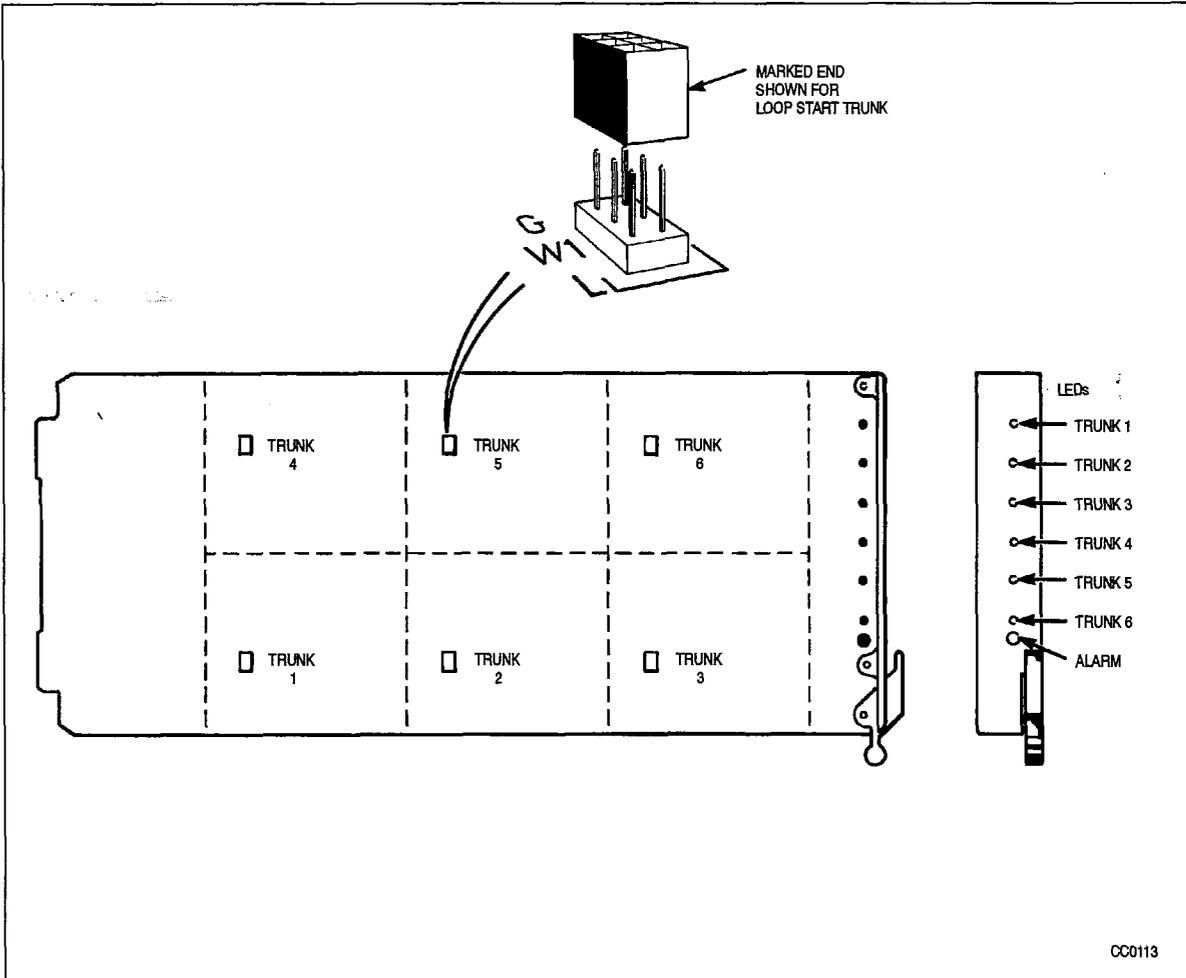
- The loopstart/groundstart (LS/GS) trunk card will be unpacked and inspected.
- The LS/GS trunk card will be installed.

**Note:** The LS/GS trunk card provides interfaces to six central office trunks. Each trunk circuit can operate as a loop start or a ground start.

**Chart 8-3 Install LS/GS Trunk Card**

Step	Action	Comments
	<b>Follow General Procedures</b>	
1.	Follow the general procedures for handling circuit cards.	Given in Chart 5-1 and Chart 5-2.
	<b>Identify Trunk Circuits</b>	
2.	Identify trunk circuits by bay, slot, circuit and type (loopstart or groundstart).	This is available from the configuration information prepared by the customer service representative.
	<b>Unpack and Inspect</b>	
3.	Wearing the antistatic wrist strap, unpack and inspect the LS/GS trunk card(s) and jumpers.	
4.	Complete repair tag, repack, and return any damaged or incorrect items.	
	<b>Set LS/GS Trunk Card Jumpers</b>	
5.	Set the jumpers into position for each of the six trunks on the card. Position the marked end to G for a ground start or L for a loop start trunk.	Shown in Figure 8-3.
	<b>Install LS/GS Trunk Card</b>	
6.	Slide the LS/GS trunk card(s) into its slot(s).	Cards with a circle on their faceplates are low power digital peripheral cards and can be installed in any upper or lower slot in a digital peripheral bay.

# Installation Information



**Figure 8-3 LS/GS Trunk Card**

## Install a T1-DS1 Trunk Card

8.4 When you have completed Chart 8-4:

- The T1-DS1 trunk card will be unpacked and inspected.
- The T1-DS1 trunk card will be installed.
- The T1 adapter card will be installed.
- The T1 trunk adapter cable will be attached.

**Notes:** 1. The T1 -DS1 trunk card interfaces to a single T1 trunk circuit. The system supports one T1-DS1 trunk card per digital bay.

2. The T1 clock module must already be installed on the Main Control Card (see Chart 6-1 and Figure 6-6).

3. The T1 trunk card kit includes:

- T1-DS1 trunk card
- T1 backplane adapter card/assembly
- T1 adapter cable assembly (SX-200 DIGITAL PABX only)
- hardware kit

**Chart 8-4 Install a T1-DS1 Trunk Card**

Step	Action	Comments
	<b>Follow General Procedures</b>	
1.	Follow the general procedures for handling circuit cards.	Given in Chart 5-1 and Chart 5-2.
	<b>Unpack and Inspect</b>	
2.	Wearing the antistatic wrist strap, unpack and inspect the T1 trunk card.	
3.	Complete repair tag, repack, and return any damaged or incorrect items.	
	<b>Set Switches</b>	
4.	Set DIP switches for cable length from the CSU. 0to149ft: S1CLOSED; S2-8OPEN 150to449ft: S2-4CLOSED; S1, S5-8OPEN 450to655ft: S5-7CLOSED; S1-4, S8OPEN	The eight DIP switches set appropriate line equalization for cable lengths up to 200 m (655 ft) from the channel service unit (CSU).  <b>Note:</b> The lengths shown are cable lengths (distance between the digital trunk card and the channel service unit), not loop lengths.

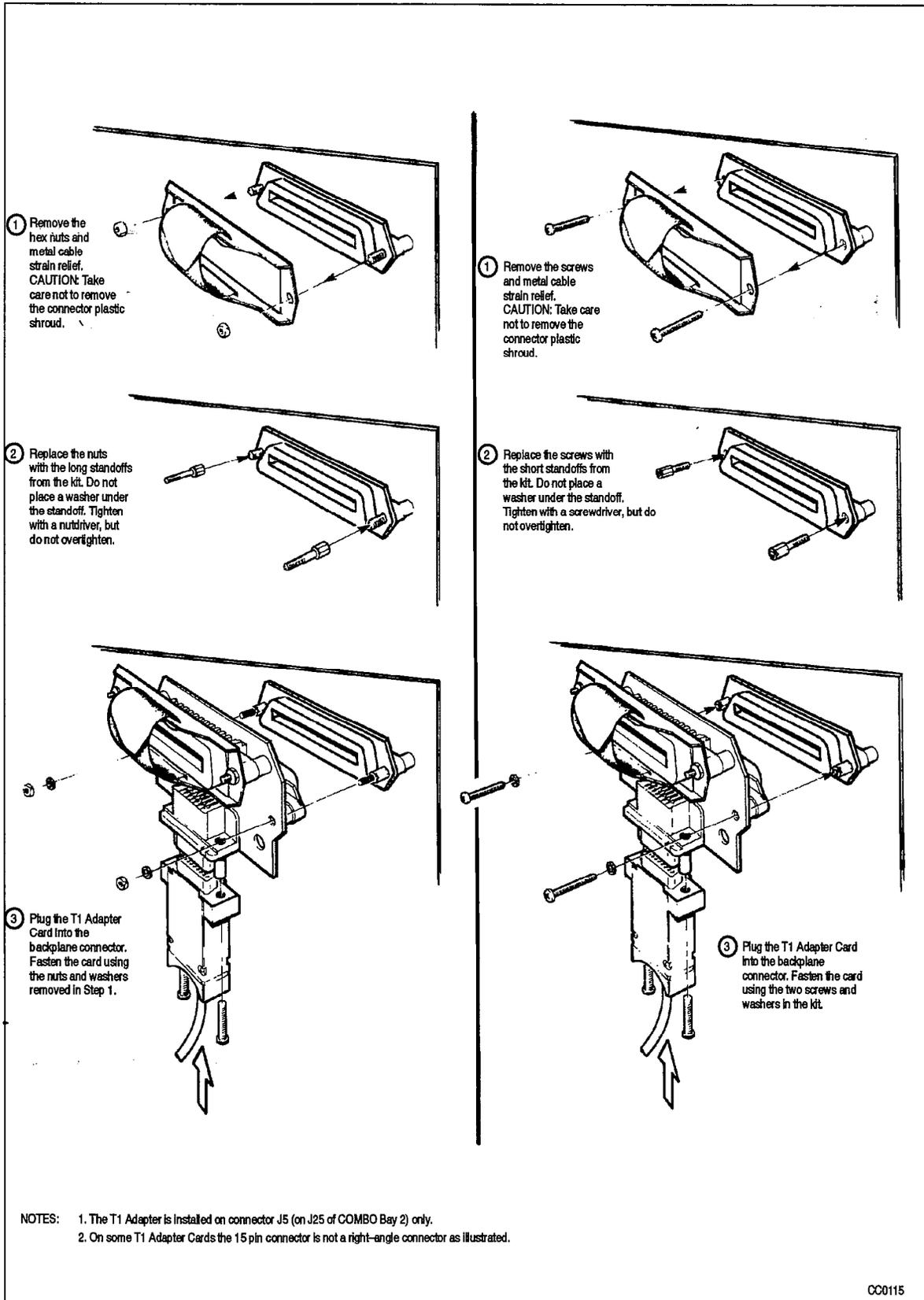
Page 1 of 3

**Chart 8-4 Install a T1-DS1 Trunk Card  
(continued)**

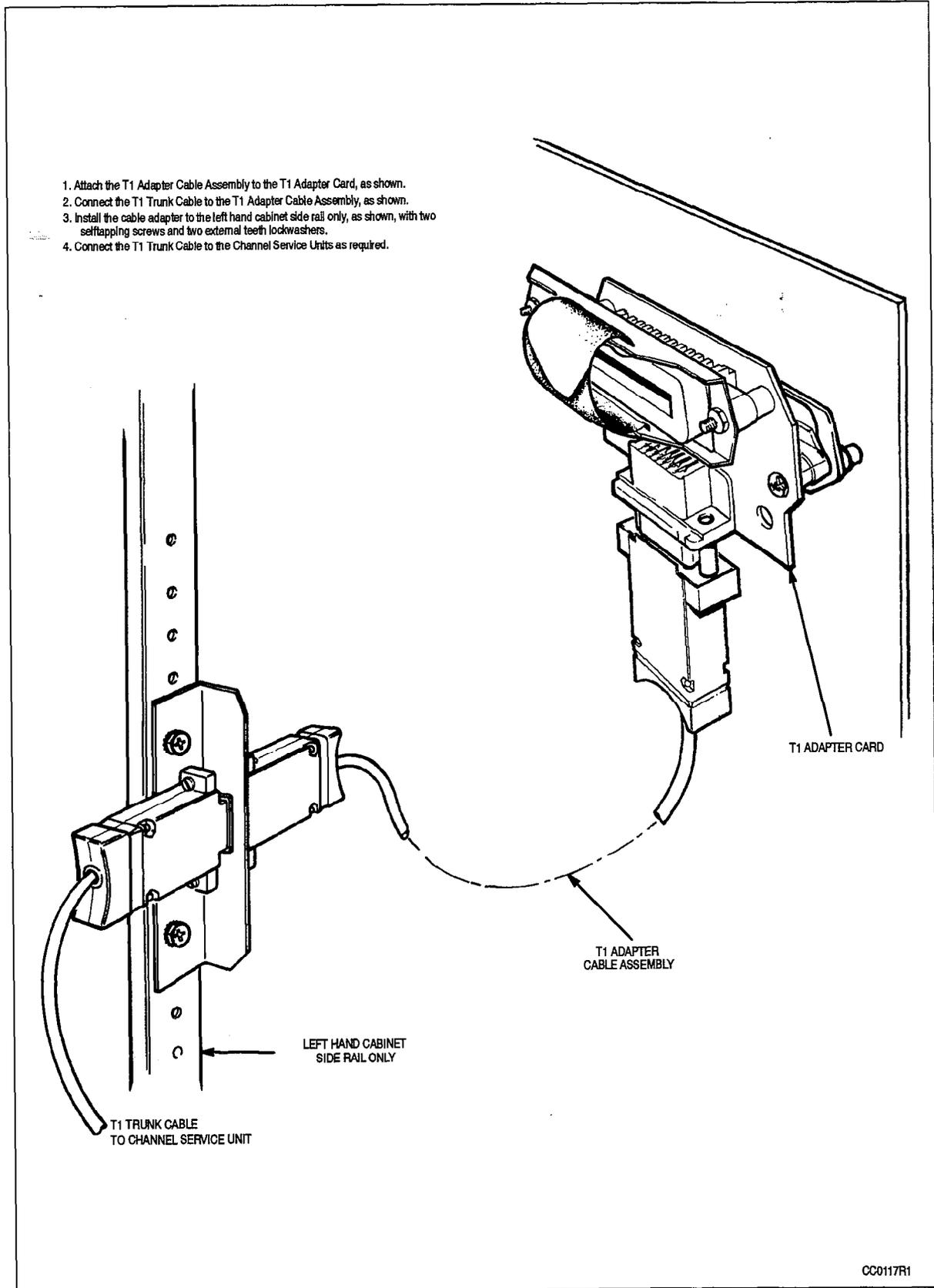
Step	Action	Comments
5.	<p><b>Install T1-DS1 Trunk Card</b></p> <p>Insert the T1-DS1 trunk card into its appropriate slot.</p>	<p><b>336-port Configuration:</b>                      Digital Bay 1: slot 6 only                      Digital Bay 2: slot 4 only                      Digital Bay 3: slot 6 only                      Digital Bay 4: slot 6 only</p> <p><b>672-port Configuration:</b>                      Digital Bays 1 – 7: slot 6 only</p> <p><b>SX-200 FD System:</b>                      Digital Bays 1 – 7: slot 6 only</p> <p>The T1-DS1 trunk card is a high-powered card. There can be only one T1 Trunk card in a bay.</p>
6.	<p>If this is an SX-200 FD system, go to step 18.</p> <p><b>Install T1 Adapter Card</b></p>	<p>Also described in 9109-953-011-NA, Install a T1 Trunk Adapter Card and T1 Adapter Cable Assembly.</p>
7.	<p>At the backplane connector associated with the T1 trunk card slot, remove the hex nuts and the strain relief assembly.</p> <p><b>CAUTION:</b> The plastic connector shroud must not be removed.</p> <p>Shown in Figure 8-4 (on the left side of the figure).</p>	<p><b>336-port Configuration:</b>                      Digital Bay 1, slot 6: Connector J5.                      Digital Bay 2, slot 4: Connector J25                      Digital Bay 3, slot 6: Connector J5                      Digital Bay 4, slot 6: Connector J5</p> <p><b>672-port Configuration:</b>                      Digital Bays 1 – 7, slot 6: Connector J5.</p>
8.	<p>Replace the nuts with the hex-slotted long standoffs that come in the kit with the card. Do not put a washer under the standoff.</p> <p><b>Install T1 Adapter Card – Connector Screws Installed from Card Side of Backplane</b></p>	<p><b>Note:</b> Some older systems had the connector screws installed from the card side of the backplane. The hardware kit contains parts to adapt to this.</p>
9.	<p>At the backplane connector associated with the T1 trunk card slot, remove the screws and the strain relief assembly. Retain the screws for use in step 14.</p> <p><b>CAUTION:</b> The plastic connector shroud must not be removed.</p> <p>Shown in Figure 8-4 (on the right side of the figure).</p>	<p><b>336-port Configuration:</b>                      Digital Bay 1, slot 6: Connector J5.                      Digital Bay 2, slot 4: Connector J25                      Digital Bay 3, slot 6: Connector J5                      Digital Bay 4, slot 6: Connector J5</p> <p><b>672-port Configuration:</b>                      Digital Bays 1 – 7, slot 6: Connector J5.</p>
10.	<p>Replace the screws with the short standoffs from the kit. Do not put a washer under the standoff.</p>	

**Chart 8-4 Install a T1-DS1 Trunk Card  
(continued)**

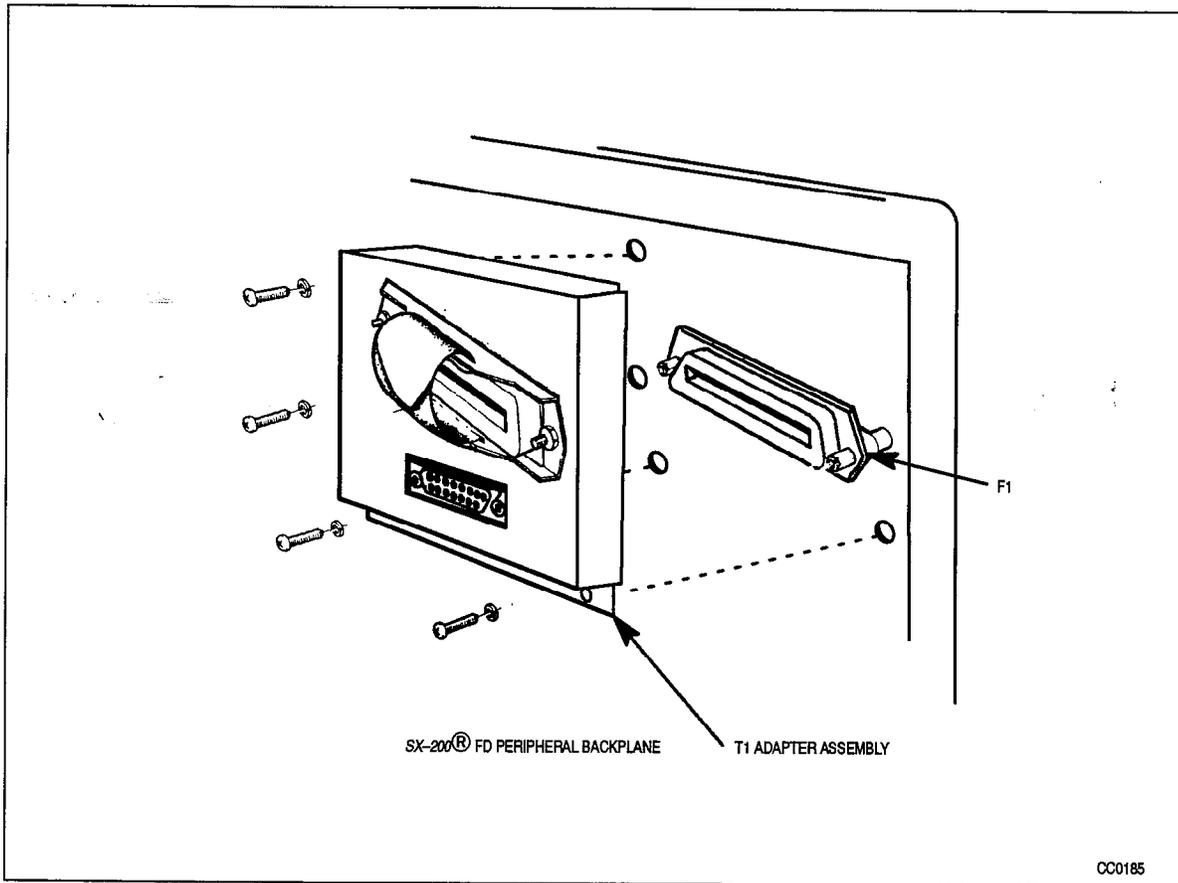
Step	Action	Comments
<b>Plug Adapter Card In</b>		
11.	Tighten the standoffs with a screwdriver until they are firm, but not too tight.	
12.	Plug the T1 adapter card into the backplane connector.	This adapter provides a 15-pin D-Sub connector for the T1 facility, and a 25-pair connector to maintain access to the adjacent odd-numbered card slot.
13.	Fasten the adapter card using the two screws and washers in the kit.	
14.	<i>Connector Screws Originally Installed from Card Side of Backplane:</i> Fasten the card using the screws removed in step 9.	
<b>Attach Adapter Cable</b>		
15.	Attach the T1 trunk adapter cable to the T1 adapter card. Fasten with two screws.	Shown in Figure 8-5.
16.	Fasten the cable adapter bracket to the cabinet left side rail with two self-tapping screws and two external tooth lockwashers.	Shown in Figure 8-5.
17.	Connect the T1 trunk cable from the CSU to the other end of the T1 trunk adapter cable. Installation is now complete for the SX-200 DIGITAL PABX.	The CSU is provided by the telephone company.
<b>Install T1 Adapter Assembly on SX-200 FD System</b>		
18.	At the backplate connector associated with the T1 trunk card, remove the hex nuts and the strain relief assembly from the connector.	Digital Bays 1 - 7, slot 6: Connector J5.
19.	Plug the T1 Adapter Assembly connector into the backplate connector, so that the 4 screw holes on the housing align with holes on the backplate.	Shown in Figure 8-6.
20.	Fasten the T1 Adapter assembly using the 4 screws and washers in the kit, in the 2 metal tabs on the left-hand side of the housing and the metal lip on the bottom side of the housing.	



**Figure 8-4 Installation of a T1 Adapter Card on the SX-200 DIGITAL PABX Backplane**



**Figure 8-5 Installation of T1 Adapter Cable Assembly on the SX-200 DIGITAL PABX**



**Figure 8-6 Installation of T1 Adapter Assembly on the SX-200 FD PABX Peripheral Backplate**

## 9.

## BRING SYSTEM INTO SERVICE

Connect Optical Fiber Cables between *SX-200* FD Nodes

## Fiber Link Specifications

- 9.1. In the *SX-200* FD PABX, 62.5/125 mm glass cable replaces copper PCM cables interconnecting peripheral bays to the control bay. Optical fiber cables allow cabinets to be located up to 1 km apart. Fiber link specifications are listed in Table 9-1.

Table 9-1 Fiber Link Specifications and Requirements	
Maximum Distance (cable length)	1 km
Fiber diameter	62.5/125 mm
Payload	8 x 2 MB links (4 Circuit Switch links + 4 Message links + FIM Maintenance)
Data Rate	16.384 MB
Line Coding	4B5B
Fiber Link Bit Rate	20.48 MB (10.24 MHz)
Transmitter Wavelength	850 nm.
Transmitter Source	LED
Fiber Cable Type	Glass Multi-mode
Connector System	"ST"
Maximum Optical Loss	10 dB (including splices and connections)

The grade or type of cable used must be suitable for the installation (i.e. light or heavy duty, plenum, outdoor, etc). Consult local building codes and your Fiber Cable supplier.

## Fiber Cable Handling Guidelines

The following basic guidelines and precautions for the handling of Fiber Cable and Connectors apply to installation or servicing of the *SX-200* FD system.

- Cleanliness of the Connector Ferrule (or tip) is important for error free transmission. Never touch the tip of a Fiber Connector.
- Always place the Dust Caps onto the connectors and Cables immediately after disconnecting.
- Ferrule Tips on Connectors can be cleaned with ethyl-alcohol.
- Fiber-Optic cables are often more easily installed and pulled than Copper because of their light weight and flexibility. However, care must be taken not to exceed specifications for minimum Bend Radius and maximum Tensile Strength.
- Procedures for the repairing, splicing or assembling of Fiber Cables are available from Fiber component manufacturer's; many of which offer training courses for this purpose.

**Fiber Cable Installation**

When you have completed Chart 9-1, optical fiber cables will be connected between each Peripheral Bay and the Control Node of the SX-200 FD PABX.

**WARNING**

Fiber Optic sources emit infrared light invisible to the human eye which can damage the retina. Never look directly into a source or into the end of a fiber energized by a source.

When working with raw Fiber Optic Cable be careful of fiber ends or slivers that can puncture the skin and cause irritation.

**Chart 9-1 Connect Optical Fiber Cables Between Nodes**

Step	Action	Comments
<b>Connect Cables to Control Node</b>		
1.	Remove the dust caps from the 2 connector ferrules at one end of the optical fiber cable.	Each cable has 2 connectors at each end.
2.	Remove the dust caps from the Transmit (TX) and Receive (RX) connector ferrules on the faceplate of each FIM.	Each FIM has 2 fiber cable connectors and 2 LEDs on the faceplate.
3.	Attach the 2 connectors of one cable to the 2 connectors of one FIM faceplate. Repeat for each installed FIM.	
4.	Run each cable to the location of the Peripheral Bay for which it is intended, following the handling guidelines listed here, and as specified by the cable manufacturer.	
<b>Connect Cables to Peripheral Bays</b>		
5.	Remove the dust caps from the 2 connector ferrules at the Peripheral Bay end of the optical fiber cable.	
6.	Remove the dust caps from the Transmit (TX) and Receive (RX) connector ferrules on the Peripheral Bay backplate.	

**Chart 9-1 Connect Optical Fiber Cables Between Nodes  
(continued)**

Step	Action	Comments
7.	Connect TX fiber cable connector to the RX connector on the lower backplate of the Peripheral Bay, and the RX cable connector to the TX connector on the Peripheral Bay.	<p>With the Control Node powered on, the TX cable may be determined by using an optometer.</p> <p>When the fiber cables are connected correctly, both LEDs on the Control Node faceplate will stay on steadily (not flashing).</p> <p>If the FIM LEDs continue to flash after connecting the cable to the Peripheral Bay, switch the TX and RX connectors on the FIM or the Peripheral Bay.</p> <p>For further information on FIM LED indicators, see Practice 9109-096-350-NA, Troubleshooting.</p>
8.	Repeat steps 5 to 7 for each Peripheral Bay.	

## Connect Cables Between PABX and Cross-Connect Field

9.2 When you have completed Chart 9-2:

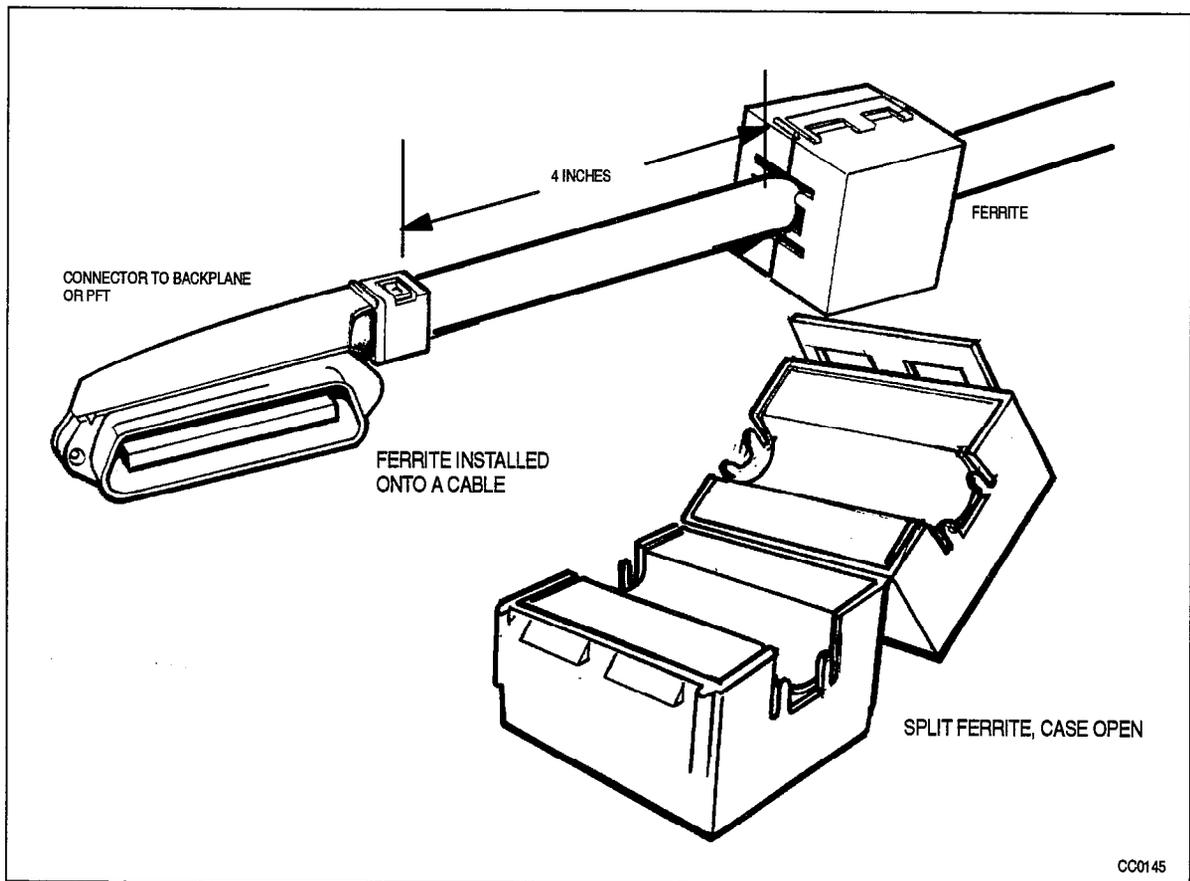
- Connection blocks will be installed.
- Cables will be connected at the connection blocks.
- Cables will be run from the cross-connect field to the cabinet(s).
- Cable connectors will be attached to the cabinet plugs, and the cables will be dressed inside the cabinet(s).
- Cables will be connected at the cross-connect field.

**Chart 9-2 Connect Cables Between PABX and Cross-connect Field**

Step	Action	Comments
	<b>Install Connection Blocks</b>	
1.	Install required connection blocks at cross-connect field.	
	<b>Connect Cables</b>	
2.	Connect 25-pair cables to connection blocks.	Cross-connection tables are shown in Section 11.
3.	Mark each cable connector or plug with its corresponding cabinet plug number.	
	<b>Run Cables</b>	
4.	Run the 25-pair cables between the cross-connect field and the cabinet.	
5.	<b>SX-200 DIGITAL PABX:</b> Route cables through cable duct at rear of cabinet, and position all cables within control cabinet.	
	<b>Attach Cabinet Cable Connectors</b>	
6.	Attach each cable connector to its cabinet plug, and tighten connector retaining screw or strap.	<b>336-port Configuration:</b> Backplane connections are shown in Figure 9-2.
		<b>SX-200 FD PABX:</b> Peripheral cabinet backplate connections are shown in Figure 9-3.
7.	Install split ferrites around each 25-pair cable which exits the system. The ferrites should be located approximately 4 inches from the case of the connector (see Figure 9-1).	The split ferrites supplied consist of two ferrite cores contained in a hinged plastic housing (see Figure 9-1).

**Chart 9-2 Connect Cables Between PABX and Cross-connect Field  
(continued)**

Step	Action	Comments
8.	Dress cables inside cabinet, attach strain reliefs. <b>SX-200 DIGITAL PABX:</b> Pull excess cable through cable duct.  <b>Cross Connect Cables at Cross-connect Field</b>	
9.	Cross connect station lines, CO trunks, other trunks, and equipment to cross-connection blocks for cables from within PABX.	The Tip and Ring assignment tables in Section 11 identify which equipment connects to each pin on the connecting block.



**Figure 9-1 Ferrite Installed onto a Cable**

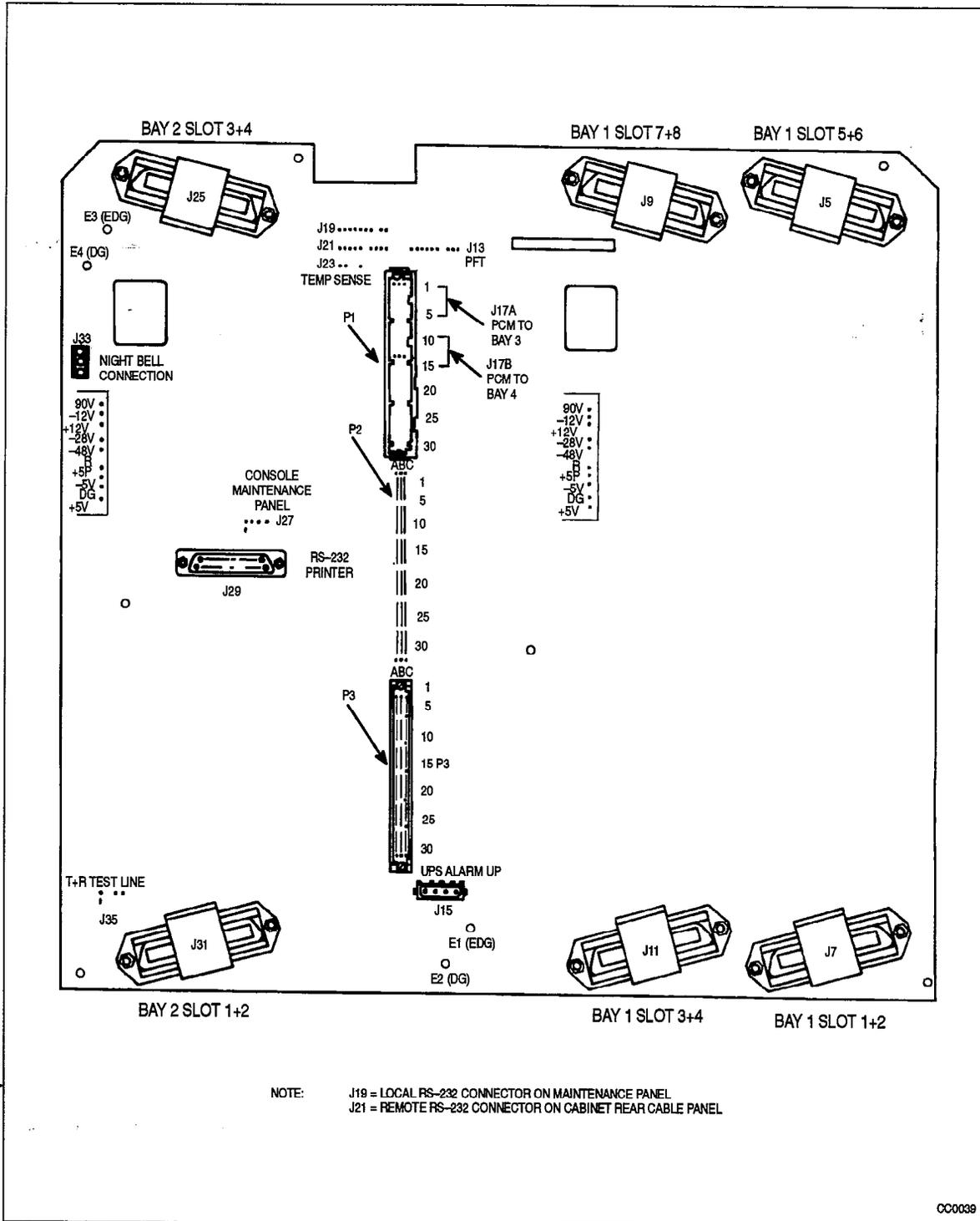
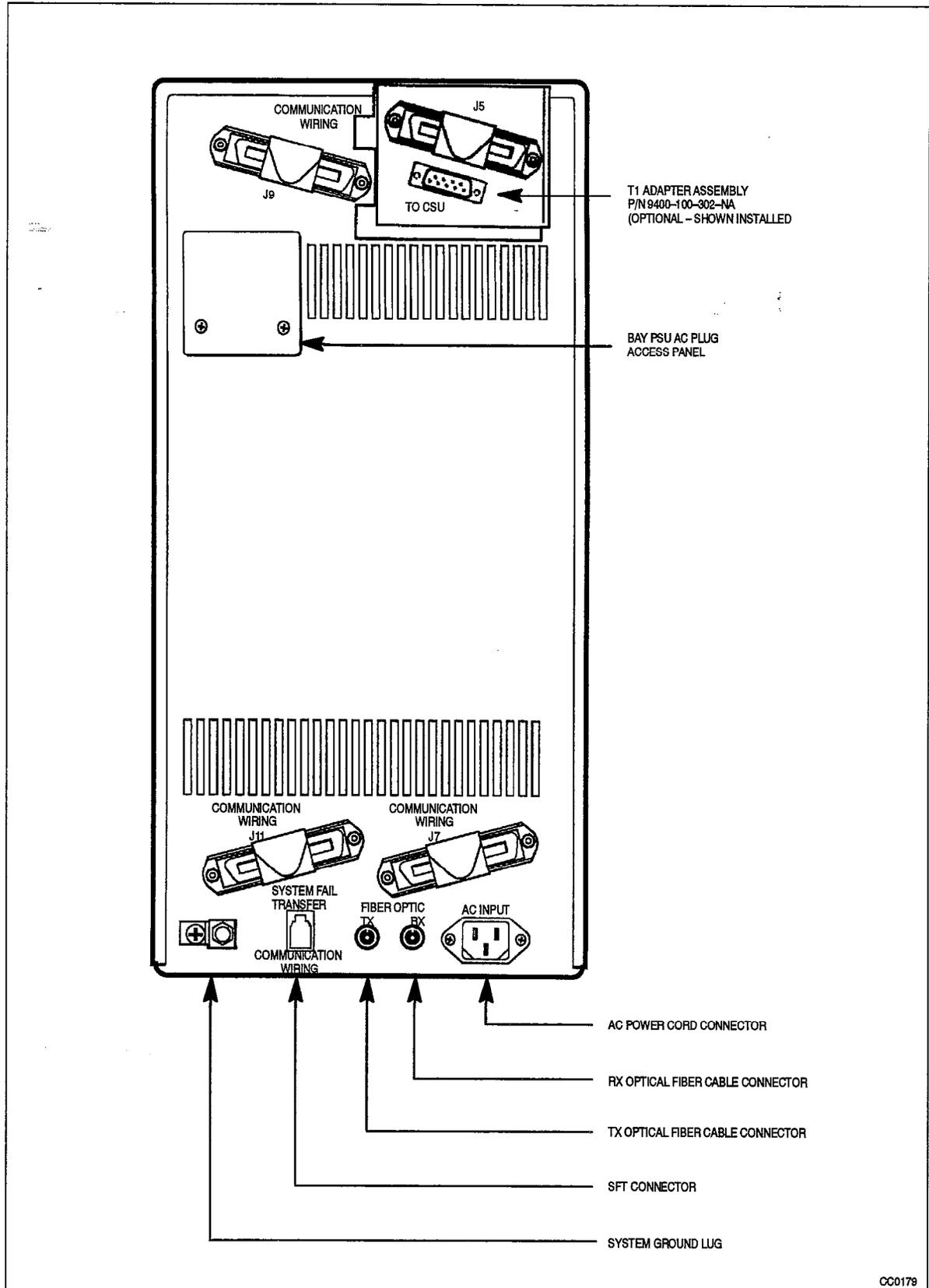


Figure 9-2 SX-200 DIGITAL 336-port Control Shelf Backplane



CC0178

Figure 9-3 SX-200 FD Peripheral Cabinet Backplate

## Power Up Control Cabinet

9.3 When you have completed Chart 9-3:

- The *SX-200* DIGITAL or *SX-200* FD PABX Control cabinet will be turned on.

**WARNING**

***SX-200* DIGITAL PABX:**

The fans in the upper back door of the Control cabinet are high-airflow devices. Loose foreign objects placed near the fans can be pulled into the impellers. Service and installation personnel must keep a safe distance away from the fans to prevent loose clothing or hair from being entangled in the fans. The covers over the fans prevent accidental contact with rotating parts and must always be installed.

***SX-200* FD PABX:**

The fan in the upper backplate of the control node cabinet is a high-airflow device. Loose foreign objects placed near the fan can be entangled in the impeller. Service and installation personnel must keep a safe distance away from the fan to prevent loose clothing or hair from being entangled in the fan.

**Chart 9-3 Power Up Control Cabinet**

Step	Action	Comments
1.	Make sure that all cards are in place and well seated, and that all cables within the cabinets, including optional Uninterruptible Power Supply (UPS), are connected.	<b><i>SX-200</i> FD PABX:</b> It is recommended that a UPS be used with all cabinets (but particularly the Control cabinet) of an <i>SX-200</i> FD system.
2.	Plug the line cord into the ac receptacle.	If the Control cabinet has a UPS, plug the line cord into the UPS, and the UPS line cord into the ac receptacle, according to manufacturer's instructions.
3.	Turn on UPS (if present), and then the main switch on the rear door or backplate of the Control cabinet.	
4.	<b><i>SX-200</i> DIGITAL PABX:</b> Turn Bay Power Supplies on.	

## Power Up Peripheral Cabinet

- 9.4 The *SX-200* DIGITAL PABX 672-port configuration may have a peripheral cabinet as well as a control cabinet. The *SX-200* FD PABX has at least one peripheral cabinet as well as the Control Node. When you have completed Chart 9-4:
- The *SX-200* DIGITAL PABX (672-port configuration) peripheral cabinet will be turned on.
  - The *SX-200* FD PABX peripheral cabinet(s) will be turned on.

**WARNING**
**672-Port Configuration:**

The fans in the upper back door of the peripheral cabinet are high-airflow devices. Loose foreign objects placed near the fans can be pulled into the impellers. Service and installation personnel must keep a safe distance away from the fans to prevent loose parts of clothing or hair from becoming entangled in the fans. The covers over the fans prevent accidental contact with rotating parts and must always be installed.

Chart 9-4 Power Up Peripheral Cabinet

Step	Action	Comments
	<b>Power On Cabinet</b>	
1.	Make sure that all cards are in place and well seated, and that all cables within the cabinet (including optional UPS in the <i>SX-200</i> FD Peripheral Bay) are connected.	
2.	Run the line cord.	
3.	Plug the line cord into the ac receptacle. <b><i>SX-200</i> FD PABX:</b> It is recommended that a UPS be used with all cabinets of an <i>SX-200</i> FD system.	If the Peripheral Bay has a UPS, the line cord should be plugged into the UPS, and the UPS line cord into the ac receptacle, according to manufacturer's instructions.
4.	If this is an <i>SX-200</i> FD PABX, go to step 8 <b><i>SX-200</i> DIGITAL PABX 672-port Configuration:</b>	
5.	Turn on breaker at rear of cabinet.	AC power LED is on.
6.	Turn Bay Power Supplies on.	
7.	Close and lock all cabinet doors. <b><i>SX-200</i> FD PABX:</b>	
8.	Turn on UPS (if present), and then the main switch on the backplate of the peripheral cabinet.	
9.	Open the peripheral bay front door panel, if not already opened.	Given in Chart 3-4.

**Chart 9-4 Power Up Peripheral Cabinet  
(continued)**

Step	Action	Comments
10.	Turn Bay Power Supply on.	
11.	Close the peripheral bay front door panel.	Given in Chart 3-4.
12.	Repeat steps 1 to 11 for each peripheral cabinet.	

**Install Diskettes in Disk Drives on SX-200 DIGITAL PABX**

9.5 When you have completed Chart 9-5:

- Packing material will be removed from the disk drives.
- The diskettes will be installed in the disk drives.

**Note:** An SX-200DIGITAL PABX with Generic 1002, 1003, 1004, or 1005 software has two disk drives (Generic 1001 software requires only 1 drive).

**CAUTION**

**Insert a diskette into the disk drive only when when system power is on.**

**Before using a diskette, acclimatize it for 24 hours in the operating environment.**

**Chart 9-5 Install Diskettes Into Disk Drives on the SX-200 DIGITAL PABX**

Step	Action	Comments
<b>Remove Packing Material</b>		
1.	Unlatch the disk drive(s).	Some disk drive units have a door. Some disk drives have a latch. Others have a button. Shown in Figure 9-4 (for the 5 1/4" disk drive).
2.	Remove the cardboard guard. <b>Install Diskette(s)</b>	The cardboard is installed for shipping.
3.	Make sure the system power is on.	
4.	Make sure diskette has been acclimatized to the operating environment.	
5.	Make sure the LED on the disk drive is off.	There should be no read/write activity in progress on the system.

Chart 9-5 Install Diskettes Into Disk Drives on the SX-200 DIGITAL PABX  
(continued)

Step	Action	Comments	
6.	Handle diskettes properly.	Diskettes should not be touched, paperclipped, bent, squeezed, heated, written on with ballpoint pens, or put near a magnetic field.	
	<b>336-port Configuration:</b>		
7.	Insert diskette A into the Bay 2 disk drive.		
8.	Insert diskette B into the Bay 1 disk drive.		
	<b>672-port Configuration:</b>		
9.	Insert diskette A into Disk Drive A.		
10.	Insert diskette B into Disk Drive B.		
	<b>Both Configurations:</b>		
11.	Close the latch(es) on the drive(s).		Shown in Figure 9-4, for the 5 1/4" disk drive. If this is a 3 1/2" disk drive, there is no latch or door on the drive.
12.	Press the system reset button on the Main Control Card and hold in for at least 3 seconds.		

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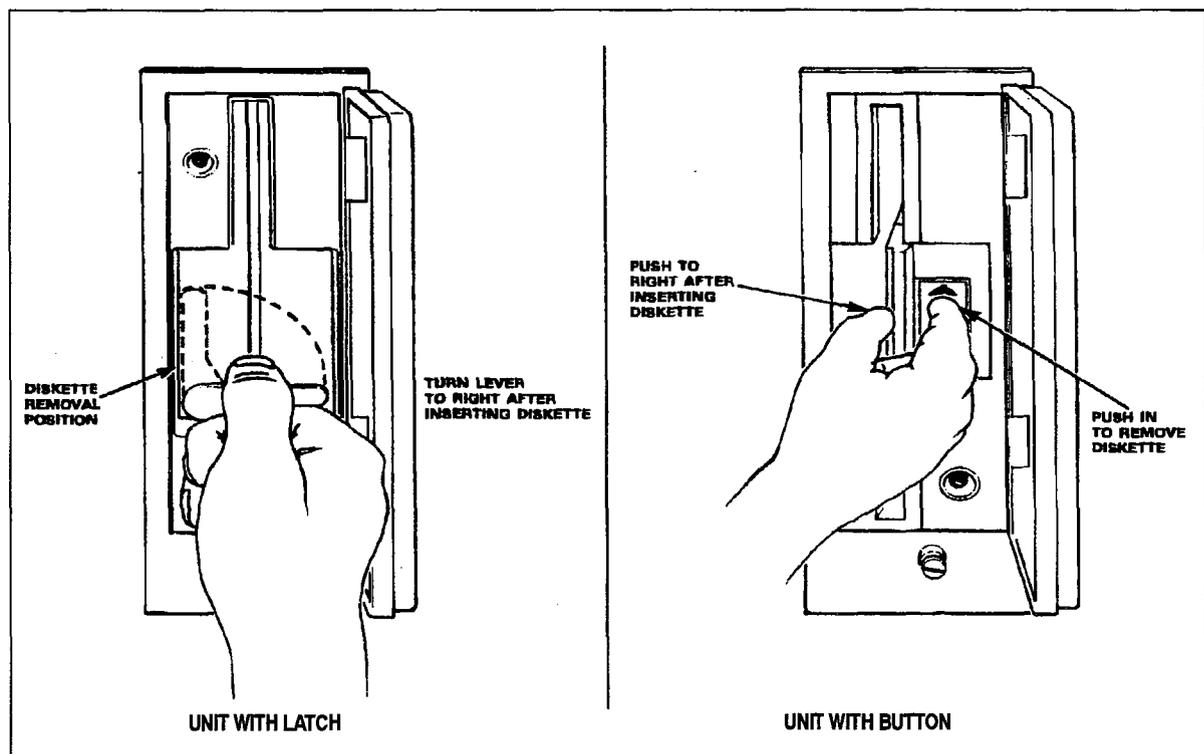


Figure 9-4 5 1/4" Disk Drives in the SX-200 DIGITAL PABX

### Install Diskettes in Disk Drives on the SX-200 FD PABX

9.6 When you have completed Chart 9-6:

- The diskettes will be installed in the disk drives.

**Note:** An SX-200 FD PABX has two disk drives at the top of the Control Node. The front door panel must be removed to access them.

**CAUTION**

**Insert a diskette into the disk drive only when when Control Node power is on.**

**Before using a diskette, acclimatize it for 24 hours in the operating environment.**

**Chart 9-6 Install Diskettes Into Disk Drives on the SX-200 FD PABX**

Step	Action	Comments
<b>Access Control Node Disk Drives</b>		
1.	Open the Control Node front door panel, if not already opened.	Given in Chart 3-4.
2.	Press the button on each disk drive slot to release the latch.	
3.	Remove the cardboard guards from the drive slots.	The cardboard is installed for shipping.
<b>Install Diskettes</b>		
4.	Make sure the cabinet power is on.	
5.	Make sure diskette has been acclimatized to the operating environment.	
6.	Make sure the LED on the disk drive is OFF.	There should be no read/write activity in progress on the system.
7.	Handle diskettes properly.	Diskettes should not be touched, paperclipped, bent, squeezed, heated, written on with ballpoint pens, or put near a magnetic field.
8.	Insert diskette A into the upper disk drive.	
9.	Insert diskette B into the lower disk drive.	
10.	Press the system reset button on the Main Control Card and hold in for at least 3 seconds.	

## Check System Initialization

9.7 When you have completed Chart 9-7:

- Initialization of the SX-200 DIGITAL or SX-200 FD PABX will be complete.

**Chart 9-7 Check System Initialization**

<b>Check Initialization</b>		
1.	Wait for the initialization procedures to complete.	The system goes into self-test mode.
2.	Check the MCC alphanumeric display for a sequence of numbers followed by a "b."	The MCC display shows a series of numbers up to 09. It then begins to load software from the diskette(s). The MCC displays a "b" followed by a "b."
3.	Check the MCC display for a " - - " and a flashing green LED.	When the download is complete and successful, each display on the MCC shows a " - ".
4.	Check the MCC display for a series of numbers.	These are diagnostic tests on programmed card locations, test line, maintenance console.  The bays boot up one at a time. The system checks the position of the bay cards, and the display stops indicating the last bay position checked.
5.	On the SX-200 FD PABX, close the Control Node front door panel.	Given in Chart 3-4.
	<b>Proceed with CDE</b>	Described in 9109-096-210-NA.

## Remove Diskettes from Disk Drives

9.8 When you have completed Chart 9-8:

- The diskettes will be removed from the disk drives.

**Notes:** 1. An SX-200 DIGITAL PABX with Generic 1002, 1003, 1004, or 1005 software has two disk drives (Generic 1001 software requires only 1 drive).

2. An SX-200 FD PABX has two disk drives at the top of the Control Node. The front door panel must be removed to access them.

**CAUTION**

**Make sure there is no read or write activity when you are removing a diskette.**

**Chart 9-8 Remove Diskette from Disk Drive**

Step	Action	Comments
<b>Remove Diskettes</b>		
1.	On the <i>SX-200</i> FD PABX, open the Control Node front door panel, if not already opened.	Given in Chart 3-4.
2.	Make sure system/cabinet power is ON.	
3.	Make sure the LED on the disk drive is off.	There should be no read/write activity in progress on the system.
4.	On the <i>SX-200</i> DIGITAL PABX, open the door of the disk drives (if present).	Not all disk drive units have a door.
5.	On the <i>SX-200</i> DIGITAL PABX, press the reset button on the Main Control Card and hold it for at least 3 seconds.	
6.	Open the latch on each disk drive.	
7.	<p><b>336-port configuration:</b> Remove diskette A from the Bay 2 disk drive, and diskette B from the Bay 1 disk drive.</p> <p><b>672-port configuration:</b> Remove diskette A from Disk Drive A, and diskette B from Disk Drive B.</p> <p><b>SX-200 FD PABX:</b> Remove diskette A from the upper disk drive, and diskette B from the lower disk drive.</p> <p>Remove each diskette by pulling it straight out with your thumb and index finger.</p>	Shown in Figure 9-4.
8.	Insert the diskette into its protective sleeve to prevent damage.	Diskettes should not be touched, paperclipped, bent, squeezed, heated, written on with a ballpoint pen, or put near a magnetic field.
9.	On the <i>SX-200</i> FD PABX, close the Control Node front door panel.	Given in Chart 3-4.

# 10. **INSTALLING PERIPHERAL EQUIPMENT**

## Introduction

### Peripheral Equipment and Applications

- 10.1 Table 10-1 shows the peripheral equipment and applications that can be installed on the *SX-200* DIGITAL PABX. Figure 10-1 shows typical connections for several peripheral devices. Procedures for installation of Attendant Consoles, *SUPERSET* telephones, and datasets are described in practice 9109-096-126-NA, Peripheral Devices.

Table 10-1 Equipment Installed in Variations of the <i>SX-200</i> DIGITAL PABX	
Equipment/Applications	Chart
LCD Attendant Console	Practice 9109-096-126
<i>SUPERCONSOLE 1000</i> Attendant Console	Practice 9109-096-126
Install a <i>SUPERSET™</i> DSS Module	Practice 9109-096-126
LCD Console installed as a maintenance console	Chart 10-3
<i>SUPERCONSOLE 1000</i> installed as a maintenance console	Chart 10-4
Local maintenance terminal	Chart 10-1
Remote maintenance terminal	Chart 10-2
System printer	Chart 10-5
Modem pooling: rack-mounted DATASET 2102	Practice 9109-096-126
Modem pooling: DATASET 2103 Standalone	Practice 9109-096-126
<i>SUPERSET</i> telephones	Practice 9109-096-126
Call Announce Port on <i>SUPERSET 4</i> telephone	Chart 10-6
Night Bell (direct connect)	Chart 10-7
Night Bell (auxiliary relay)	Chart 10-8
Paging equipment	Chart 10-9
Music on hold equipment	Chart 10-10
Alternate music source – Automatic Call Distribution only	Chart 10-11

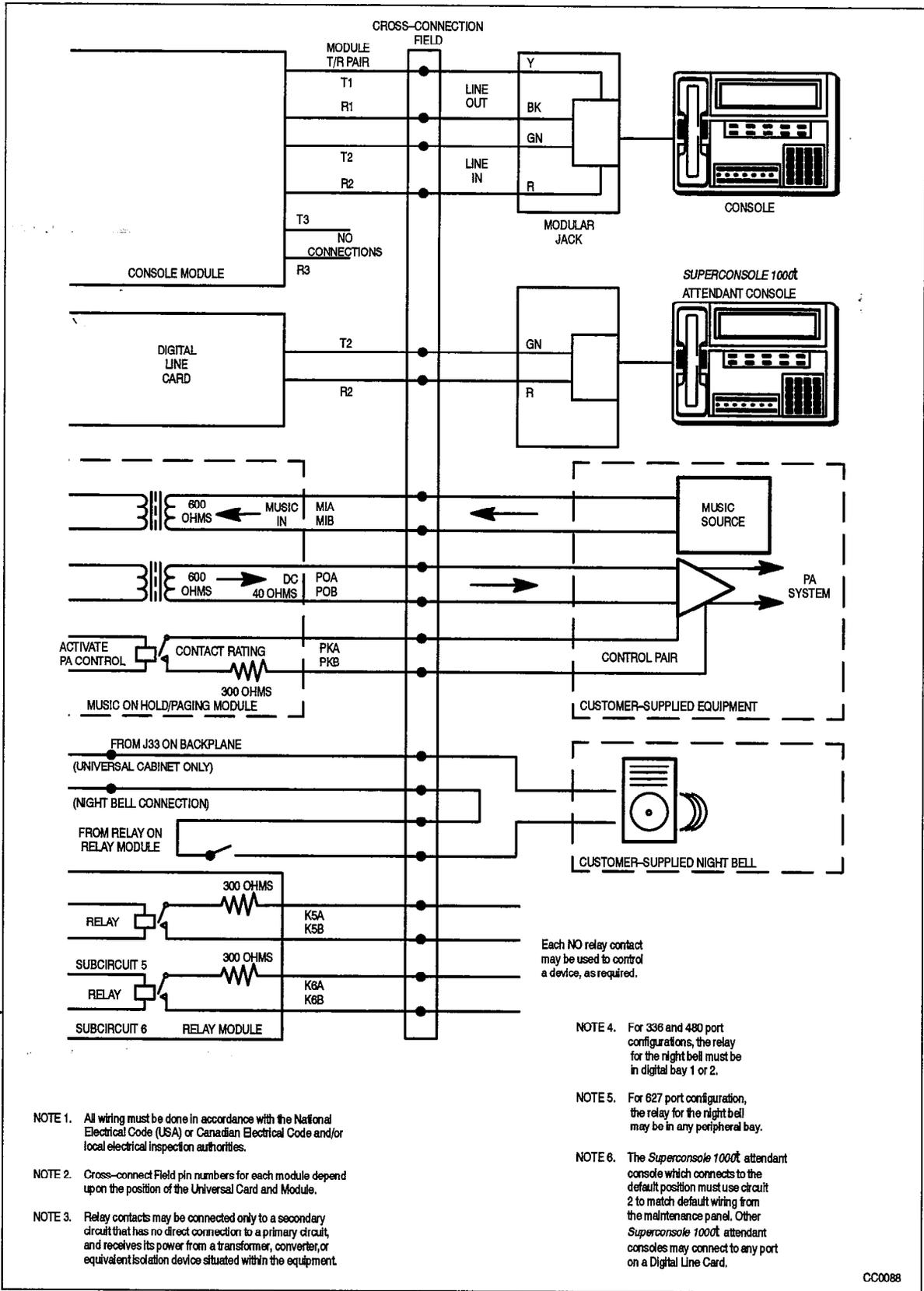


Figure 10-1 Music, Relay, and Paging Connections on the SX-200 DIGITAL PABX

### MITEL Peripheral Equipment

Table 10-2 lists the part numbers for MITEL peripheral equipment discussed in this Section. This equipment applies to 336-port, 456-port, 672-port and SX-200 FD configurations. A full list of MITEL peripherals can be found in Practice 9109-096-355-NA, Field-Replaceable Units.

Table 10-2 MITEL Peripheral Equipment	
Equipment	Part Number
LCD Attendant Console	9108-007-001-NA
<i>SUPERCONSOLE 1000</i> Attendant Console	9189-000-001-NA
<i>SUPERSET 3DN</i> Telephone	9183-000-200-NA
<i>SUPERSET 4DN</i> Telephone	9184-000-200-NA
<i>SUPERSET 401</i> Telephone (single unit)	9113-000-000-NA
<i>SUPERSET 401</i> Telephone (box of 6 units)	9113-000-060-NA
<i>SUPERSET 410</i> Telephone	9114-000-000-NA
<i>SUPERSET 420</i> Telephone	9115-000-000-NA
<i>SUPERSET 430</i> Telephone	9116-000-001-NA

Details on other MITEL peripheral equipment are found in practice 9109-096-126-NA.

## Install A Maintenance Terminal

### Install a Local Maintenance Terminal

10.2 When you have completed Chart 10-1:

- The *VT100*<sup>™</sup>, or equivalent, terminal will be unpacked and inspected.
- The *VT100* terminal will be installed.
- Permanently connected cable will be routed through the cabinet.
- The terminal will be powered up.

- Notes:**
1. On the SX-200 DIGITAL PABX, a maintenance terminal can be connected either to the local port, or to the remote port making use of a modem. Both cannot be connected at one time.
  2. On the SX-200 FD PABX, a maintenance terminal can be connected to the local port on the Control Node backplate, or to the remote port on the Peripheral FIM Carrier in the peripheral bay.
  3. The RS-232 maintenance terminal is described in Practice 9109-096-351-NA, RS-232 Maintenance Terminal.

**Chart 10-1 Install a Local Maintenance terminal**

Step	Action	Comments
<b>Inventory, Unpack, Inspect</b>		
1.	Check off received items against packing list and equipment list, above.	
2.	Unpack cartons.	
3.	Tag defective items.	
4.	Fill in relevant portion of damage report.	
5.	Repack tagged items and return according to local procedures.	
<b>Position Terminal</b>		
6.	Put the terminal in its assigned position.	Maximum cable length is 15 m (50 ft) without a modem. Positioning is shown in Figure 10-4.
<b>Connect to an SX-200 DIGITAL PABX</b>		
7.	Run an RS-232 cable between the terminal and the local (maintenance) port on the maintenance panel.	A flat ribbon cable should be used if the cable is to be permanently connected, to allow the door to close.
8.	Set the maintenance port selection switch at the right of the maintenance panel to TERMINAL (DTE).	The local (DTE or data terminal equipment) port is designed to interface with a terminal. Pin assignments are shown in Table 10-3.
<b>Connect to an SX-200 FD PABX</b>		
9.	<p>Connect the other end of the 25-pin RS-232 maintenance terminal cable to a 25-to-9 pin RS-232 adapter arrangement (connector adapter or cable adapter). Then connect the adapter arrangement to the maintenance port on the node.</p> <p><b>Note:</b> A maintenance terminal may be connected to any node of the system. However, the Peripheral Cabinet maintenance port is a service-only port. No cable should be left connected to this port. It can only be used at time of service.</p>	<p>The maintenance port on the Control Node is located on the lower backplate; the maintenance port on the Peripheral Node is located on the upper front edge of the Peripheral FIM Carrier, attached to the Bay Control Card.</p> <p>See Figure 10-3 and Figure 10-2.</p>
<b>Set Up Terminal Data Characteristics</b>		
10.	Set up the terminal data characteristics.	<p>8 data bits                      1 start bit                      1 stop bit                      no parity                      300-9600 baud</p>

**Chart 10-1 Install a Local Maintenance terminal  
(continued)**

Step	Action	Comments
11.	<p><b>Route Cable</b></p> <p><b>On the SX-200 DIGITAL PABX:</b> <i>If the cable is permanently connected, route it between the maintenance panel and the peripheral shelf to the back of the control cabinet, and out of the cabinet with the connectorized cables.</i></p> <p><b>On the SX-200 FD PABX:</b> In general, only a Maintenance terminal connected to the Control Node should be permanently cabled. No special cable routing is necessary.</p>	Only one maintenance session may be conducted at any one time.
12.	<p><b>Power Up</b></p> <p>Plug in the terminal, and turn it on.</p>	

Page 2 of 2

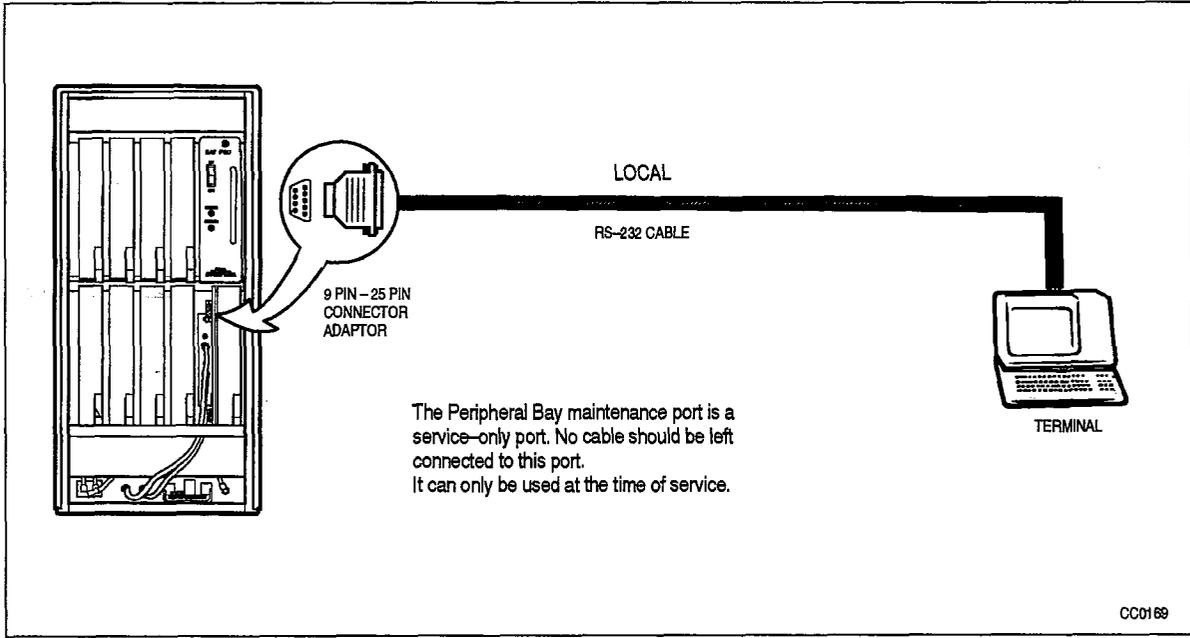
**Table 10-3 Maintenance Panel RS-232 Connector Pins at DTE Port**

SX-200 DIGITAL RS-232 Pin	SX-200 FD RS-232 Pin <sup>1</sup> .	RS-232 Signal	Local DTE Port
2	3	TRANSMIT DATA	from terminal
3	2	RECEIVE DATA	to terminal
4	7	REQUEST TO SEND	from terminal
5	8	CLEAR TO SEND	to terminal
6 <sup>2</sup> .	6	DATA SET READY	to terminal
7	5	SIGNAL GROUND	
8 <sup>1</sup> .	14.	CARRIER DETECT	to terminal
20 <sup>2</sup> , 3.	4 <sup>4</sup> .	DATA TERMINAL READY	from terminal

**Notes:** 1. In the SX-200 FD PABX, the DTE ports are located on the Control Node backplate and on the Peripheral FIM Carrier in the peripheral bay. There is no maintenance panel.

2. J5 DTE pins 6, 8, and 20 are tied together
3. DTE pin 20 and DCE pin 5 are tied together
4. DTE pins 1 and 4 are tied together

Installation Information



**Figure 10-2 Maintenance Terminal Connection – SX-200 FD Peripheral Bay**

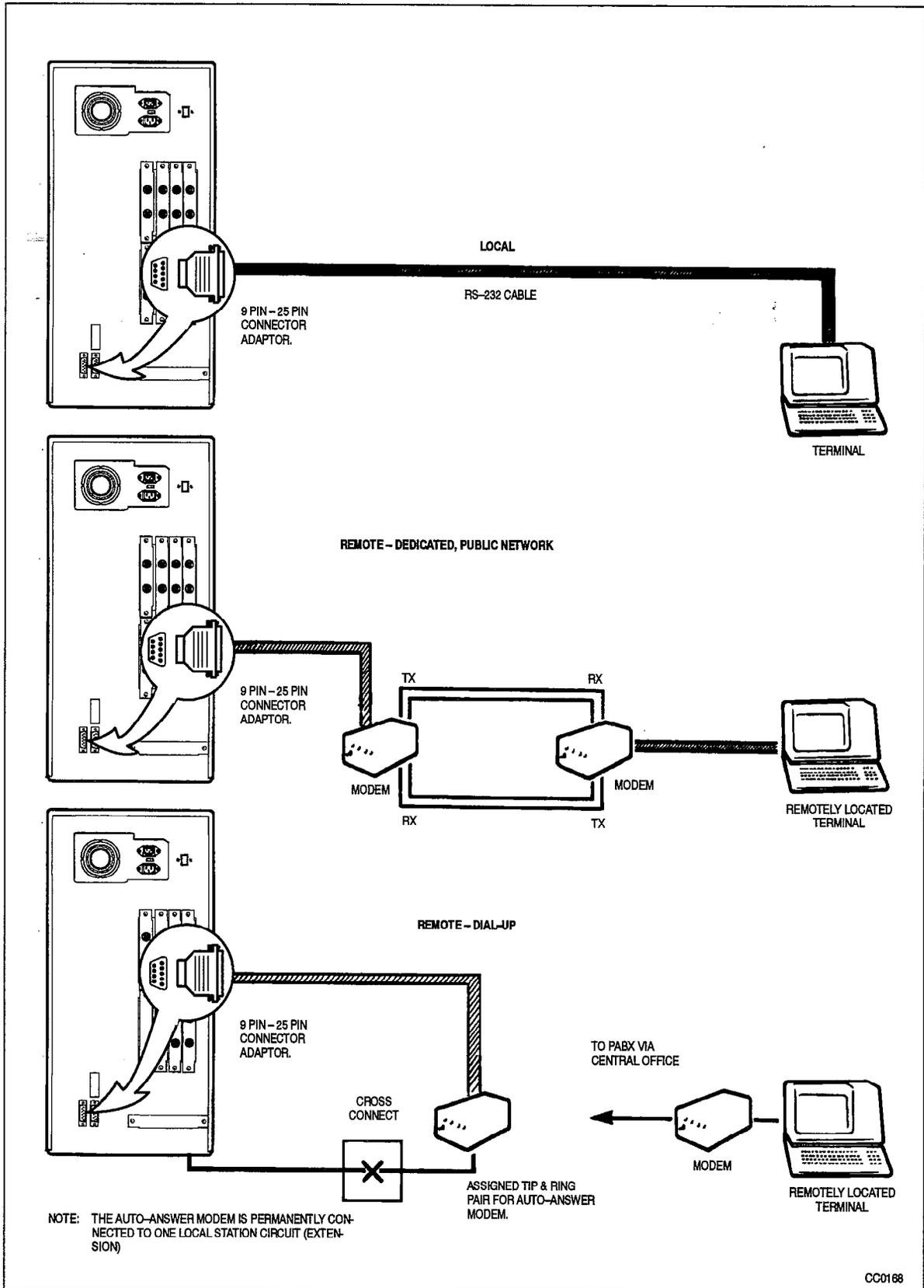


Figure 10-3 Maintenance Terminal Connections - SX-200 FD Control Node

### Install a Remote Maintenance Terminal

When you have completed Chart 10-2:

- The *VT100*, or equivalent, terminal will be unpacked and inspected.
- The modems will be unpacked and inspected.
- The *VT100* terminal and modems will be installed.

- Notes:**
1. On the *SX-200* DIGITAL PABX, a maintenance terminal can be connected either to the local port, or to the remote port with the use of a modem. Both cannot be connected at one time.
  2. A remote maintenance terminal is a means to perform maintenance checks (logs and alarms), and customer data entry, without visiting the customer site.
  3. There are two methods of connecting a remote terminal; by dialing up to an auto-answer modem connected to a dedicated network trunk (direct access), or to an autoanswer modem connected to an ONS port (dial-up access) on an as-required basis. Refer to Figure 10-4.
  4. The RS-232 maintenance terminal is described in Practice 9109-096-351-NA, RS-232 Maintenance Terminal.
  5. On the *SX-200* FD PABX, a maintenance terminal can be connected either to the Control Node port, or to the peripheral bay remote port. Both should not be connected at the same time. A modem cannot be connected to a peripheral cabinet maintenance port. See Figure 10-2 and Figure 10-3.

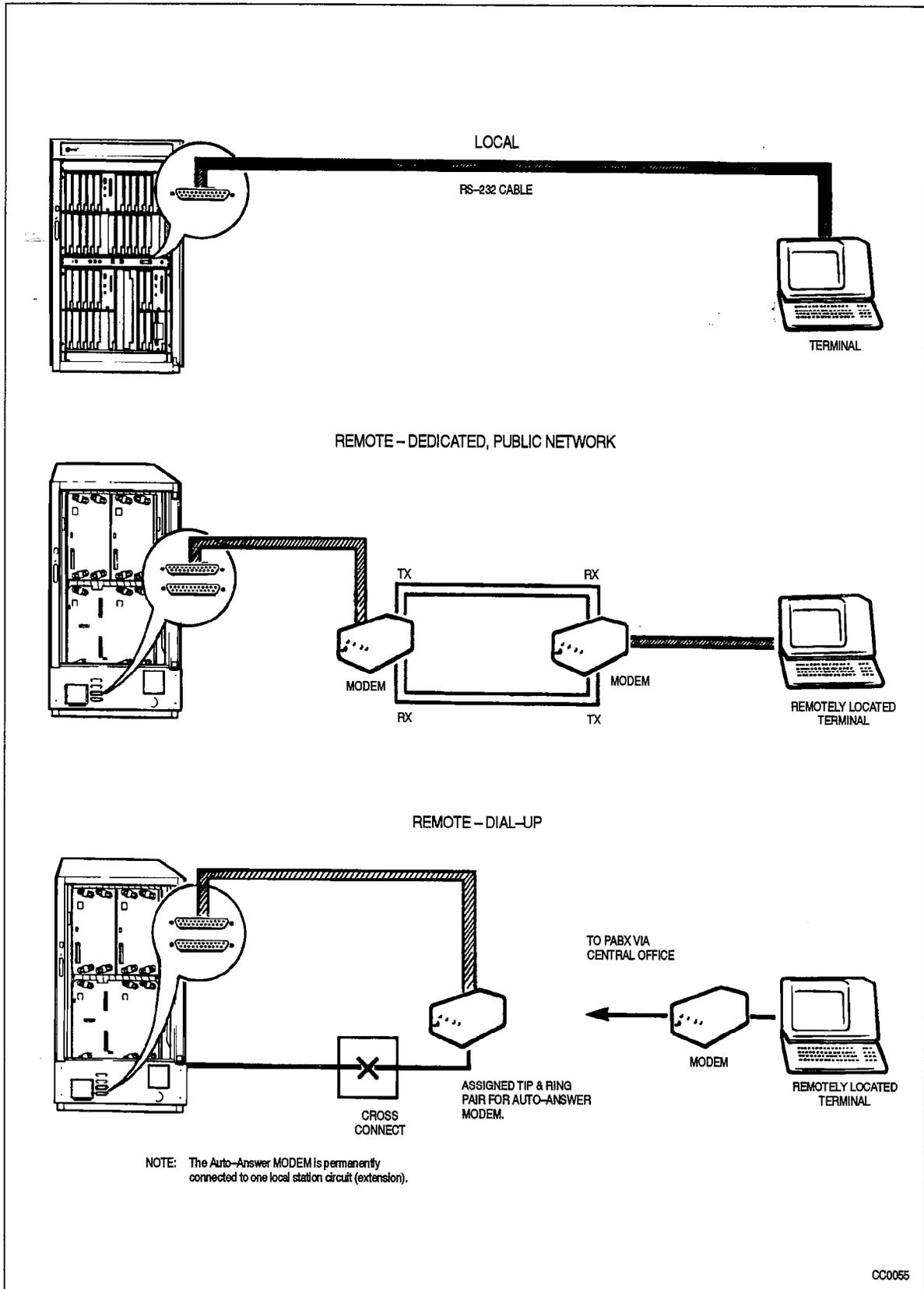


Figure 10-4 Maintenance Terminal Connections – SX-200 DIGITAL Control Cabinet

**Chart 10-2 Install a Remote Maintenance Terminal**

Step	Action	Comments
<b>Inventory, Unpack, Inspect</b>		
1.	Check off received items against packing list and equipment list, above.	
2.	Unpack cartons.	
3.	Tag defective items.	
4.	Fill in relevant portion of damage report.	
5.	Repack tagged items and return according to local procedures.	
<b>Install the Modem</b>		
6.	Set up the modem data characteristics.	8 data bits 1 start bit 1 stop bit no parity 300-9600 baud
7.	<p><b>SX-200 DIGITAL PABX:</b> Connect the modem to the remote port on the power distribution panel on the rear of the cabinet using an RS-232 cable.</p> <p><b>SX-200 FD PABX:</b> Connect the modem to a 25-to-9 pin RS-232 adapter arrangement (connector adapter or cable adapter). Then connect the adapter arrangement to the maintenance port on the Control Node backplate.</p>	<p>The remote (DCE or data communication equipment) port is designed to interface with a modem. Pin assignments are shown in Table 10-4.</p> <p><b>Note:</b> A modem cannot be connected to the remote maintenance port on the Peripheral FIM Carrier in the peripheral bay.</p>
8.	Connect the Tip/Ring pair of the modem to the dedicated trunk, or to the ONS port.	
9.	Set the maintenance port selection switch at the right of the maintenance panel to MODEM (DCE).	<b>Note:</b> A terminal can not be connected directly to the remote connector on the SX-200 DIGITAL PABX.

Table 10-4 Maintenance Panel RS-232 Connector Pins at DCE Port

RS-232 Pin	RS-232 Signal	Remote DCE Port
2	TRANSMIT DATA	to modem
3	RECEIVE DATA	from modem
4	REQUEST TO SEND	to modem
5*	CLEAR TO SEND	from modem
6	DATA SET READY	from modem
7	SIGNAL GROUND	
8	CARRIER DETECT	from modem

Note: \* DCE pin 5 and DTE pin 20 are tied together

**Install an LCD Console as a Maintenance Console**

When you have completed Chart 10-3:

- The LCD Attendant Console will be connected to the system as a Maintenance Console.

**Notes:** 1. **336-, 456-port configurations:** The console jack on the maintenance panel provides a connecting point for the maintenance console. To allow access to this console jack with an LCD console, a universal card is required in bay 2 slot 3 with a console module in circuit 1 position. The default database provided for the system shows a universal card in this position. Circuit 1 of the card is programmed as a console module.

**672-port configuration:** The console jack on the maintenance panel provides a connecting point for the maintenance console. To allow access to this console jack with an LCD console, a universal card is required in bay 1 slot 5 with a console module in circuit 1 position. The default database provided for the system shows a universal card in this position. Circuit 1 of the card is programmed as a console module.

2. **SX-200 FD system:** Any LCD console installed in the default manner (see Practice 9109-096-126-NA, Peripheral Devices) can be used as a maintenance terminal. There is no console jack on the SX-200 FD system Control or Peripheral cabinets.

**Chart 10-3 Install an LCD Console as a Maintenance Console**

Step	Action	Comments
1.	<p><b>Connect Console</b></p> <p><i>336-, 456-port configurations:</i> Connect the console to the maintenance console jack on the maintenance panel on the front of the control cabinet.</p> <p><i>672-port configuration:</i> Connect the console to the maintenance console jack on the maintenance panel on the front of the 672-port control cabinet.</p>	<p><i>336-, 456-port configurations:</i> Bay 2, slot 3 must have a universal card installed.</p> <p><i>672-port configuration:</i> Bay 1, slot 5 must have a universal card installed.</p>

### Install a *SUPERCONSOLE 1000* Attendant Console as a Maintenance Console

When you have completed Chart 10-4:

- A *SUPERCONSOLE 1000* Attendant Console will be installed as a maintenance console.
- A printer will be connected to it (optional).

**Notes:** 1. **336-, 456-port Configurations:** The Tip/Ring (green/red) pair of the console jack on the maintenance panel is connected to position bay 2, slot 3, circuit 2 of the control cabinet. To allow access to this console jack with a *SUPERCONSOLE 1000* Attendant Console, a digital line card is required in bay 2 slot 3. The default database provided for the system must be modified to show a digital line card in this position (the default universal card and modules programming must be replaced by "digital line card"). Circuit 2 of the card must be programmed as a console.

**672-port Configuration:** The Tip/Ring (green/red) pair of the console jack on the maintenance panel is connected to position bay 1, slot 5, circuit 2 of the control cabinet. To allow access to this console jack with a *SUPERCONSOLE 1000* Attendant Console, a digital line card is required in bay 1 slot 5. The default database provided for the system must be modified to show a digital line card in this position (the default universal card and modules programming must be replaced by "digital line card"). Circuit 2 of the card must be programmed as a console.

2. **SX-200 FD System:** Any *SUPERCONSOLE 1000* Attendant Console installed in the default manner (see Practice 9109-096-126-NA, Peripheral Devices) can be used as a maintenance terminal. There is no console jack on the *SX-200* FD system Control or Peripheral cabinets.

**Chart 10-4 Install a *SUPERCONSOLE 1000* Attendant Console as a Maintenance Console**

Step	Action	Comments
1.	<p><b>Connect Console</b></p> <p><i>336-, 456-port configurations:</i> Connect the console to the maintenance console jack on the maintenance panel on the front of the control cabinet.</p> <p><i>672-port configuration:</i> Connect the console to the maintenance console jack on the maintenance panel on the front of the 672-port system control cabinet.</p>	<p><i>336-, 456-port configurations:</i> Bay 2, slot 3 must have a digital line card installed. CDE must be modified accordingly.</p> <p><i>672-port configuration:</i> Bay 1, slot 5 must have a digital line card installed. CDE must be modified accordingly.</p>

Page 1 of 2

**Chart 10-4 Install a *SUPERCONSOLE 1000* Attendant Console as a Maintenance Console  
(continued)**

Step	Action	Comments																				
2.	<p><b>Connect Printer (Optional)</b></p> <p>Connect the printer to the RS-232 printer connector on the back of the console.</p>	<table border="0"> <tr> <td><b>Pin</b></td> <td><b>Signal</b></td> </tr> <tr> <td>1</td> <td>frame ground</td> </tr> <tr> <td>2</td> <td>transmit data</td> </tr> <tr> <td>3</td> <td>receive data</td> </tr> <tr> <td>4</td> <td>ready to send</td> </tr> <tr> <td>5</td> <td>clear to send</td> </tr> <tr> <td>6</td> <td>data set ready</td> </tr> <tr> <td>7</td> <td>signal ground</td> </tr> <tr> <td>8</td> <td>carrier detect</td> </tr> <tr> <td>20</td> <td>data terminal ready</td> </tr> </table> <p>Maximum 50 ft between the printer and the printer port on the <i>SUPERCONSOLE 1000</i> Attendant Console .</p>	<b>Pin</b>	<b>Signal</b>	1	frame ground	2	transmit data	3	receive data	4	ready to send	5	clear to send	6	data set ready	7	signal ground	8	carrier detect	20	data terminal ready
<b>Pin</b>	<b>Signal</b>																					
1	frame ground																					
2	transmit data																					
3	receive data																					
4	ready to send																					
5	clear to send																					
6	data set ready																					
7	signal ground																					
8	carrier detect																					
20	data terminal ready																					
3.	Set the printer baud rate.	Maximum baud rate is 2400 baud.																				

## Install a System Printer

10.3 When you have completed Chart 10-5:

- The system printer will be connected to the control cabinet.
- The system printer will be powered up.

**Chart 10-5 Install a System Printer**

Step	Action	Comments
	<b>Connect System Printer</b>	
1.	Connect one end of a standard 25-pin RS-232 cable to the RS-232 port of the printer (or similar output device).	
2.	<b>SX-200 DIGITAL PABX:</b> Connect the other end of the 25-pin RS-232 cable to the system printer port on the power distribution panel at the rear of the control cabinet (socket J29 on the backplane of bay 2). <b>SX-200 FD PABX:</b> Connect the other end of the 25-pin RS-232 cable to a 25-to-9 pin S-232 adapter arrangement (connector adapter or cable adapter). Then connect the adapter arrangement to the printer port (J11) located on the lower backplate of the Control Node.	J8 printer pins 6, 8, and 20 are tied together.
3.	Set up the printer data characteristics.	8 data bits 1 start bit 1 stop bit no parity 300-9600 baud (system default baud rate is 1200 baud)
	<b>Power Up</b>	
4.	Plug in the printer and turn it on.	

**Table 10-5 SX-200 FD Printer Port Pinout**

RS-232 Pin	RS-232 Signal	Printer Port
2	RECEIVE DATA	to printer
3	TRANSMIT DATA	from printer
5	SIGNAL GROUND	
7	REQUEST TO SEND	from printer
8	CLEAR TO SEND	to printer

## Install Call Announce Port on a *SUPERSET 4* Telephone

10.4 When you have completed Chart 10–6:

- Class of service (COS) options ( executive busy override and override announce) will be enabled for the telephones that are able to access the Call Announce Port.

**Notes:** 1. The Call Announce Port of the *SUPERSET 4* telephone connects to an OPS digital line card, a COV (digital) line card, or an eight–station (analog) line card. It does not connect to a *SUPERSET* line card, or an ONS (digital) line card.

2. The call announce circuit is not assigned a directory number in CDE.

3. The following must have been assigned in CDE:

- a feature access code for executive busy override.
- a call announce circuit to the *SUPERSET 4* Call Announce Port
- override and override announce to the *SUPERSET 4* telephone's COS

**Chart 10–6 Install Call Announce Port on a *SUPERSET 4* Telephone**

Step	Action	Comments
1.	<p><b>Connect Call Announce Port</b></p> <p>Connect the Tip and Ring of the Call Announce Port circuit to the yellow (Tip) and black (Ring) leads of the associated <i>SUPERSET 4</i> modular telephone jack.</p>	<p>The yellow and black leads connect through the cross–connect field to the Tip and Ring circuits on the OPS card. Shown in Figure 10–5.</p> <p>The red and green leads connect through the cross–connect field to the Tip and Ring circuits on the COV card.</p>

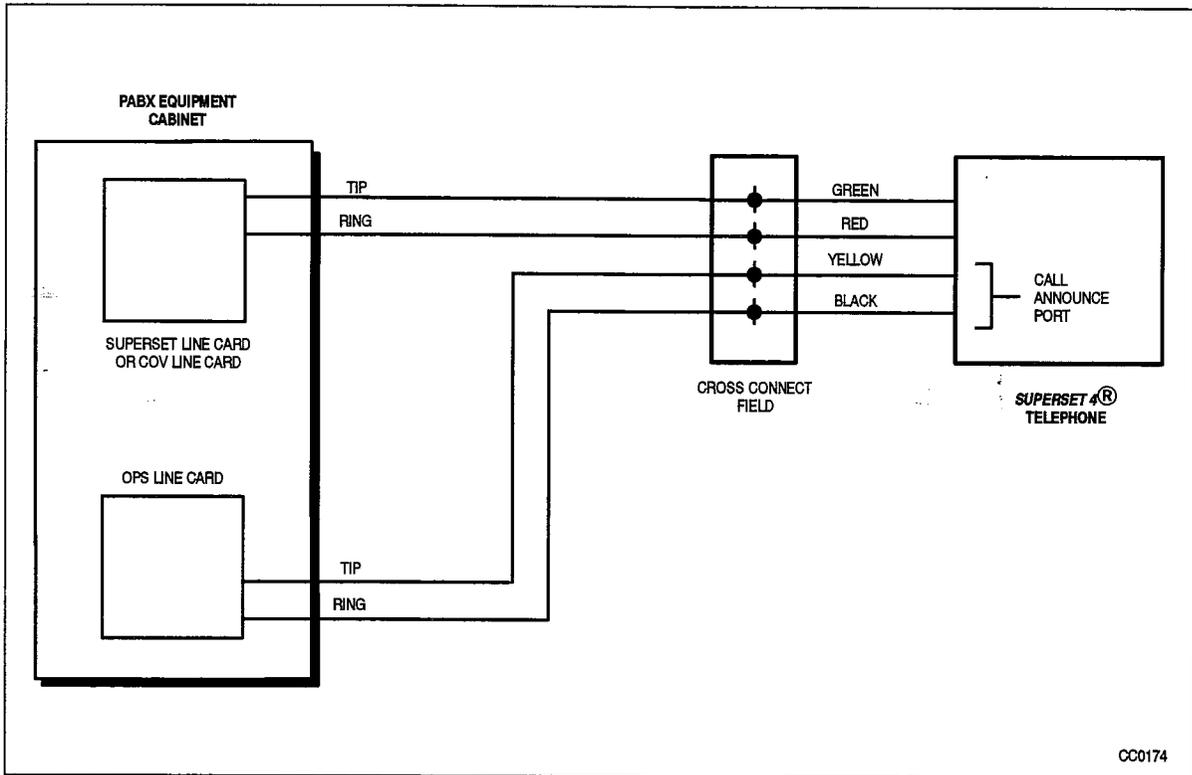


Figure 10-5 Call Announce Port Installation

## Install Night Bell

10.5 Chart 10-7 describes the procedure for installing a Direct Connect night bell, and Chart 10-8 describes the procedure for an Auxiliary Relay night bell. When you have completed Chart 10-7 or Chart 10-8:

- The DTMF receiver/relay module will be installed.
- The night bell will be installed.
- The night bell will be connected.

**Notes:** 1. Incoming and internal calls can be directed to a common alerting device (bell). The bell is activated by a relay on the DTMF receiver/relay module on the universal card. The calls can be answered from the attendant console, or from any station with the trunk access from any station (TAFAS) feature access assigned to it.

2. The night bell, the auxiliary relay (normally open) and independent ringing supply are customer-supplied.

*336-or 672-port configurations:* The night bell is connected to the night bell ringing voltage provided on the control shelf backplane or to a customer supplied source.

*456-port configurations:* The night bell is connected to the night bell ringing voltage provided on the control shelf backplane, the back door power supply, or to a customer supplied source.

On the *SX-200* FD system, the night bell must be a "Buzzer" style unit which does not require ringing voltage. A power source other than the PABX is required.

3. Direct Connect Method: Night bells can be connected directly if the total current requirement does not exceed the relay contact ratings.
4. Auxiliary Relay method: Night bells must be connected through an auxiliary relay if the total current requirement exceeds the relay contact ratings. An additional dc voltage source may be required to drive the auxiliary relay for the 336-port or 672-port configuration. The fused 0V and -48V outputs of the back door power supply can be used for the 456-port configurations.
5. All wiring must be done in accordance with local electrical codes.

Chart 10-7 Install Night Bell (Direct Connect)

Step	Action	Comments
1.	<p><b>Install DTMF Receiver/Relay Module</b></p> <p>Make sure the DTMF receiver/relay module is installed on the universal card.</p>	<p><i>336-, 456-port configurations:</i> The relay for the night bell must be in digital bay 1 or 2.</p> <p><i>672-port configuration:</i> The relay for the night bell can be in any peripheral bay.</p>
	<p><b>Install Bell</b></p>	
2.	<p>Follow manufacturer's instructions to install the bell.</p>	<p>The equipment should be installed in the environment specified by the manufacturer.</p>
	<p><b>Connect Bell (Direct Connect)</b></p>	
3.	<p>Connect one side of the night bell through the cross-connect field to the ringing voltage connector J33 on the universal control cabinet backplane (or other ringing supply). On the <i>SX-200</i> FD system, it must be connected to another power source. See Figure 10-1.</p>	<p><i>336-, 456-port configurations:</i> The ringing voltage connector is on the control shelf backplane (bays 1 and 2).</p> <p><i>672-port configuration:</i> The ringing voltage connector is on bay 0.</p>
4.	<p>Connect one side of the relay contact from the DTMF receiver/relay module to ground and the other side of the relay contact to the other side of the night bell.</p>	<p><b>Note:</b> Relay contacts may be connected only to a secondary circuit that has no direct connection to a primary circuit, and receives its power from a transformer, converter, or equivalent isolation device situated within the equipment.</p> <p><b>Relay contact ratings:</b>  90 Vrms at 0.1 A  48 Vdc at 0.5 A</p>

**Chart 10-8 Install Night Bell (Auxiliary Relay)**

Step	Action	Comments
<b>Install DTMF Receiver/Relay Module</b>		
1.	Make sure the DTMF receiver/relay module is installed on the universal card.	<p><i>336-, 456-port configurations:</i> The relay for the night bell must be in digital bay 1 or 2.</p> <p><i>672-port configuration:</i> The relay for the night bell can be in any peripheral bay.</p>
<b>Install Bell</b>		
2.	Follow manufacturer's instructions to install the bell.	The equipment should be installed in the environment specified by the manufacturer.
<b>Connect Auxiliary Relay</b>		
3.	Connect one side of the auxiliary relay coil through the cross-connect field to the fused -48V of the back door power supply (or customer supplied DC source). On the SX-200 FD system, it must be connected to a customer supplied power source. See Figure 10-6.	<p><i>336-, 456-port configurations:</i> The ringing voltage connector is on the control shelf backplane (bays 1 and 2).</p> <p><i>672-port configuration:</i> The ringing voltage connector is on bay 0.</p>
4.	Connect one side of the relay contact from the DTMF receiver/relay module to fused 0V of the back door power supply (or ground) and the other side of the relay contact to the other side of the auxiliary relay coil.	<p><b>Note:</b> Relay contacts may be connected only to a secondary circuit that has no direct connection to a primary circuit, and receives its power from a transformer, converter, or equivalent isolation device situated within the equipment.</p> <p><b>Relay contact ratings:</b>            90 Vrms at 0.1 A            48 Vdc at 0.5 A</p>
<b>Connect Bell to Auxiliary Relay</b>		
5.	Connect one side of the bell to one side of the auxiliary relay contact.	
6.	Connect the other side of the bell to one side of the independent ringing source.	
7.	Connect the other side of the auxiliary relay contact to the other side of the independent ringing source.	

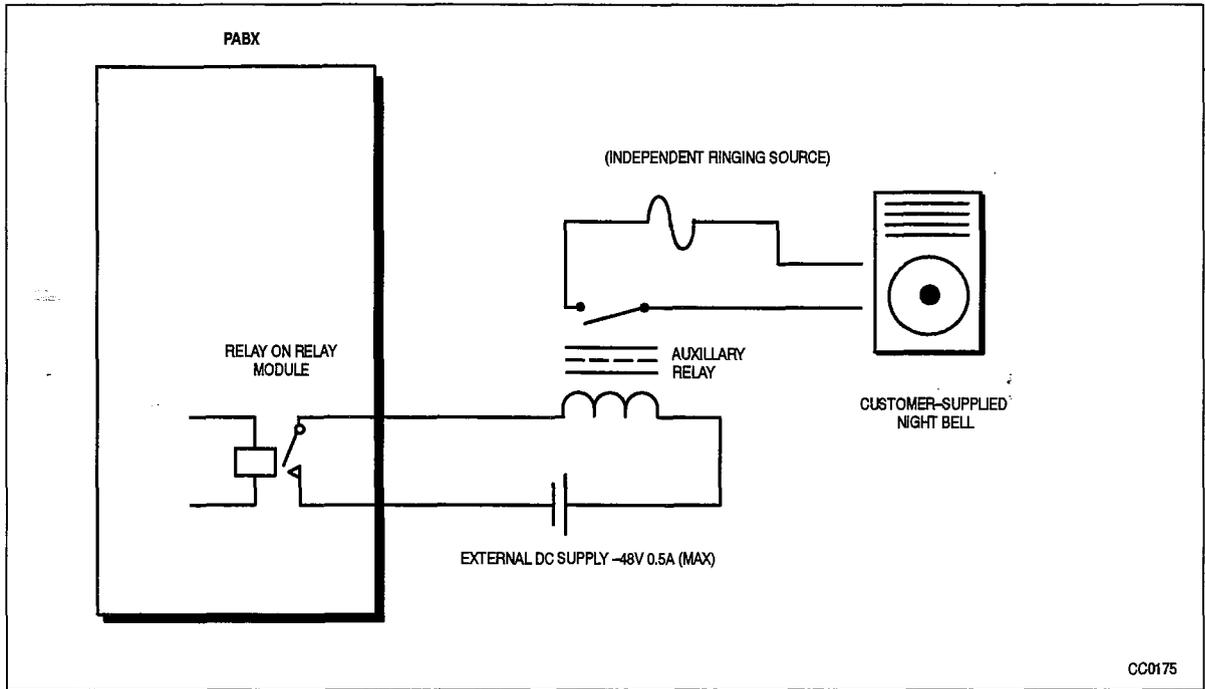


Figure 10-6 Night Bell With Auxiliary Relay

## Install Paging Equipment

10.6 When you have completed Chart 10–9:

- The music on hold/paging module will be installed.
- The paging equipment will be installed.
- The paging equipment will be connected.

**Notes:** 1. The paging equipment is customer-supplied.

2. The PABX supports up to nine separate paging zones. Each zone requires a paging module.
- 

**Chart 10–9 Install Paging Equipment**

Step	Action	Comments
1.	<p><b>Install the Music on Hold/Paging Module</b></p> <p>Make sure the Music on Hold/Paging module is installed on the universal card.</p>	
2.	<p><b>Install Paging Equipment</b></p> <p>Follow manufacturer's instructions to install the paging equipment. See Figure 10–1.</p>	<p>The equipment should be installed in the environment specified by the manufacturers.</p>
3.	<p><b>Connect Paging Equipment</b></p> <p>Connect the output from POA and POB on the Music on Hold/Paging module through the cross-connect field to the paging equipment.</p>	<p><b>Output impedance (low):</b> 200 ohm  <b>Output level into 600 ohm:</b> –6dBm</p>
4.	<p>Connect the relay contact from the Music on Hold/Paging module (PKA and PKB) to the control circuit of the paging equipment.</p>	<p><b>Note:</b> Relay contacts may be connected only to a secondary circuit that has no direct connection to a primary circuit, and receives its power from a transformer, converter, or equivalent isolation device situated within the equipment.</p> <p><b>Relay contact ratings:</b>            90 Vrms at 0.1 A            48 Vdc at 0.5 A</p>

## Install Music On Hold Equipment

10.7 When you have completed Chart 10–10:

- The Music on Hold/Paging module will be installed.
- The Music on Hold source will be installed.
- The Music on Hold source will be connected.

**Notes:** 1. An external music source can be connected to the system using a Music on Hold/Paging module on the universal card. Music on hold is used with the camp-on and hold features. Calls on hold hear music instead of silence; camp-on calls hear music instead of busy tone.

2. The PABX supports only one music on hold source.

3. This equipment also provides the background music played through the speakers of the *SUPERSET 4*, *SUPERSET3DN*, *SUPERSET 4DN*, *SUPERSET 410*, *SUPERSET 420*, or *SUPERSET 430* while the set is idle (background music feature).

4. The music source is customer-supplied, and can be a tape recorder or radio.

**Chart 10–10 Install Music On Hold Equipment**

Step	Action	Comments
	<b>Install the Music on Hold/Paging Module</b>	
1.	Make sure the Music on Hold/Paging module is installed on the universal card.	
	<b>Install Music Source</b>	
2.	Follow manufacturer's instructions to install the music source. See Figure 10–1.	The equipment should be installed in the environment specified by the manufacturers.
	<b>Connect Music Source</b>	
3.	Connect the input from the music source through the cross-connect field to MIA and MIB on the Music on Hold/Paging module.	<b>Input impedance:</b> 600 ohm <b>Input level :</b> –6dBm

## Install Alternate Music Source for ACD

10.8 When you have completed Chart 10–11:

- The alternate music source for Automatic Call Distribution (ACD) will be installed.

**Notes:** 1. An alternate music source for the ACD feature package must be either:

- an FCC Part 68– and DOC– approved recorded announcement device connected to an on–premises (ONS) line card circuit
- any other source which is connected through an FCC Part 68– and DOC– approved voice coupler or voice–connecting arrangement to an ONS circuit.

2. The equipment is used to provide music and recorded announcements that entertain callers waiting for an ACD agent.

3. The equipment is customer–supplied.

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**Chart 10–11 Install Alternate Music Source – Automatic Call Distribution Only**

Step	Action	Comments
1.	<p><b>Install ONS Line Card</b></p> <p>Make sure an ONS line card is installed.</p>	<p>This card can be installed in any slot in any digital bay.</p>
2.	<p><b>Install Recorded Announcement Device</b></p> <p>Install the recorded announcement device according to manufacturer's instructions.</p>	
3.	<p><b>Connect Recorded Announcement Device</b></p> <p>Connect the recorded announcement device through the cross–connect field to a circuit on the ONS card.</p>	
4.	<p><b>Connect Voice Coupler</b></p> <p><i>If the recorded announcement device to be installed is not FCC Part 68– and DOC– approved, install a voice coupler or other type of voice connector between the recorded announcement device and the cross–connect field.</i></p>	

# 11. **CABLING AND CROSS CONNECTIONS**

## System Cabling

- 11.1 This section gives the Tip-Ring Assignment tables for cabling and crossconnecting the SX-200 DIGITAL PABX and the SX-200 FD PABX. Table 11-1 lists these tables.

<b>Table 11-1 Cable Terminations</b>	
<b>Table</b>	<b>Contents</b>
Table 11-2	<b>Tip and Ring Assignments</b> J5 and J9 for Digital Bays 1 through 7 (672-port and SX-200 FD PABX), or Bays 1, 3 and 4 (336-port), or Bays 1 and 3 (456-port), or J25 for Bay 2 (336- or 456-port)
Table 11-3	<b>Tip and Ring Assignments for Universal Card Modules</b> J5 and J9 for Digital Bays 1 through 7 (672-port and SX-200 FD PABX), or Bays 1, 3 and 4 (336-port), or Bays 1 and 3 (456-port), or J25 for Bay 2 (336- or 456-port)
Table 11-4	<b>Tip and Ring Assignments</b> J7 and J11 for Digital Bays 1 through 7 (672-port and SX-200 FD PABX), or Bays 1, 3 and 4 (336-port), or Bays 1 and 3 (456-port), or J31 for Bay 2 (336- or 456-port)
Table 11-5	<b>6-circuit PFT Card Tip and Ring Assignments</b>
Table 11-6	<b>12-circuit PFT Card Tip and Ring Assignments</b>
Table 11-7	<b>Bay 4 P1, or Bay 5 P7 Connections to Cross-Connect Field</b>
Table 11-8	<b>Bay 4 P2, or Bay 5 P8 Connections to Cross-Connect Field</b>
Table 11-9	<b>Bay 4 P3, or Bay 5 P9 Connections to Cross-Connect Field</b>
Table 11-10	<b>Bay 4 P4, or Bay 5 P10 Connections to Cross-Connect Field</b>
Table 11-11	<b>Bay 4 P19 Connections to Interconnect Card</b>
Table 11-12	<b>USOC Connector Pin Designations</b>

**Table 11-2 Digital Bay Tip and Ring Assignments**

J5, J7, and J9 for Digital Bays: 1, 3, and 4 (336-port) or  
 1 and 3 (456-port) or  
 1 through 7 (672-port and SX-200 FD) or  
 J25 for Digital Bay 2 (336-, 456-port)

Slot	Plug	Pin	Pair	Lead Designation							
				Cct	ONS or DLC	Cct	LS/GS	Cct	COV	Cct	OPS or DID
2 or 6 or 8 or 4	J7 J5 J9 J25	26	W-BL	1	T1	1	T1	1	T1	1	T1
		1	BL-W		R1		R1		R1		R1
		27	W-O	2	T2		MM1	2			
		2	O-W		R2		M1		R2		
		28	W-G	3	T3	2	T2	3	T3	2	T2
		3	G-W		R3		R2		R3		R2
		29	W-BR	4	T4		MM2	4	T4		
		4	BR-W		R4		M2		R4		
		30	W-S	5	T5	3	T3	5	T5	3	T3
		5	S-W		R5		R3		R5		R3
		31	R-BL	6	T6		MM3	6	T6		
		6	BL-R		R6		M3		R6		
32	R-O	7	T7	4	T4			4	T4		
7	O-R		R7		R4				R4		
33	R-G	8	T8		MM4						
8	G-R		R8		M4						
34	R-BR	9	T9	5	T5			5	T5		
9	BR-R		R9		R5				R5		
35	R-S	10	T10		MM5						
10	S-R		R10		M5						
36	BK-BL	11	T11	6	T6			6	T6		
11	BL-BK		R11		R6				R6		
37	BK-O	12	T12		MM6						
12	O-BK		R12		M6						
		38	BK-G	SPARE							

**Table 11-2 Digital Bay Tip and Ring Assignments  
(continued)**

Slot	Plug	Pin	Pair	Lead Designation							
				Cct	ONS or DLC	Cct	LS/GS	Cct	COV	Cct	OPS or DID
		13	G-BK	SPARE							
		39	BK-BR	1	T1	1	T1	1	T1	1	T1
		14	BR-BK		R1		R1		R1		R1
		40	BK-S	2	T2		MM1	2	T2		
1	J7	15	S-BK		R2		M1		R2		
or		41	Y-BL	3	T3	2	T2	3	T3	2	T2
5	J5	16	BL-Y		R3		R2		R3		R2
or		42	Y-O	4	T4		MM2	4	T4		
7	J9	17	O-Y		R4		M2		R4		
or		43	Y-G	5	T5	3	T3	5	T5	3	T3
3	J25	18	G-Y		R5		R3		R5		R3
		44	Y-BR	6	T6		MM3	6	T6		
		19	BR-Y		R6		M3		R6		
		45	Y-S	7	T7	4	T4			4	T4
		20	S-Y		R7		R4				R4
		46	V-BL	8	T8		MM4				
		21	BL-V		R8		M4				
		47	V-O	9	T9	5	T5			5	T5
		22	O-V		R9		R5				R5
		48	V-G	10	T10		MM5				
		23	G-V		R10		M5				
		49	V-BR	11	T11	6	T6			6	T6
		24	BR-V		R11		R6				R6
		50	V-S	12	T12		MM6				
		25	S-V		R12		M6				

**Table 11-3 Tip and Ring Assignments for Universal Card Modules**

J5 and J9 for Digital Bays: 1 through 7 (672-port and SX-200 FD) or  
 1, 3, and 4 (336-port) or  
 1 and 3 (456-port) or

J25 for Digital Bay 2 (336-, 456-port)

Slot	Plug	Pin	Pair	Lead Designation									
				Cct	DLIC	Cct	MOH/ Pager	Cct	DTMF Relay	Cct	E&M Trunk		
6 or 8 or 4	J5	26	W-BL	1	T1	1	MIA1	1		1	T1		
		1	BL-W		R1		MIB1				R1		
		27	W-O		T2		POA1				K5A1	TR1	
		2	O-W		R2		POB1				K5B1	RR1	
		28	W-G				PKA1				K6A1	E1	
		3	G-W				PKB1				K6B1	M1	
	J9	29	W-BR	2	T1	2	MIA2	2		2	T2		
		4	BR-W		R1		MIB2				R2		
		30	W-S		T2		POA2				K5A2	TR2	
		J25	5		S-W		R2				POB2	K5B2	RR2
			31		R-BL						PKA2	K6A2	E2
			6		BL-R						PKB2	K6B2	M2
32	R-O		3	T1	3	MIA3	3		3	T3			
7	O-R	R1		MIB3		R3							
33	R-G	T2		POA3		K5A3				TR3			
8	G-R	R2		POB3		K5B3				RR3			
		34	R-BR	4		4	PKA3	4		4	E3		
		9	BR-R		PKB3		K6B3				M3		
		35	R-S		T1		MIA4				T4		
		10	S-R		R1		MIB4				R4		
		36	BK-BL		T2		POA4				K5A4	TR4	
		11	BL-BK		R2		POB4				K5B4	RR4	
		37	BK-O				PKA4				K6A4	E4	
		12	O-BK				PKB4				K6B4	M4	
		38	BK-G	SPARE									

**Table 11-3 Tip and Ring Assignments for Universal Card Modules  
(continued)**

Slot	Plug	Pin	Pair	Lead Designation							
				Cct	DLIC	Cct	MOH/ Pager	Cct	DTMF Relay	Cct	E&M Trunk
		13	G-BK	SPARE							
5 or 7 or 3	J5 or J9 or J25	39	BK-BR	1	T1	1	MIA1	1		1	T1
		14	BR-BK		R1		MIB1				R1
		40	BK-S		T2		POA1		K5A1		TR1
		15	S-BK		R2		POB1		K5B1		RR1
		41	Y-BL				PKA1		K6A1		E1
		16	BL-Y				PKB1		K6B1		M1
		42	Y-O	2	T1	2	MIA2	2		2	T2
		17	O-Y		R1		MIB2				R2
		43	Y-G		T2		POA2		K5A2		TR2
		18	G-Y		R2		POB2		K5B2		RR2
		44	Y-BR				PKA2		K6A2		E2
		19	BR-Y				PKB2		K6B2		M2
		45	Y-S	3	T1	3	MIA3	3		3	T3
		20	S-Y		R1		MIB3				R3
		46	V-BL		T2		POA3		K5A3		TR3
		21	BL-V		R2		POB3		K5B3		RR3
		47	V-O				PKA3		K6A3		E3
		22	O-V				PKB3		K6B3		M3
		48	V-G	4	T1	4	MIA4	4		4	T4
		23	G-V		R1		MIB4				R4
		49	V-BR		T2		POA4		K5A4		TR4
		24	BR-V		R2		POB4		K5B4		RR4
		50	V-S				PKA4		K6A4		E4
		25	S-V				PKB4		K6B4		M4

**Table 11-4 Tip and Ring Assignments**

J7 and J11 for Digital Bays: 1 through 7 (672-port and SX-200 FD) or  
 1, 3, and 4 (336-port) or  
 1 and 3 (456-port) or

J31 for Digital Bay 2 (336-, 456-port)

Slot	Plug	Pin	Pair	Lead Designation				
				Cct	ONS or DLC	Cct	LS/GS	
2	J7	26	W-BL	1	T1	1	T1	
		1	BL-W		R1		R1	
		27	W-O	2	T2		MM1	
		2	O-W		R2		M1	
		28	W-G	3	T3	2	T2	
		3	G-W		R3		R2	
	4	J11	29	W-BR	4	T4		MM2
			4	BR-W		R4		M2
	2	J31	30	W-S	5	T5	3	T3
			5	S-W		R5		R3
			31	R-BL	6	T6		MM3
			6	BL-R		R6		M3
32			R-O	7	T7	4	T4	
7			O-R		R7		R4	
2	J31	33	R-G	8	T8		MM4	
		8	G-R		R8		M4	
		34	R-BR	9	T9	5	T5	
		9	BR-R		R9		R5	
		35	R-S	10	T10		MM5	
		10	S-R		R10		M5	
2	J31	36	BK-BL	11	T11	6	T6	
		11	BL-BK		R11		R6	
		37	BK-O	12	T12		MM6	
		12	O-BK		R12		M6	
		38	BK-G	SPARE				

**Table 11-4 Tip and Ring Assignments  
(continued)**

Slot	Plug	Pin	Pair	Lead Designation			
				Cct	ONS or DLC	Cct	LS/GS
		13	G-BK	SPARE			
		39	BK-BR	1	T1	1	T1
		14	BR-BK		R1		R1
		40	BK-S	2	T2	2	MM1
		5	S-BK		R2		M1
		41	Y-BL	3	T3	2	T2
1	J7	16	BL-Y		R3		R2
	or	42	Y-O	4	T4		MM2
3	J11	17	O-Y		R4		M2
	or	43	Y-G	5	T5	3	T3
1	J31	18	G-Y		R5		R3
		44	Y-BR	6	T6		MM3
		19	BR-Y		R6		M3
		45	Y-S	7	T7	4	T4
		20	S-Y		R7		R4
		46	V-BL	8	T8		MM4
		21	BL-V		R8		M4
		47	V-O	9	T9	5	T5
		22	O-V		R9		R5
		48	V-G	10	T10		MM5
		23	G-V		R10		M5
		49	V-BR	11	T11	6	T6
		24	BR-V		R11		R6
		50	V-S	12	T12		MM6
		25	S-V		T12		M6

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**Table 11-5 6-circuit PFT Card Tip and Ring Assignments**

Pin	Color	J1 Lead Designations
26	W-BL	Trunk R1
1	BL-W	Trunk T1
27	W-O	Trunk R2
2	O-W	Trunk T2
28	W-G	Trunk R3
3	G-W	Trunk T3
29	W-BR	Trunk R4
4	BR-W	Trunk T4
30	W-S	Trunk R5
5	S-W	Trunk T5
31	R-BL	Trunk R6
6	BL-R	Trunk T6
32	R-O	Trunk Circuit R1
7	O-R	Trunk Circuit T1
33	R-G	Trunk Circuit R2
8	G-R	Trunk Circuit T2
34	R-BR	Trunk Circuit R3
9	BR-R	Trunk Circuit T3
35	R-S	Trunk Circuit R4
10	S-R	Trunk Circuit T4
36	BK-BL	Trunk Circuit R5
11	BL-BK	Trunk Circuit T5
37	BK-O	Trunk Circuit R6
12	O-BK	Trunk Circuit T6
38	BK-G	Spare
13	G-BK	Spare
39	BK-BR	Line Circuit R1
14	BR-BK	Line Circuit T1
40	BK-S	Line Circuit R2
15	S-BK	Line Circuit T2
41	Y-BL	Line Circuit R3
16	BL-Y	Line Circuit T3
42	Y-O	Line Circuit R4
17	O-Y	Line Circuit T4
43	Y-G	Line Circuit R5
18	G-Y	Line Circuit T5
44	Y-BR	Line Circuit R6
19	BR-Y	Line Circuit T6

**Table 11-5 6-circuit PFT Card Tip and Ring Assignments  
(continued)**

<b>Pin</b>	<b>Color</b>	<b>J1 Lead Designations</b>
45	Y-S	Station R1
20	S-Y	Station T1
46	V-BL	Station R2
21	BL-V	Station T2
47	V-O	Station R3
22	O-V	Station T3
48	V-G	Station R4
23	G-V	Station T4
49	V-BR	Station R5
24	BR-V	Station T5
50	V-S	Station R6
25	S-V	Station T6

- Notes:** 1. There are six circuits per PFT card.  
2. More than one PFT card may be present.

**Table 11-6 12-circuit PFT Card Tip and Ring Assignments**

Pin	Color	P20 Lead Designations	P21 Lead Designations
26	W-BL	Station T1	Station T7
1	BL-W	Station R1	Station R7
27	W-O	Line Circuit T1	Line Circuit T7
2	O-W	Line Circuit R1	Line Circuit R7
28	W-G	Trunk T1	Trunk T7
3	G-W	Trunk R1	Trunk R7
29	W-BR	Trunk Circuit T1	Trunk Circuit T7
4	BR-W	Trunk Circuit R1	Trunk Circuit R7
30	W-S	Station T2	Station T8
5	S-W	Station R2	Station R8
31	R-BL	Line Circuit T2	Line Circuit T8
6	BL-R	Line Circuit R2	Line Circuit R8
32	R-O	Trunk T2	Trunk T8
7	R-O	Trunk R2	Trunk R8
33	R-G	Trunk Circuit T2	Trunk Circuit T8
8	G-R	Trunk Circuit R2	Trunk Circuit R8
34	R-BR	Station T3	Station T9
9	BR-R	Station R3	Station R9
35	R-S	Line Circuit T3	Line Circuit T9
10	S-R	Line Circuit R3	Line Circuit R9
36	BK-BL	Trunk T3	Trunk T9
11	BL-BK	Trunk R3	Trunk R9
37	BK-O	Trunk Circuit T3	Trunk Circuit T9
12	O-BK	Trunk Circuit R3	Trunk Circuit R9
38	BK-G	Station T4	Station T10
13	G-BK	Station R4	Station R10
39	BK-BR	Line Circuit T4	Line Circuit T10
14	BR-BK	Line Circuit R4	Line Circuit R10
40	BK-S	Trunk T4	Trunk T10
15	S-BK	Trunk R4	Trunk R10
41	Y-BL	Trunk Circuit T4	Trunk Circuit T10
16	BL-Y	Trunk Circuit R4	Trunk Circuit R10
42	Y-O	Station T5	Station T11
17	O-Y	Station R5	Station R11
43	Y-G	Line Circuit T5	Line Circuit T11
18	G-Y	Line Circuit R5	Line Circuit R11
44	Y-BR	Trunk T5	Trunk T11
19	BR-Y	Trunk R5	Trunk R11

**Table 11-6 12-circuit PFT Card Tip and Ring Assignments  
(continued)**

<b>Pin</b>	<b>Color</b>	<b>P20 Lead Designations</b>	<b>P21 Lead Designations</b>
45	Y-S	Trunk Circuit T5	Trunk Circuit T11
20	S-Y	Trunk Circuit R5	Trunk Circuit R11
46	V-BL	Station T6	Station T12
21	BL-V	Station R6	Station R12
47	V-O	Line Circuit T6	Line Circuit T12
22	O-V	Line Circuit R6	Line Circuit R12
48	V-G	Trunk T6	Trunk T12
23	G-V	Trunk R6	Trunk R12
49	V-BR	Trunk Circuit T6	Trunk Circuit T12
24	BR-V	Trunk Circuit R6	Trunk Circuit R12
50	V-S	Spare	Spare
25	S-V	Spare	Spare

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**Table 11-7 Analog Bay Tip and Ring Assignments**

P1 for Analog Bay 4 (456-port) or P7 for Analog Bay 5 (456-port)

Slot	Cct	Pin	Color	Lines	CO	DID/TIE	E&M
1	1	26	W-BL	T1	T1	T1	T1
		1	BL-W	R1	R1	R1	R1
	2	27	W-O	T2	XT2		TR1
		2	O-W	R2	XT1		RR1
	3	28	W-G	T3	T2		E1
		3	G-W	R3	R2		M1
	4	29	W-BR	T4			
		4	BR-W	R4			
2	1	30	W-S	T1	T1	T1	T1
		5	S-W	R1	R1	R1	R1
	2	31	R-BL	T2	XT2		TR1
		6	BL-R	R2	XT1		RR1
	3	32	R-O	T3	T2		E1
		7	O-R	R3	R2		M1
	4	33	R-G	T4			
		8	G-R	R4			
3	1	34	R-BR	T1	T1	T1	T1
		9	BR-R	R1	R1	R1	R1
	2	35	R-S	T2	XT2		TR1
		10	S-R	R2	XT1		RR1
	3	36	BK-BL	T3	T2		E1
		11	BL-BK	R3	R2		M1
	4	37	BK-O	T4			
		12	O-BK	R4			
4	1	38	BK-G	T1	T1	T1	T1
		13	G-BK	R1	R1	R1	R1
	2	39	BK-BR	T2	XT2		TR1
		14	BR-BK	R2	XT1		RR1
	3	40	BK-S	T3	T2		E1
		15	S-BK	R3	R2		M1
	4	41	Y-BL	T4			
		16	BL-Y	R4			

**Table 11-7 Analog Bay Tip and Ring Assignments  
(continued)**

Slot	Cct	Pin	Color	Lines	CO	DID/TIE	E&M
5	1	42	Y-O	T1	T1	T1	T1
		17	O-Y	R1	R1	R1	R1
	2	43	Y-G	T2	XT2		TR1
		18	G-Y	R2	XT1		RR1
	3	44	Y-BR	T3	T2		E1
		19	BR-Y	R3	R2		M1
	4	45	Y-S	T4			
		20	S-Y	R4			
6	1	46	V-BL	T1	T1	T1	T1
		21	BL-V	R1	R1	R1	R1
	2	47	V-O	T2	XT2		TR1
		22	O-V	R2	XT1		RR1
	3	48	V-G	T3	T2		E1
		23	G-V	R3	R2		M1
	4	49	V-BR	T4			
		24	BR-V	R4			
		50	V-S	SPARE			
		25	S-V	SPARE			

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**Note:** For 2-wire E&M Trunk operation DO NOT connect RR and TR leads.

**Table 11-8 Analog Bay Tip and Ring Assignments**

P2 for Analog Bay 4 (456-port) or P8 for Analog Bay 5 (456-port)

Slot	Cct	Pin	Color	Lines	CO	DID/TIE	E&M
1	5	26	W-BL	T5	T3	T2	T2
		1	BL-W	R5	R3	R2	R2
	6	27	W-O	T6	XT4		TR2
		2	O-W	R6	XT3		RR2
	7	28	W-G	T7	T4		E2
		3	G-W	R7	R4		M2
	8	29	W-BR	T8			
		4	BR-W	R8			
2	5	30	W-S	T5	T3	T2	T2
		5	S-W	R5	R3	R2	R2
	6	31	R-BL	T6	XT4		TR2
		6	BL-R	R6	XT3		RR2
	7	32	R-O	T7	T4		E2
		7	O-R	R7	R4		M2
	8	33	R-G	T8			
		8	G-R	R8			
3	5	34	R-BR	T5	T3	T2	T2
		9	BR-R	R5	R3	R2	R2
	6	35	R-S	T6	XT4		TR2
		10	S-R	R6	XT3		RR2
	7	36	BK-BL	T7	T4		E2
		11	BL-BK	R7	R4		M2
	8	37	BK-O	T8			
		12	O-BK	R8			
4	5	38	BK-G	T5	T3	T2	T2
		13	G-BK	R5	R3	R2	R2
	6	39	BK-BR	T6	XT4		TR2
		14	BR-BK	R6	XT3		RR2
	7	40	BK-S	T7	T4		E2
		15	S-BK	R7	R4		M2
	8	41	Y-BL	T8			
		16	BL-Y	R8			

**Table 11-8 Analog Bay Tip and Ring Assignments  
(continued)**

Slot	Cct	Pin	Color	Lines	CO	DID/TIE	E&M
5	5	42	Y-O	T5	T3	T2	T2
		17	O-Y	R5	R3	R2	R2
	6	43	Y-G	T6	XT4		TR2
		18	G-Y	R6	XT3		RR2
	7	44	Y-BR	T7	T4		E2
		19	BR-Y	R7	R4		M2
	8	45	Y-S	T8			
		20	S-Y	R8			
6	5	46	V-BL	T5	T3	T2	T2
		21	BL-V	R5	R3	R2	R2
	6	47	V-O	T6	XT4		TR2
		22	O-V	R6	XT3		RR2
	7	48	V-G	T7	T4		E2
		23	G-V	R7	R4		M2
	8	49	V-BR	T8			
		24	BR-V	R8			
		50	V-S	SPARE			
		25	S-V	SPARE			

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**Note:** For 2-wire E&M Trunk operation DO NOT connect RR and TR leads.

**Table 11-9 Analog Bay Tip and Ring Assignments**

P3 for Analog Bay 4 (456-port) or P9 for Analog Bay 5 (456-port)

Slot	Cct	Pin	Color	Lines	CO	DID/TIE	E&M
7	1	26	W-BL	T1	T1	T1	T1
		1	BL-W	R1	R1	R1	R1
	2	27	W-O	T2	XT2		TR1
		2	O-W	R2	XT1		RR1
	3	28	W-G	T3	T2		E1
		3	G-W	R3	R2		M1
	4	29	W-BR	T4			
		4	BR-W	R4			
8	1	30	W-S	T1	T1	T1	T1
		5	S-W	R1	R1	R1	R1
	2	31	R-BL	T2	XT2		TR1
		6	BL-R	R2	XT1		RR1
	3	32	R-O	T3	T2		E1
		7	O-R	R3	R2		M1
	4	33	R-G	T4			
		8	G-R	R4			
9	1	34	R-BR	T1	T1	T1	T1
		9	BR-R	R1	R1	R1	R1
	2	35	R-S	T2	XT2		TR1
		10	S-R	R2	XT1		RR1
	3	36	BK-BL	T3	T2		E1
		11	BL-BK	R3	R2		M1
	4	37	BK-O	T4			
		12	O-BK	R4			
10	1	38	BK-G	T1	T1	T1	T1
		13	G-BK	R1	R1	R1	R1
	2	39	BK-BR	T2	XT2		TR1
		14	BR-BK	R2	XT1		RR1
	3	40	BK-S	T3	T2		E1
		15	S-BK	R3	R2		M1
	4	41	Y-BL	T4			
		16	BL-Y	R4			

**Table 11-9 Analog Bay Tip and Ring Assignments  
(continued)**

Slot	Cct	Pin	Color	Lines	CO	DID/TIE	E&M
11	1	42	Y-O	T1	T1	T1	T1
		17	O-Y	R1	R1	R1	R1
	2	43	Y-G	T2	XT2		TR1
		18	G-Y	R2	XT1		RR1
	3	44	Y-BR	T3	T2		E1
		19	BR-Y	R3	R2		M1
	4	45	Y-S	T4			
		20	S-Y	R4			
12	1	46	V-BL	T1	T1	T1	T1
		21	BL-V	R1	R1	R1	R1
	2	47	V-O	T2	XT2		TR1
		22	O-V	R2	XT1		RR1
	3	48	V-G	T3	T2		E1
		23	G-V	R3	R2		M1
	4	49	V-BR	T4			
		24	BR-V	R4			
		50	V-S	SPARE			
		25	S-V	SPARE			

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**Note:** For 2-wire E&M Trunk operation DO NOT connect RR and TR leads.

**Table 11-10 Analog Bay Tip and Ring Assignments**

P4 for Analog Bay 4 (456-port) or P10 for Analog Bay 5 (456-port)

Slot	Cct	Pin	Color	Lines	CO	DID/TIE	E&M
7	5	26	W-BL	T5	T3	T2	T2
		1	BL-W	R5	R3	R2	R2
	6	27	W-O	T6	XT4		TR2
		2	O-W	R6	XT3		RR2
	7	28	W-G	T7	T4		E2
		3	G-W	R7	R4		M2
	8	29	W-BR	T8			
		4	BR-W	R8			
8	5	30	W-S	T5	T3	T2	T2
		5	S-W	R5	R3	R2	R2
	6	31	R-BL	T6	XT4		TR2
		6	BL-R	R6	XT3		RR2
	7	32	R-O	T7	T4		E2
		7	O-R	R7	R4		M2
	8	33	R-G	T8			
		8	G-R	R8			
9	5	34	R-BR	T5	T3	T2	T2
		9	BR-R	R5	R3	R2	R2
	6	35	R-S	T6	XT4		TR2
		10	S-R	R6	XT3		RR2
	7	36	BK-BL	T7	T4		E2
		11	BL-BK	R7	R4		M2
	8	37	BK-O	T8			
		12	O-BK	R8			
10	5	38	BK-G	T5	T3	T2	T2
		13	G-BK	R5	R3	R2	R2
	6	39	BK-BR	T6	XT4		TR2
		14	BR-BK	R6	XT3		RR2
	7	40	BK-S	T7	T4		E2
		15	S-BK	R7	R4		M2
	8	41	Y-BL	T8			
		16	BL-Y	R8			

**Table 11-10 Analog Bay Tip and Ring Assignments  
(continued)**

Slot	Cct	Pin	Color	Lines	CO	DID/TIE	E&M
11	5	42	Y-O	T5	T3	T2	T2
		17	O-Y	R5	R3	R2	R2
	6	43	Y-G	T6	XT4		TR2
		18	G-Y	R6	XT3		RR2
	7	44	Y-BR	T7	T4		E2
		19	BR-Y	R7	R4		M2
	8	45	Y-S	T8			
		20	S-Y	R8			
12	5	46	V-BL	T5	T3	T2	T2
		21	BL-V	R5	R3	R2	R2
	6	47	V-O	T6	XT4		TR2
		22	O-V	R6	XT3		RR2
	7	48	V-G	T7	T4		E2
		23	G-V	R7	R4		M2
	8	49	V-BR	T8			
		24	BR-V	R8			
		50	V-S	SPARE			
		25	S-V	SPARE			

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**Note:** For 2-wire E&M Trunk operation DO NOT connect RR and TR leads.

**Table 11-11 Interconnect Card Tip and Ring Assignments**

P19 for Analog Bay 4 (456-port)

Slot	Cct	Pin	Color	Lines	CO	DID/TIE	E&M
		26	W-BL	SPARE			
		1	BL-W	SPARE			
15	8	27	W-O	T8			
		2	O-W	R8			
	7	28	W-G	T7	T4		E2
		3	G-W	R7	R4		M2
	6	29	W-BR	T6	XT3		TR2
		4	BR-W	R6	XT4		RR2
	5	30	W-S	T5	T3	T2	T2
		5	S-W	R5	R3	R2	R2
14	8	31	R-BL	T8			
		6	BL-R	R8			
	7	32	R-O	T7	T4		E2
		7	O-R	R7	R4		M2
	6	33	R-G	T6	XT3		TR2
		8	G-R	R6	XT4		RR2
	5	34	R-BR	T5	T3	T2	T2
		9	BR-R	R5	R3	R2	R2
13	8	35	R-S	T8			
		10	S-R	R8			
	7	36	BK-BL	T7	T4		E2
		11	BL-BK	R7	R4		M2
	6	37	BK-O	T6	XT3		TR2
		12	O-BK	R6	XT4		RR2
	5	38	BK-G	T5	T3	T2	T2
		13	G-BK	R5	R3	R2	R2
15	4	39	BK-BR	T4			
		14	BR-BK	R4			
	3	40	BK-S	T3	T2		E1
		15	S-BK	R3	R2		M1
	2	41	Y-BL	T2	XT1		TR1
		16	BL-Y	R2	XT2		RR1
	1	42	Y-O	T1	T1	T1	T1
		17	O-Y	R1	R1	R1	R1

Table 11-11 Interconnect Card Tip and Ring Assignments (continued)							
Slot	Cct	Pin	Color	Lines	CO	DID/TIE	E&M
14	4	43	Y-G	T4			
		18	G-Y	R4			
	3	44	Y-BR	T3	T2		E1
		19	BR-Y	R3	R2		M1
	2	45	Y-S	T2	XT1		TR1
		20	S-Y	R2	XT2		RR1
	1	46	V-BL	T1	T1	T1	T1
21		BL-V	R1	R1	R1	R1	
13	4	47	V-O	T4			
		22	O-V	R4			
	3	48	V-G	T3	T2		E1
		23	G-V	R3	R2		M1
	2	49	V-BR	T2	XT1		TR1
		24	BR-V	R2	XT2		RR1
	1	50	V-S	T1	T1	T1	T1
25		S-V	R1	R1	R1	R1	

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**Note:** For 2-wire E&M Trunk operation DO NOT connect RR and TR leads.

<b>Table 11-12 USOC Connector Pin Designations</b>				
		<b>Connector Type</b>		
		<b>RJ21X</b>	<b>RJ2EX</b>	<b>RJ2GX</b>
26	W-BL	T	T	T
1	BL-W	R	R	R
27	W-O	T	E	T1
2	O-W	R	M	R1
28	W-G	T	T	E
3	G-W	R	R	M
29	W-BR	T	E	T
4	BR-W	R	M	R
30	W-S	T	T	T1
5	S-W	R	R	R1
31	R-BL	T	E	E
6	BL-R	R	M	M
32	R-O	T	T	T
7	O-R	R	R	R
33	R-G	T	E	T1
8	G-R	R	M	R1
34	R-BR	T	T	E
9	BR-R	R	R	M
35	R-S	T	E	T
10	S-R	R	M	R
36	BK-BL	T	T	T1
11	BL-BK	R	R	R1
37	BK-O	T	E	E
12	O-BK	R	M	M

**Table 11-12 USOC Connector Pin Designations  
(continued)**

		Connector Type		
		RJ21X	RJ2EX	RJ2GX
38	BK-G	T	T	T
13	G-BK	R	R	R
39	BK-BR	T	E	T1
14	BR-BK	R	M	R1
40	BK-S	T	T	E
15	S-BK	R	R	M
41	Y-BL	T	E	T
16	BL-Y	R	M	R
42	Y-O	T	T	T1
17	O-Y	R	R	R1
43	Y-G	T	E	E
18	G-Y	R	M	M
44	Y-BR	T	T	T
19	BR-Y	R	R	R
45	Y-S	T	E	T1
20	S-Y	R	M	R1
46	V-BL	T	T	E
21	BL-V	R	R	M
47	V-O	T	E	T
22	O-V	R	M	R
48	V-G	T	T	T1
23	G-V	R	R	R1
49	V-BR	T	E	E
24	BR-V	R	M	M
50	V-S	spare		
25	S-V	spare		

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- Notes:**
1. RJ21X is a standard trunk.
  2. RJ2EX is a two-wire E&M trunk.
  3. RJ2GX is a four-wire E&M trunk.

## Installation Information

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# Appendix A.

## SYSTEM UPGRADE KIT INSTALLATION PROCEDURES

### A1. INTRODUCTION

A1.1 Upgrading is changing one configuration of PABX to another configuration of PABX. There are two types of upgrades:

- An *SX-200* PABX can be upgraded to an *SX-200* DIGITAL PABX (456-port configuration).
- An *SX-200* DIGITAL PABX (336-port configuration, either basic system or fully configured, can be upgraded to a 672-port PABX.

#### Upgrading an *SX-200* PABX to an *SX-200* DIGITAL PABX

A1.2 The MITEL *SX-200* PABX can be upgraded to an *SX-200* DIGITAL PABX. In this procedure, the original welded Control cabinet becomes a peripheral cabinet. A new Control cabinet is added to the system.

In Chart A2-1 to Chart A2-8 of the procedure, the new Control cabinet is installed beside the original *SX-200* Control cabinet. It is equipped with a new console, new stations, trunks or features for bays 1, 2, or 3, and powered up. All testing can be completed, and the new database entered with CDE, including all equipment in the existing *SX-200* system.

In Chart A2-9 of the procedure, the existing *SX-200* Control cabinet is reconfigured as a peripheral cabinet. It is then powered up and added to the operating *SX-200* DIGITAL system.

#### Upgrading a 336-port to a 672-port System

A1.3 The MITEL *SX-200* DIGITAL PABX in 336-port configuration, can be upgraded to the 672-port configuration. In this procedure, the original Control cabinet becomes a peripheral cabinet. A new 672-port Control cabinet is added to the system.

## Upgrade Procedures

A1.4 Upgrade procedures are listed in Table A1-1.

<b>Table A1-1 Upgrade Procedures</b>	
<b>Installation Procedure</b>	<b>Chart</b>
Upgrade an Existing <i>SX-200</i> PABX to an <i>SX-200</i> DIGITAL PABX	Chart A2-1 to Chart A2-9
Upgrade a 336-port or Basic System to a 672-port System*	Chart A3-1

\*This chart only describes the conversion of the original Control cabinet into a peripheral cabinet. Installation of the 672-port system will not be complete. Outlines installation procedures for the 672-port system.

## Part Numbers

A1.5 Part numbers for the 336- to 672-port upgrade kit are shown in Table A1-2.

<b>Table A1-2 336- to 672-port Upgrade Kit Part Numbers</b>	
<b>Part Number</b>	
9109-129-010-NA	Canada
9109-129-000-SA	United States

## A2. UPGRADE AN SX-200 PABX TO AN SX-200 DIGITAL PABX (456-PORT)

### Introduction

A2.1 Table A2-1 indicates which charts to follow in sequence to upgrade an SX-200 PABX to an SX-200 DIGITAL PABX. When these charts are completed:

- A new SX-200 DIGITAL Control cabinet will be installed beside the original SX-200 PABX.
- The SX-200 DIGITAL system will be equipped with a new attendant console, stations, trunks, and features for Bays 1, 2, or 3.
- The SX-200 DIGITAL system will be powered up.
- The original system will have become an integral part of the SX-200 DIGITAL PABX, analog Bays 4 and 5.

**Notes:** 1. This procedure assumes that most of the existing stations and trunks remain the same in the peripheral cabinet as they were in the SX-200 system.

2. Expansion is provided by adding the new Control cabinet. The control cards from the SX-200 PABX are not needed except for the Scanner card.

3. The following circuits will be disconnected from the SX-200:

- music on hold source
- paging voice lines
- paging control lines
- night bell control line

4. The following SX-200 PABX connections are not used after an upgrade to an SX-200 DIGITAL PABX:

- console connections, including the connector on the maintenance panel.
- test line terminals (still connected to Bay 4, slot 1, circuit 1.
- special connections described in Note 3.
- RMATS modem or modules
- recorded announcement cards (RAC).

5. An SX-100® PABX can also be upgraded to an SX-200 DIGITAL PABX by following this procedure; however, there will never be an analog Bay 5.

6. When positioning the Control cabinet, allow room for any PABX accessories, such as a UPS or ac surge suppressor, or peripherals such as a maintenance terminal.

7. When referring to charts that include instructions for both 336-port and 672-port configurations of the SX-200 DIGITAL PABX, use only those instructions applying to the 336-port configuration.

**Table A2-1 Charts to Follow to Upgrade an SX-200 PABX to an SX-200 DIGITAL PABX**

Activity	Basic	Chart
<b>Prepare for Installation</b>		
Prepare for Installation	X	Chart 2-1
<b>Install Control Cabinet</b>		
Unpack and Inspect SX-200 DIGITAL Control Cabinet	X	Chart 3-1
Install SX-200 DIGITAL Control Cabinet	X	Chart 3-2
Label Bays and Relocate Ground Connection	X	Chart A2-1
<b>Handle Printed Circuit Cards</b>		
Unpack and Handle Printed Circuit Cards	X	Chart 5-1
Identify Analog Card Positions	@	Chart A2-2
<b>Install Digital Control Cards</b>		
Install the Main Control Card	X	Chart 6-1
Remove a Module From the Main Control Card	X	Chart 6-2
Install Floppy Disk Drive	X	Chart 6-6
Install Bay Power Supply	X	Chart 6-7
<b>Install Digital Peripheral Cards</b>		
Install Universal Card and Modules	#	Chart 8-1
Install Line (ONS, OPS, COV, or Digital) and DID Trunk Cards	#	Chart 8-2
Install LS/GS Trunk Card	#	Chart 8-3
Install T1-DS1 Trunk Card	#	Chart A2-3
<b>Install Analog Peripheral Cards</b>		
Install Digital Interface Card	#	Chart A2-4
Install Analog Peripheral Cards (Peripheral Control, Scanner, Eight-station Line, or SUPERSET Line cards)	#	Chart A2-5
Install CO Trunk Card (all types)	#	Chart A2-6
Install E&M Trunk Card	#	Chart A2-7
Install DID/Tie Trunk Card	#	Chart A2-8
<b>Bring System Into Service</b>		
Connect Cables Between System and Cross-connect Field	X	Chart 9-2
Power Up Control Cabinet	X	Chart 9-3
Add Stations, Trunks and Features to Database	X	described in para. A2.7

**Table A2-1 Charts to Follow to Upgrade an SX-200 PABX to an SX-200 DIGITAL PABX  
(continued)**

Activity	Basic	Chart
Reconfigure SX-200 PABX Cabinet as Peripheral Cabinet	X	Chart A2-9
Install Diskettes into Disk Drives on the System	X	Chart 9-5
Check System Initialization	X	Chart 9-7
Page 2 of 2		

**X means:** Do this chart.

**@ means:** Do this chart as required

**# means:** Type and number of circuit cards to be installed vary according to customer requirements.

## Install Control Cabinet

**A2.2** To convert an SX-200 PABX to an SX-200 DIGITAL PABX, an SX-200 DIGITAL Control cabinet must be added to the existing SX-200 PABX. The procedures for installing the Control cabinet are described in Section 3: Install Cabinets, of this practice. Refer to the following charts to unpack, inspect and install the Control cabinet:

- Chart 3-1: Unpack and Inspect SX-200 DIGITAL Control Cabinet
- Chart 3-2: Install SX-200 DIGITAL Control Cabinet

When you have completed those charts, proceed to Chart A2-1, below, to label bays and relocate the grounding connection.

### WARNING

The covers must always be installed over the fans to prevent accidental contact with rotating parts. The fans in the upper back door of the Control cabinet are high-airflow devices. Loose foreign objects placed near the fans can be pulled into the impellers. Service and installation personnel must keep a safe distance away from the fans to prevent loose parts of clothing or hair from becoming entangled in the fans.

**Chart A2-1 Label Bays and Relocate Ground**

Step	Action	Comments
<b>Label Bays</b>		
1.	Remove the bay numbering labels from inside the front door.	
2.	Stick the appropriate label onto the inside of each cardfile at the back.	Bay numbering is shown in Figure A2-1. In 456-port configuration, bays 1 and 2 will hold the control shelf. Bay 3 will be a digital peripheral bay.
3.	Keep unused numbers for new bays as the PABX is expanded.	Numbers are supplied for two cabinets.
<b>Relocate Ground</b>		
4.	Connect a temporary jumper between the SX-200 cabinet and the ground wire.	This keeps up a continuous connection between the PABX and the building ground (to keep the ground start trunks operational).  <b>Note:</b> Lighter gauge wire can be used, since the connection is only needed for a few minutes.
5.	Relocate the #6 AWG system ground to the common ground stud in the Control cabinet.	
6.	Install the intercabinet cable between the cabinets.	
7.	Connect the braid to the ground stud in each cabinet. Do not connect the signal part of the cable.	
8.	Disconnect the temporary jumper installed in Step 4.	
<b>Connect Signal Cables on Backplate</b>		
9.	Signal cabling on the rear of the Control cabinet is shown in Figure A2-2.	

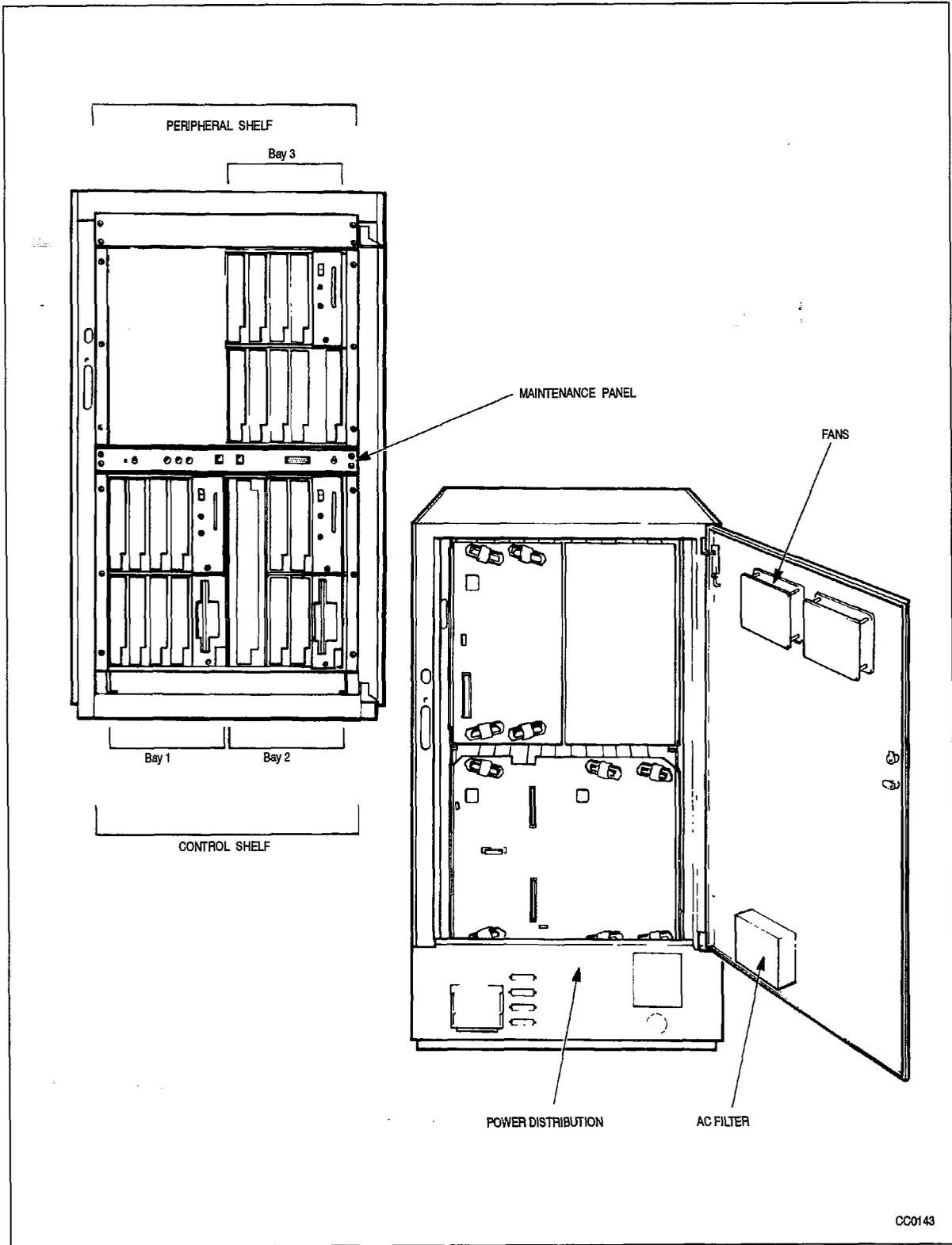
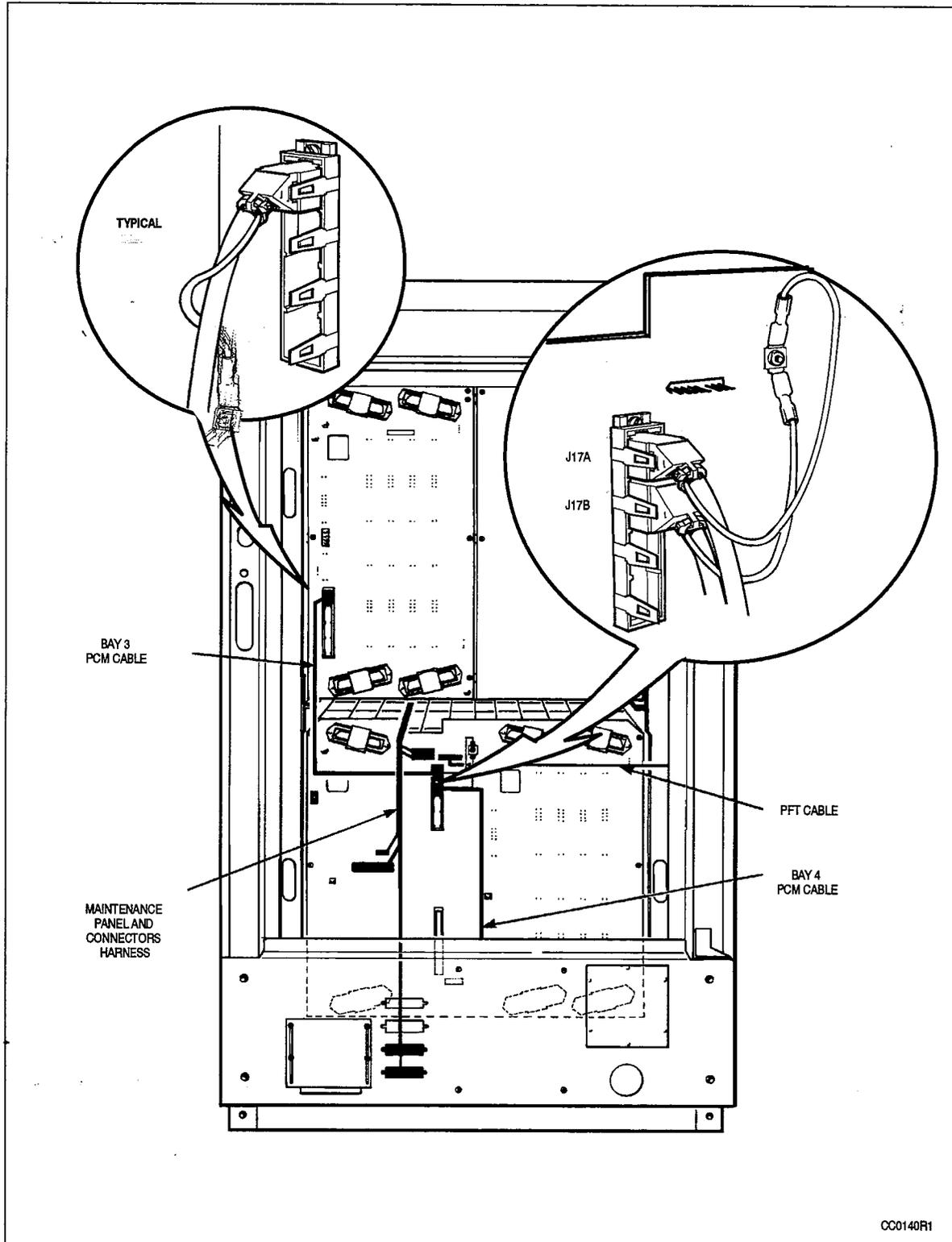


Figure A2-1 Control Cabinet With Digital Peripheral Shelf (456-port Configuration)



**Figure A2-2 Rear View of 456-port Control Cabinet – Signal Cables**

## Unpack and Handle Printed Circuit Cards

**A2.3** Cards are unpacked and handled for the upgraded *SX-200* DIGITAL PABX (456-port) as for any *SX-200* DIGITAL PABX. The procedures for handling, installing, and removing printed circuit cards are described in Section 5: Handle Printed Circuit Cards, of this practice. Refer to Chart 5-1: Unpack and Handle Printed Circuit Cards, for procedures on handling and installing printed circuit cards in the upgraded system.

In the 456-port configuration, analog peripheral cards are used as well as digital peripheral cards. Chart A2-2: Install Analog Peripheral Cards, provides additional instructions for installing analog peripheral cards in the system.

**Note: Circuit Cards in the 456-port Configuration PABX:**

The basic 456-port system with Bay 2 has a Main Control Card, one Bay Power Supply, and one Floppy Disk Drive (drive A). Bay 2 has up to four digital peripheral cards (two rows of two cards).

Digital peripheral Bay 1 has one Bay Power Supply and up to eight digital peripheral cards arranged in two rows (two rows of four). Bay 1 includes the second Floppy Disk Drive (drive B); this drive is powered from Bay 2.

Digital peripheral Bay 3 has one Bay Power Supply, a Bay Control Card (BCC), and up to eight digital peripheral cards arranged in two rows (two rows of four).

Analog peripheral Bay 4 has a Digital Interface Card, a Scanner card, a Peripheral Interface Card, and up to 15 analog peripheral cards.

Analog peripheral Bay 5 has a Digital Interface Card and up to 12 analog peripheral cards.

**Chart A2-2 Identify Analog Card Locations**

Step	Action	Comments
	<p><b>Follow General Procedures</b></p>	
1.	<p>Follow the general instructions for unpacking, handling, and installing printed circuit cards.</p>	<p>Given in Chart 5-1.</p>
	<p><b>Identify Analog Card Positions</b></p>	
2.	<p>Identify the appropriate slots for the analog control cards in the analog peripheral bays.</p>	<p><b>CAUTION:</b> Do not install cards yet. Card installation is described in Chart A2-4 to Chart A2-8.</p>
3.	<p>Put the line or trunk cards in positions with blue or black color-coded stripes in the analog peripheral bays.</p>	<p><b>Digital Interface Card:</b> slot 18, analog Bay 4 and 5 (yellow extractors)  <b>Peripheral Control Card:</b> slot 20, analog Bay 4 (red extractors)  <b>Scanner card:</b> slot 19, analog Bay 4 (orange extractors)</p>
4.	<p>Lift the card extractors, and slide the card into the slot. Press on the extractors after they mate with the notches in the shelf to seat the card firmly.</p>	<p>The card name is printed on each card. Line cards should be installed in the lowest numbered card positions in the analog peripheral bays. Trunk cards should be installed in the highest numbered card positions in the analog peripheral bays.</p>
4.	<p>Lift the card extractors, and slide the card into the slot. Press on the extractors after they mate with the notches in the shelf to seat the card firmly.</p>	<p>Each analog peripheral card has two card extractors. The extractors help seat the card firmly in the backplane. Extractors are also used to provide leverage to pull the card free of the backplane connector.</p>

**Install Digital Control Cards**

A2.4 The Main Control Card, Floppy Disk Drives and the Bay Power Supply are installed as described in Section 6: Installing Digital Control Cards, of this practice. Refer to the following charts to install the cards listed above:

- Chart 6-1: Install the Main Control Card
- Chart 6-6: Install Floppy Disk Drive
- Chart 6-7: Install Bay Power Supply

Where alternative procedures are provided for different configurations, follow the instructions for the 336-port configuration in the above charts.

## Install Digital Peripheral Cards

A2.5 Digital peripheral cards are installed in the upgraded system as described in Section 8: Installing Digital Peripheral Cards, in this practice. Refer to the following charts to install digital peripheral cards:

- Chart 8–1: Install Universal Card and Modules
- Chart 8–2: Install ONS Line Card
- Chart 8–2: Install OPS Line Card
- Chart 8–2: Install COV Line Card
- Chart 8–2: Install Digital Line Card
- Chart 8–2: Install DID Trunk Card
- Chart 8–3: Install LS/GS Trunk Card
- Chart 8–4: Install T1–DS1 Trunk Card

Where alternative procedures are provided for different configurations, follow the instructions for the 336–port configuration in the above charts.

Additional instructions for installing the T1–DS1 Trunk card in the upgraded *SX–200* DIGITAL PABX (456–port configuration) are provided in Chart A2–3. When you have completed Chart A2–3:

- The T1–DS1 trunk card will be unpacked and inspected.
- The T1–DS1 trunk card will be installed.
- The T1 adapter card will be installed.
- The T1 trunk adapter cable will be attached.

**Notes:** 1. The T1–DS1 trunk card interfaces to a single T1 trunk circuit. The system supports one T1–DS1 trunk card per digital bay.

2. The T1 clock module must already be installed on the Main Control Card.

3. The T1 trunk card kit includes:

- T1–DS1 trunk card
- T1 backplane adapter card
- T1 adapter cable assembly
- Hardware kit

**Chart A2-3 Install a T1-DS1 Trunk Card in the Upgraded SX-200 DIGITAL PABX**

Step	Action	Comments
	<p><b>Follow General Procedures</b></p>	
<p>1.</p>	<p>Follow the general instructions for installing the T1-DS1 Trunk card.</p>	<p>Given in Chart A2-2 and Chart 8-4. The only changes for the 456-port configuration are the slot and connector numbers, listed below.</p>
	<p><b>Install T1-DS1 Trunk Card</b></p>	
<p>2.</p>	<p>Insert the T1-DS1 Trunk card into its appropriate slot.</p>	<p><b>Digital Bay 1:</b> slot 6 only  <b>Digital Bay 2:</b> slot 4 only  <b>Digital Bay 3:</b> slot 6 only</p> <p>The T1-DS1 trunk card is a high-powered card. There can be only one trunk card in a bay.</p>
	<p><b>Install T1 Adapter Card</b></p>	
<p>3.</p>	<p>Install the T1 Adapter card at the backplane connector associated with the T1 trunk card slot.</p>	<p>Also described in Practice 9109-953-011-NA; Install a T1 Trunk Adapter Card and T1 Adapter Cable Assembly.</p> <p><b>Digital Bay 1, slot 6:</b> Connector J5  <b>Digital Bay 2, slot 4:</b> Connector J25  <b>Digital Bay 3, slot 6:</b> Connector J5</p> <p>Shown in Figure 8-4 (on the left side of the figure).</p>

## Install Analog Peripheral Cards

### Install Digital Interface Card

A2.6 When you have completed Chart A2–4:

- The Digital Interface Card will be unpacked and inspected.
- The Digital Interface Card will be installed in analog peripheral bays 3, 4 and 5.

**Note:** The Digital Interface Card has three functions:

- (a) It converts analog voice signals to digital PCM format and vice versa.
- (b) It transmits voice signals in digital PCM format between the analog peripheral shelf and the Main Control Card.
- (c) It provides a message link between the Main Control Card and the Peripheral Control Card on the analog peripheral shelf.

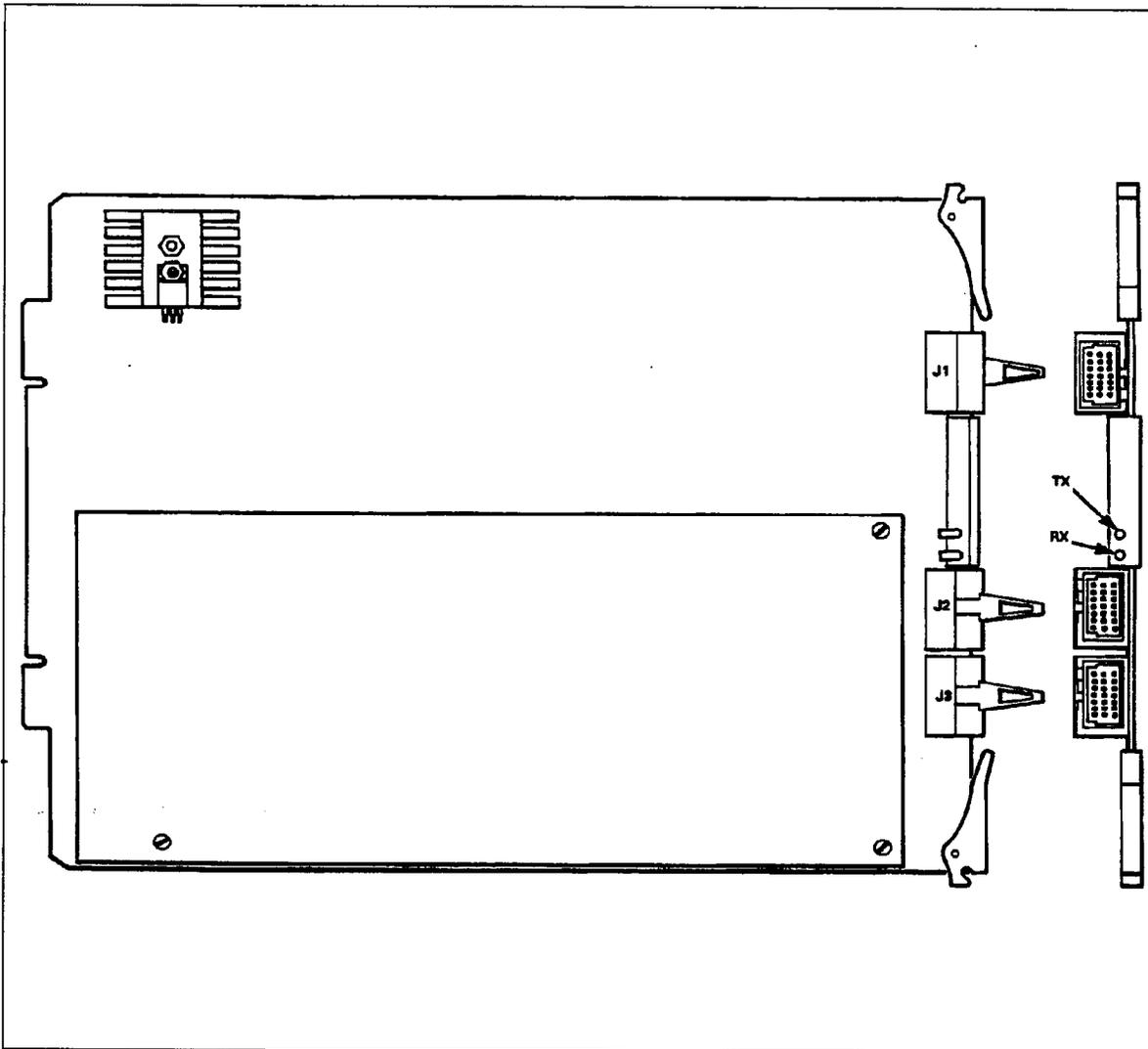
**Chart A2–4 Install Digital Interface Card**

Step	Action	Comments
	<b>Follow General Procedures</b>	
1.	Follow the general procedures for handling circuit cards.	Given in Chart 5–1 and Chart A2–2.
	<b>Unpack and Inspect</b>	
2.	Wearing the antistatic wrist strap, unpack and inspect the Digital Interface Card.	The card is shown in Figure A2–3.
3.	Complete repair tag, repack, and return any damaged or incorrect items.	
	<b>Install Digital Interface Card</b>	
4.	Slide the Digital Interface Card into its slot(s).	Analog Bay 4: slot 18 Analog Bay 5: slot 18
	<b>Connect PCM Cable</b>	
5.	Connect intercabinet PCM cable PN 9108–026–000–NA from the Control cabinet to J2 of the DIC card in Bay 4, slot 18.	<b>CAUTION:</b> The connector plug must be positioned so the cable hangs downwards from it. If a connector plug is reversed, equipment function will be impaired.

Page 1 of 2

**Chart A2-4 Install Digital Interface Card  
(continued)**

Step	Action	Comments
6.	Connect intershelf PCM cable PN 9108-027-000-NA between Digital Interface Cards in Bay 4, slot 18, J1, and Bay 5, slot 18, J3.	The intershelf cable connector on Bay 4, Slot 18, J1 only, has the cable exiting in an upward direction. Cable locations are shown in Figure A2-4.



**Figure A2-3 Digital Interface Card**

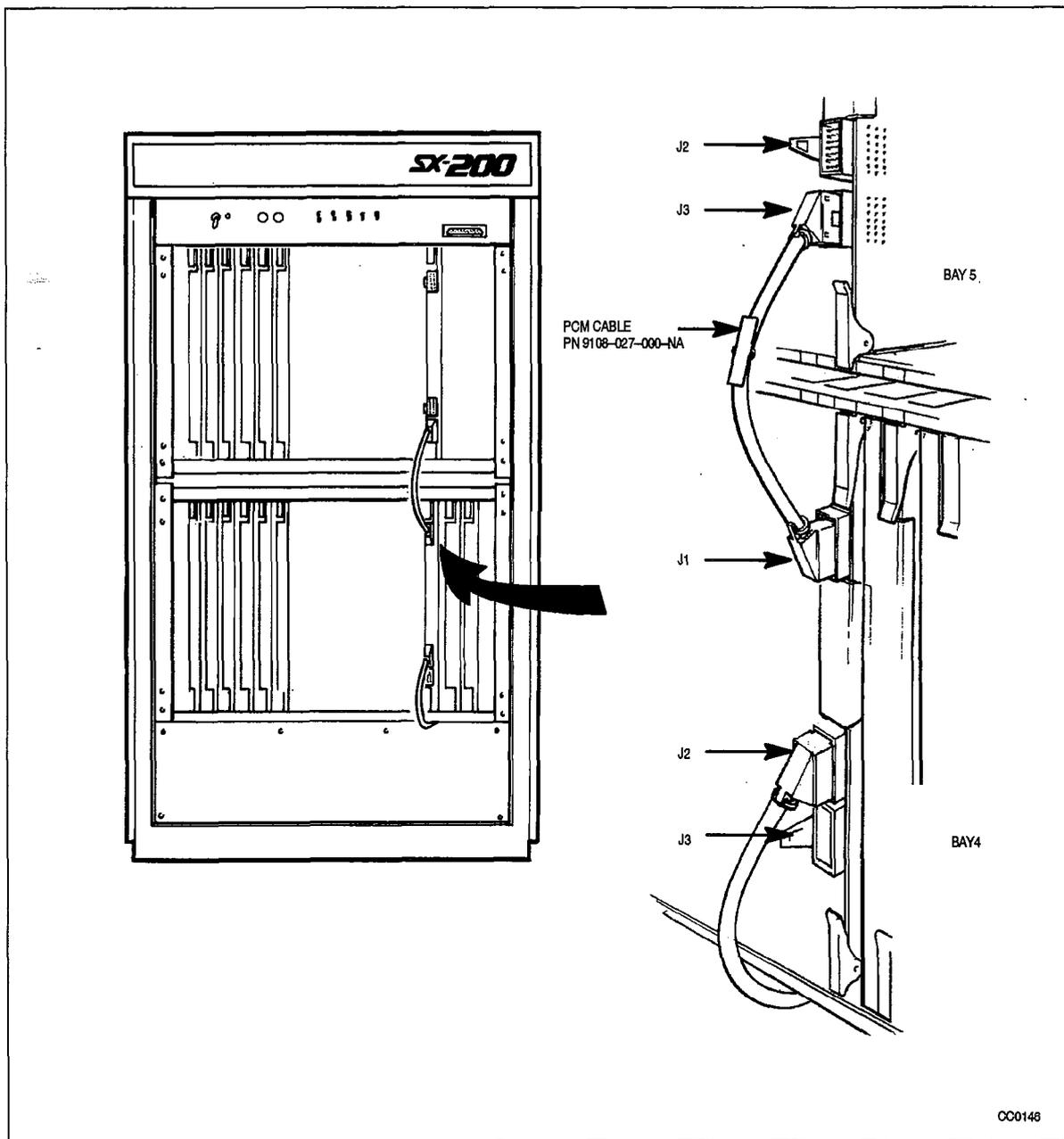


Figure A2-4 Location of PCM Cables

### Install Analog Control and Peripheral Cards

The following chart describes the installation of:

- the Peripheral Control Card (PCC)
- the Scanner Card
- the Eight-station Line Card
- the *SUPERSET* Line Card.

When you have completed Chart A2-5:

- The analog peripheral circuit card will be unpacked and inspected.
- The analog peripheral circuit card will be installed in the appropriate analog peripheral bay and slot (Bay 4 and/or 5).

- Notes:**
1. The PCC controls all basic functions of the analog peripheral shelf cards such as debouncing switchhooks, tone cadencing, signaling on trunks and monitoring hardware activity. It reports to the Main Control Card via the Digital Interface Card.
  2. The Scanner card scans the analog peripheral shelf ports to detect signals that require processor action, such as off-hook signals.
  3. The Eight-station Line card interfaces up to eight standard telephone sets (rotary or DTMF).
  4. The *SUPERSET* Line card interfaces up to eight *SUPERSET 3* or *SUPERSET 4* telephones.

**Chart A2-5 Install Analog Peripheral Cards**

Step	Action	Comments
	<b>Follow General Procedures</b>	
1.	Follow the general procedures for handling circuit cards.	Given in Chart 5-1 and Chart A2-2.
	<b>Unpack and Inspect</b>	
2.	Wearing the antistatic wrist strap, unpack and inspect the circuit card being installed.	
3.	Complete repair tag, repack, and return any damaged or incorrect items.	
	<b>Install Analog Peripheral Cards</b>	
4.	Slide the Peripheral Control card into analog peripheral Bay 4, slot 20.	This card also controls analog peripheral Bay 5.
	Slide the Scanner card into analog peripheral Bay 4, slot 19.	This card also controls analog peripheral Bay 5.
	Slide the Eight-station Line card into its slot(s).	Analog peripheral bays 4 and 5.
	Slide the <i>SUPERSET</i> Line card into its slot(s).	Analog peripheral bays 4 and 5.

### Install CO Trunk Card

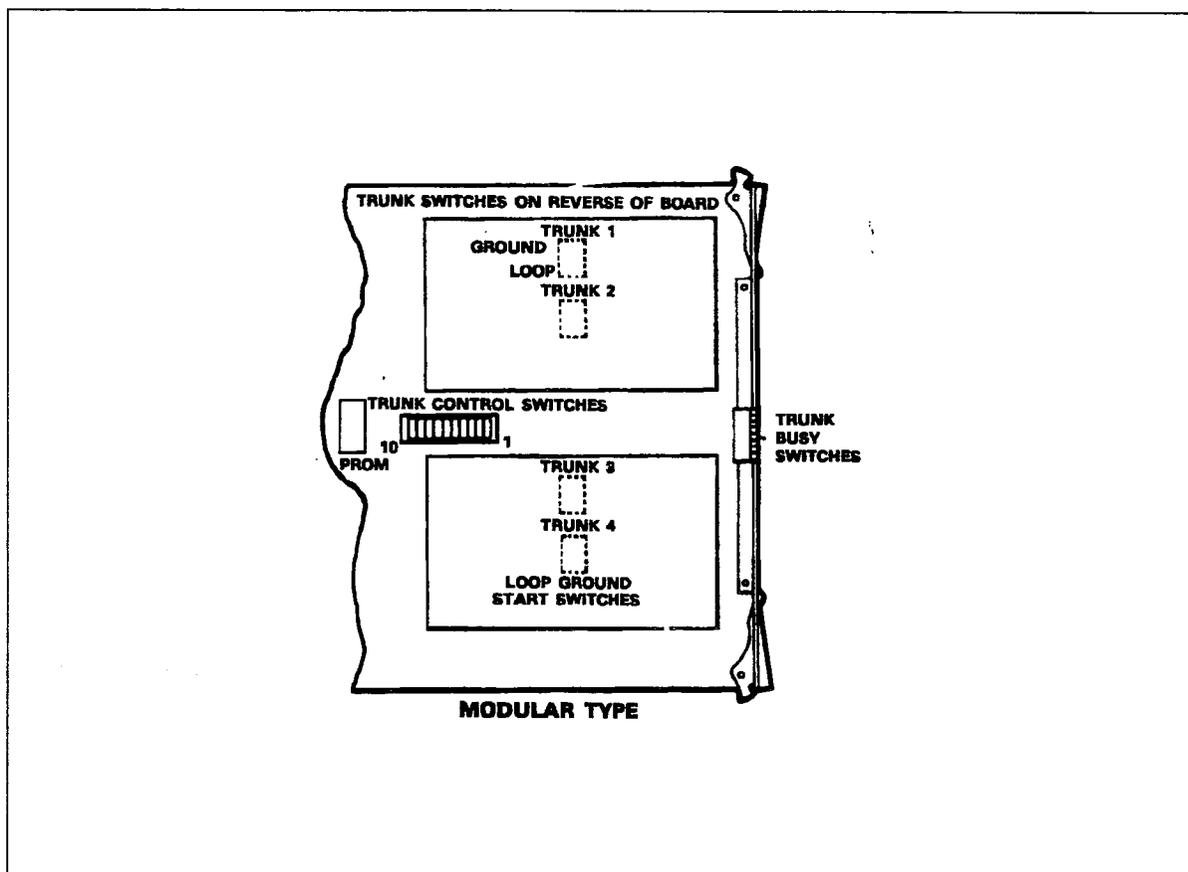
The CO Trunk card is available as a type –011/211 or as a type –211/311 card. The installation of both types is described here. When you have completed Chart A2–6:

- The CO (central office) trunk card will be unpacked and inspected.
- The trunk busy switches will be set.
- The loopstart/groundstart switches will be set.
- The trunk control switches will be set.
- The CO trunk card will be installed in analog peripheral bays 4 and 5.

**Notes:** 1. The CO trunk card serves four central office loopstart/groundstart trunks.

2. The type –011/111 CO trunk card is shown in Figure A2–5.

3. The type –211/311 CO trunk card is shown in Figure A2–6.



**Figure A2–5 CO Trunk Card (Types –011/111)**

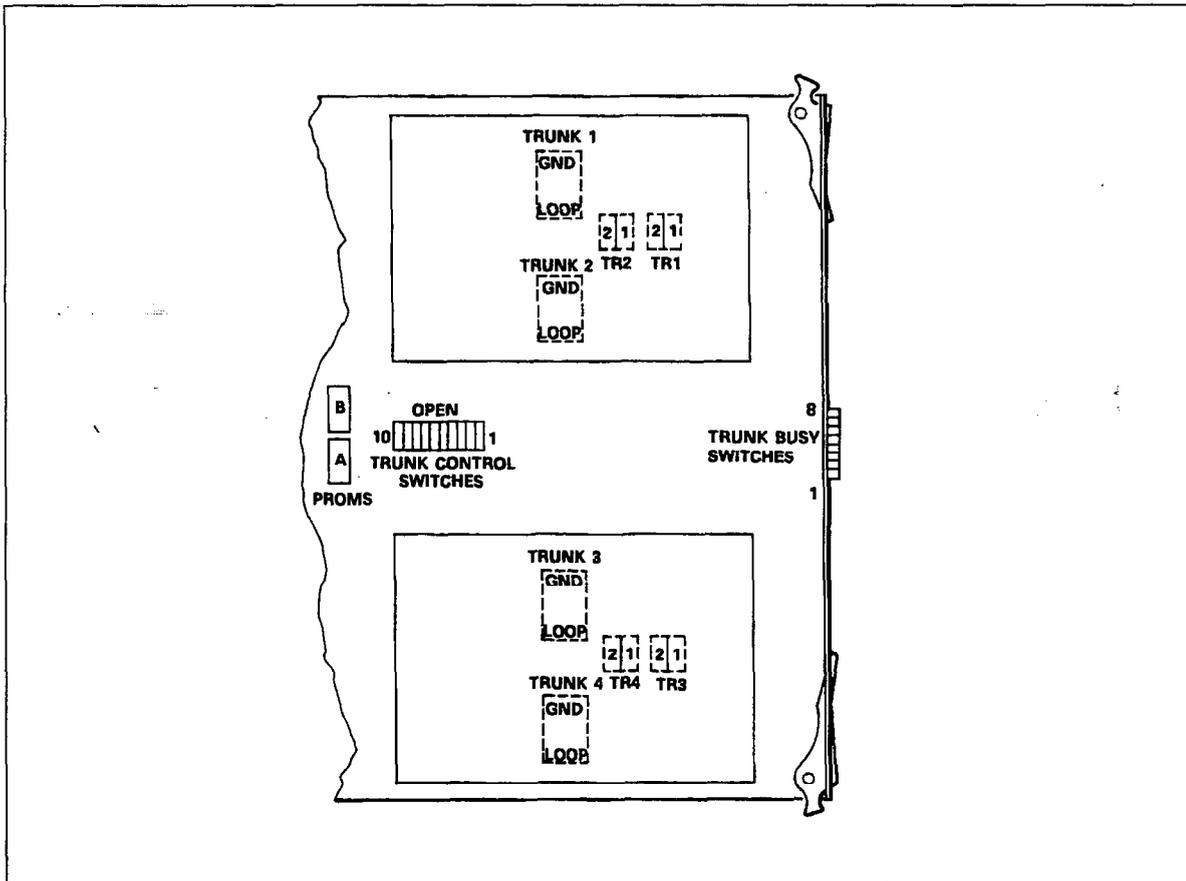


Figure A2-6 CO Trunk Card (Type -211/311)

Chart A2-6 Install CO Trunk Card

Step	Action	Comments
	<b>Follow General Procedures</b>	
1.	Identify trunk circuit by card position, type and circuit number.	
2.	Follow the general procedures for handling circuit cards.	Given in Chart 5-1 and Chart A2-2.
	<b>Unpack and Inspect</b>	
3.	Wearing the antistatic wrist strap, unpack and inspect the CO trunk card.	The type -011/111 CO trunk card is shown in Figure A2-5. The type -211/311 CO trunk card is shown in Figure A2-6.
4.	Complete repair tag, repack, and return any damaged or incorrect items.	

**Chart A2-6 Install CO Trunk Card  
(continued)**

Step	Action	Comments																						
5.	<p><b>Set Trunk Busy Switches</b></p> <p>Set trunk busy switches to the required configuration.</p>	<p>There are eight trunk busy DIP switches.</p> <p>Usual setting is: 1-4 OPEN, 5-8 CLOSED.</p> <p>Settings are described in Figure A2-7 and Table A2-2.</p>																						
6.	<p><b>Set Loopstart/Groundstart Switch</b></p> <p>Set loopstart/groundstart switch to LOOP (1) for a loopstart trunk, or to GROUND (2) for a groundstart trunk.</p>	<p>The method of finding out whether a trunk is loopstart or groundstart is described in Practice 9109-096-350-NA, Troubleshooting in the appendix called Loop Start vs Ground Start Check.</p>																						
7.	<p><b>Set Trunk Control Switches</b> (for trunks with PROMs 80304-0100, 80304-0101, 80304-0102, 80304-0103, 80304-0004.)</p> <p>Set third-wire switches to CLOSED.</p> <p><i>If trunk is to be used as a dictation trunk, or XT lead is used to give a busy condition, or XT lead is used to record meter pulses, set third-wire switches (switches 1, 2, 3, 4) to OPEN.</i></p>	<table border="0"> <thead> <tr> <th>Number</th> <th>Function</th> </tr> </thead> <tbody> <tr><td>1</td><td>3rd wire trunk 1</td></tr> <tr><td>2</td><td>3rd wire trunk 2</td></tr> <tr><td>3</td><td>3rd wire trunk 3</td></tr> <tr><td>4</td><td>3rd wire trunk 4</td></tr> <tr><td>5</td><td>Ignore reversals</td></tr> <tr><td>6</td><td>Release time A</td></tr> <tr><td>7</td><td>Make/break ratio</td></tr> <tr><td>8</td><td>Release time B</td></tr> <tr><td>9</td><td>Not used</td></tr> <tr><td>10</td><td>Not used</td></tr> </tbody> </table> <p>The usual setting is closed.</p>	Number	Function	1	3rd wire trunk 1	2	3rd wire trunk 2	3	3rd wire trunk 3	4	3rd wire trunk 4	5	Ignore reversals	6	Release time A	7	Make/break ratio	8	Release time B	9	Not used	10	Not used
Number	Function																							
1	3rd wire trunk 1																							
2	3rd wire trunk 2																							
3	3rd wire trunk 3																							
4	3rd wire trunk 4																							
5	Ignore reversals																							
6	Release time A																							
7	Make/break ratio																							
8	Release time B																							
9	Not used																							
10	Not used																							
8.	<p><i>If trunk is to ignore line reversals as an incoming call, set IGN REVS (switch 5) to OPEN.</i></p> <p><i>If trunk is to recognize line reversals as a incoming call, set IGN REVS to CLOSED.</i></p>	<p>The third-wire lead (when required) is connected to the local exchange:</p> <ul style="list-style-type: none"> <li>- to record meter pulses (extended from the CO)</li> <li>- when dictation or code calling equipment has been taken into service by other trunks and is causing a busy condition.</li> </ul> <p><b>OPEN:</b> recognize earth (ground) from the local exchange as a busy condition</p> <p><b>CLOSED:</b> no effect</p> <p>The usual setting is open.</p>																						

**Chart A2-6 Install CO Trunk Card  
(continued)**

Step	Action	Comments															
9.	Set the release time switches (switches 6 and 8) to the required release time setting.	<p>The usual setting is closed.</p> <p><b>Type -0100 to -0103 PROMs:</b> Valid trunk release times are recognized by the following release time settings on:</p> <p><b>OPEN:</b> greater than 50 ms of NO LOOP current. <b>CLOSED:</b> greater than 500 ms of NO LOOP current.</p> <p><b>Type -0004 PROMs:</b> Valid trunk release times are recognized by the following release time settings:</p> <table border="1"> <thead> <tr> <th>A</th> <th>B</th> <th>Release Time</th> </tr> </thead> <tbody> <tr> <td>Open</td> <td>Closed</td> <td>50 ms</td> </tr> <tr> <td>Closed</td> <td>Closed</td> <td>500ms</td> </tr> <tr> <td>Open</td> <td>Open</td> <td>2.5 s</td> </tr> <tr> <td>Closed</td> <td>Open</td> <td>Infinite (nonrelease)</td> </tr> </tbody> </table>	A	B	Release Time	Open	Closed	50 ms	Closed	Closed	500ms	Open	Open	2.5 s	Closed	Open	Infinite (nonrelease)
A	B	Release Time															
Open	Closed	50 ms															
Closed	Closed	500ms															
Open	Open	2.5 s															
Closed	Open	Infinite (nonrelease)															
10.	Set the make/break switch (switch 7) to CLOSED.	<p>Trunks with PROM 80304-0004 only.</p> <p><b>OPEN:</b> 33/66 make/break ratio <b>CLOSED:</b> 40/60 make/break ratio</p>															
11.	Set switches 9 and 10 to CLOSED. <b>Set XT Switches (Type -211/311 Card)</b>	<p>These switches are not used.</p> <p>Dual DIP switches on the module</p>															
12.	Set XT switch to -48 V or to GND.	<p>There is one XT switch per trunk.</p> <p><b>-48 V:</b> The circuit responds to a -48 Vdc signal (meter pulse or busy condition).</p> <p><b>GND:</b> The circuit responds to an ground signal (meter pulse or busy condition).</p>															

**Chart A2-6 Install CO Trunk Card  
(continued)**

Step	Action	Comments
13.	<p><b>Set High-Impedance Switch (Type -211/311 Card)</b></p> <p>Set the high-impedance switch to HI-Z or NORM.</p>	<p>Dual DIP switches on the module (shown in Figure A2-8).</p> <p>The high-impedance switch allows the proper impedance on incoming calls.</p> <p><b>HI-Z:</b> presents the normal impedance to incoming ringing signals, but a high blocking impedance to incoming voice signals.</p> <p><b>NORM:</b> presents a normal impedance to both ringing signals and voice signals.</p> <p><b>CAUTION:</b> In Canada, the high-Z switch must be set to HI-Z.</p>
14.	<p><b>Install CO Trunk Card</b></p> <p>Slide the CO trunk card into its slot(s).</p>	<p>Analog peripheral bays 4 and 5.</p>

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**Table A2-2 Trunk Busy Switch Settings**

Outgoing Busy Switch Set To:	Incoming Busy Switch Set To:	Result
<b>The following settings are recommended:</b>		
IDLE	BUSY	This is the normal switch setting. If the trunk is made busy by the attendant (using the attendant trunk busy-out feature from the console), an outgoing busy/incoming busy condition results. See BUSY/BUSY, below.
BUSY	BUSY	This is the recommended setting if a trunk is not installed, or is faulty and has to be taken out of service. The trunk cannot be used, either incoming to the PABX, or outgoing from the PABX.
<b>The following settings are NOT recommended:</b>		
BUSY	IDLE	Outgoing calls receive a busy tone. Incoming calls receive ringing tone but cannot be answered. Telephone service is paralyzed.
IDLE	IDLE	The trunk operates normally. However, if the trunk is made busy by the attendant (using the attendant trunk busy-out feature from the console), an outgoing busy/incoming idle condition results. See BUSY/IDLE, above.

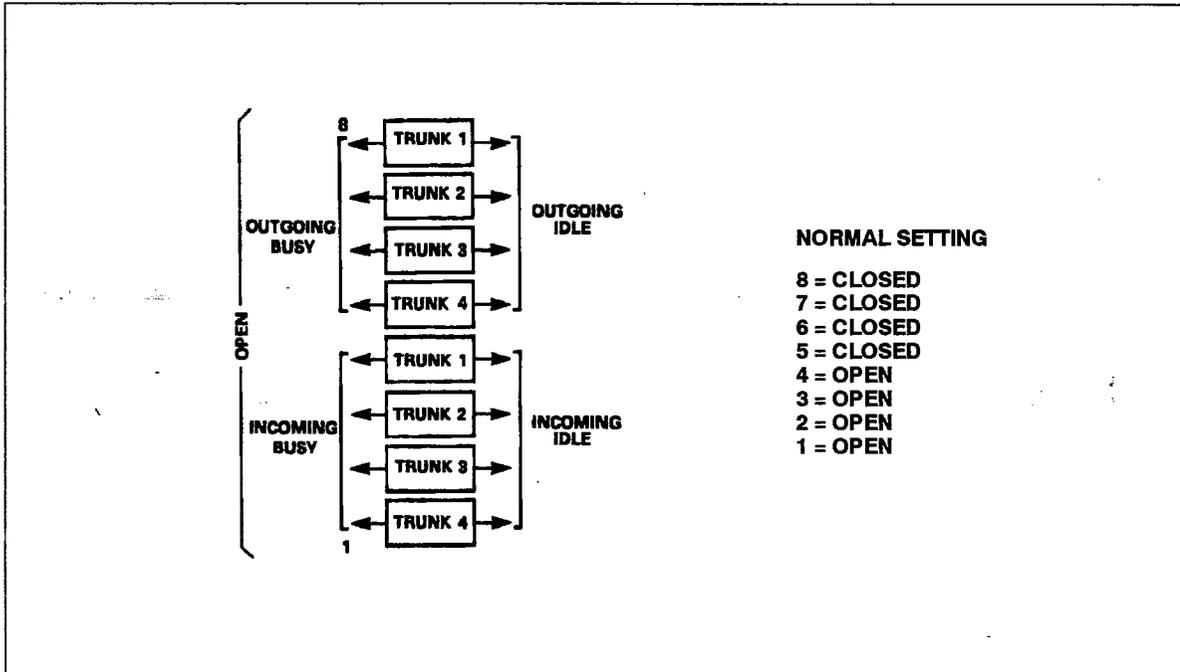


Figure A2-7 Trunk Busy Switch Settings

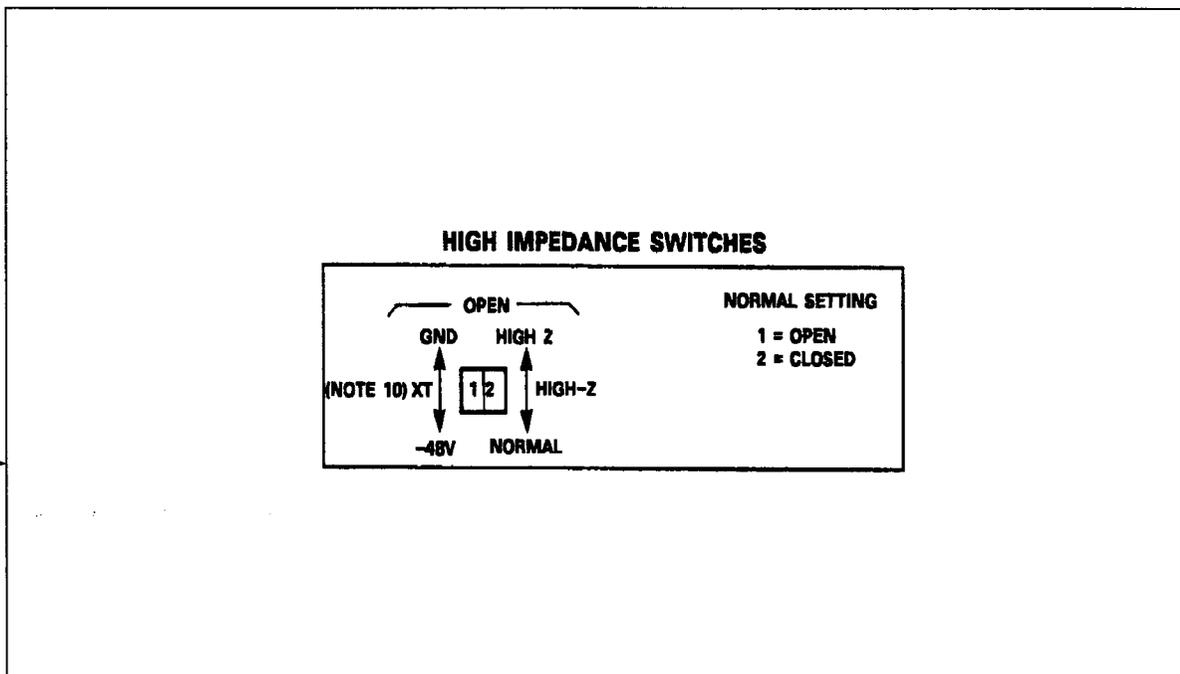


Figure A2-8 High Impedance Switch Settings (Type -211/311 CO Trunk Card)

### Install E&M Trunk Card

When you have completed Chart A2-7:

- The E&M trunk card will be unpacked and inspected.
- The trunk busy switches will be set.
- The trunk impedance switches will be set.
- The trunk control switches will be set.
- The E&M trunk card will be installed in analog peripheral bays 4 and 5.

**Note:** The E&M trunk card provides two 2- or 4-wire E&M tie trunks. The E&M trunk card is shown in Figure A2-9.

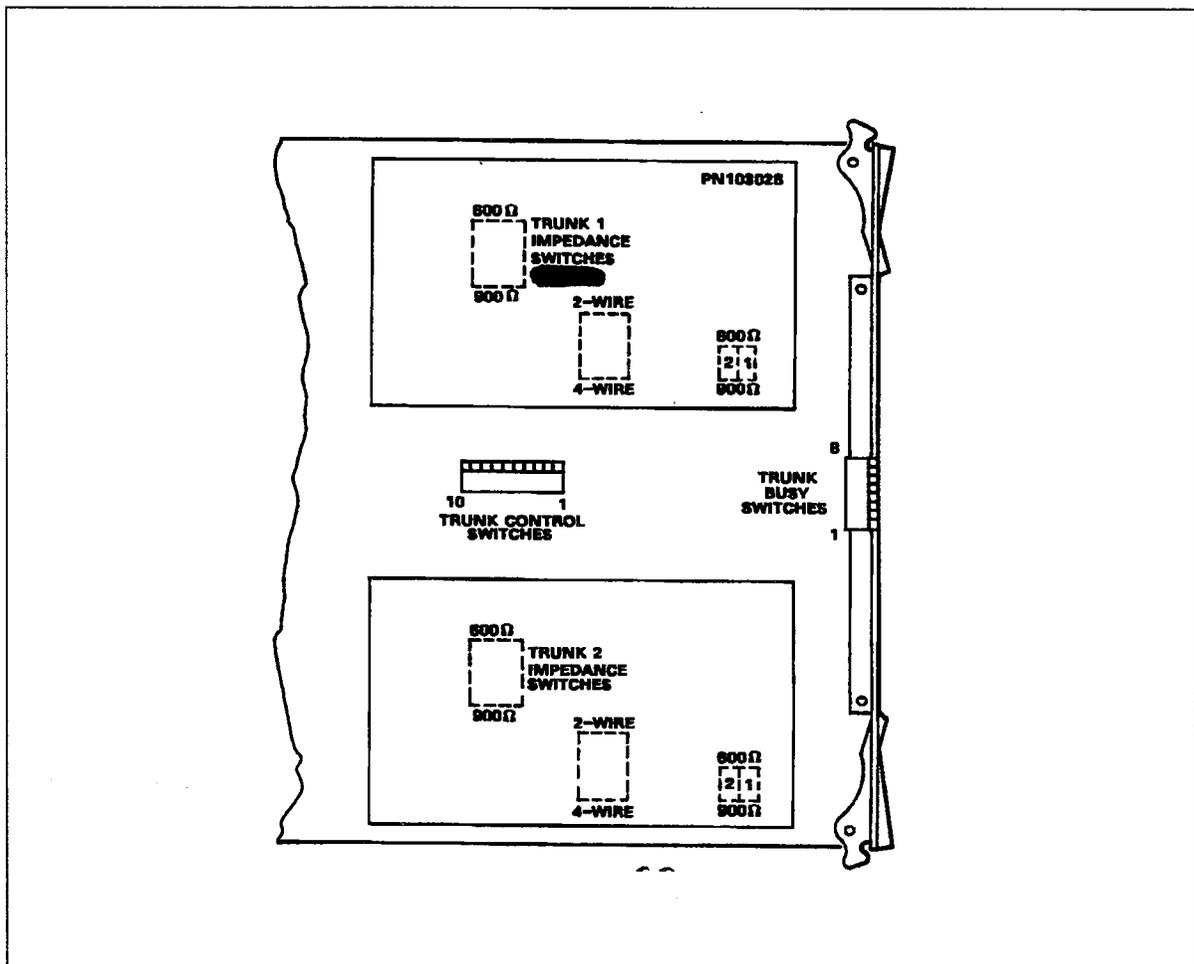


Figure A2-9 E&M Trunk Card

Chart A2-7 Install E&M Trunk Card

Step	Action	Comments									
1.	Identify trunk circuit by card position, type and circuit number.										
	<b>Follow General Procedures</b>										
2.	Follow the general procedures for handling circuit cards.	Given in Chart 5-1 and Chart A2-2.									
	<b>Unpack and Inspect</b>										
3.	Wearing the antistatic wrist strap, unpack and inspect the E&M trunk card.	The card is shown in Figure A2-9.									
4.	Complete repair tag, repack, and return any damaged or incorrect items.										
	<b>Set Trunk Busy Switches</b>	There are eight trunk busy DIP switches on the trunk card faceplate.									
5.	Set switches 7 and 8 to OUTGOING IDLE or OUTGOING BUSY as required for the trunks.	Normal setting is closed (outgoing idle). Settings are described in Figure A2-10.									
6.	Set switches 5 and 6 to INCOMING IDLE or INCOMING BUSY as required for the trunks.	Normal setting is open (incoming busy). Settings are described in Figure A2-10.									
7.	Set switches 3 and 4 to STOP DIAL or NOT STOP DIAL as required for the trunks.	Normal setting is closed (not stop dial). <b>Stop dial</b> means there can be a delay in transmitting dialed digits. If the delay is more than 4.5 seconds, the PABX assumes the call has been answered.									
8.	Set switches 1 and 2 (M lead) to M LEAD NORMAL or M LEAD INVERT as required for the trunks.	Normal setting is closed: (M lead normal) The position of the M lead switch determines the condition appearing on the M lead: <b>Conditions</b> <table border="1"> <thead> <tr> <th>Switch</th> <th>Idle</th> <th>Selzed</th> </tr> </thead> <tbody> <tr> <td>normal-</td> <td>ground</td> <td>-48 Vdc</td> </tr> <tr> <td>invert</td> <td>-48 Vdc</td> <td>ground</td> </tr> </tbody> </table> INVERT is necessary when two E&M trunks are connected back to back.	Switch	Idle	Selzed	normal-	ground	-48 Vdc	invert	-48 Vdc	ground
Switch	Idle	Selzed									
normal-	ground	-48 Vdc									
invert	-48 Vdc	ground									
	<b>Set Trunk Impedance Switches</b>										
9.	Set the trunk impedance switch(es) to 600 ohms or 900 ohms as required for the trunk(s).	For 600 or 900-ohm operation. The switches are on the rear face of the trunk card.									

**Chart A2-7 Install E&M Trunk Card  
(continued)**

Step	Action	Comments
	<b>Set Trunk Control Switches</b>	There are ten DIP switches in the center of the side of the card. The card is shown in Figure A2-11.
10.	Set the gain switch(es) (switches 1 and 2) to NORMAL or SPECIAL as required for the trunk(s).	Normal setting is closed (normal gain). <b>Normal:</b> provides 0.5 dB insertion loss. <b>Special:</b> provides signal level of +7 dB on the receive pair and -16 dB on the transmit pair, for four-wire applications such as microwave or RF transmission.
11.	Set the two-wire/four-wire switches (switches 3 and 4) to 2-WIRE or 4-WIRE as required by the trunk(s).	<b>Two-wire:</b> Audio is received on two wires and transmitted on the same two wires (Tip and Ring). <b>Four-wire:</b> Audio is received on two wires (Tip and Ring) and transmitted on two different wires (Tip and Ring).
12.	Set the incoming wink switch(es) (switches 5 and 6) to INCOMING WINK or NOT INCOMING WINK as required by the trunk(s).	The normal setting is closed (NOT INCOMING WINK). <b>Incoming wink:</b> a 180-msec assertion pulse on the M lead that signals the calling party that the trunk is ready to accept digits.
13.	Set the outgoing wink switch(es) (switches 7 and 8) to OUTGOING WINK or NOT OUTGOING WINK as required by the trunk(s).	The normal setting is closed (NOT OUTGOING WINK). <b>Outgoing wink:</b> The trunk waits for a 100 msec assertion pulse on the M lead before sending digits.
14.	Do not set switches 9 and 10.	These switches are not used.
	<b>Install E&amp;M Trunk Card</b>	
15.	Slide the E&M trunk card into its slot(s).	Analog peripheral bays 4 and 5.

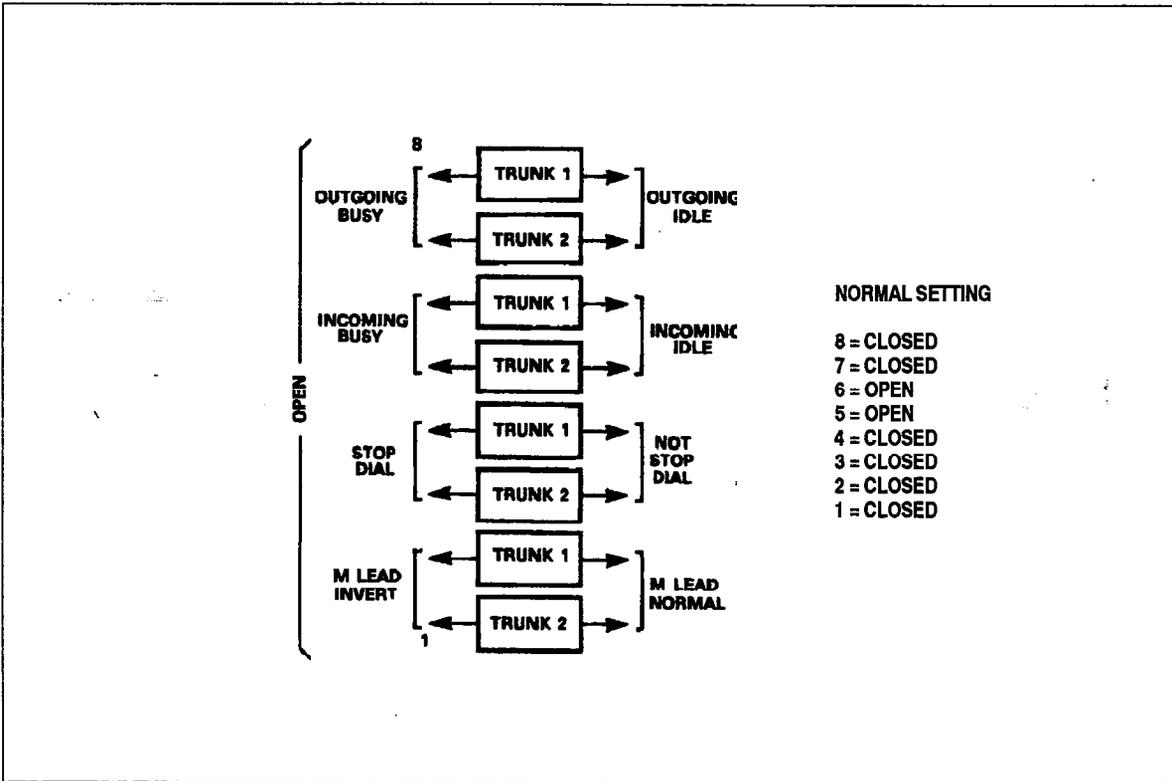


Figure A2-10 Trunk Busy Switch Settings

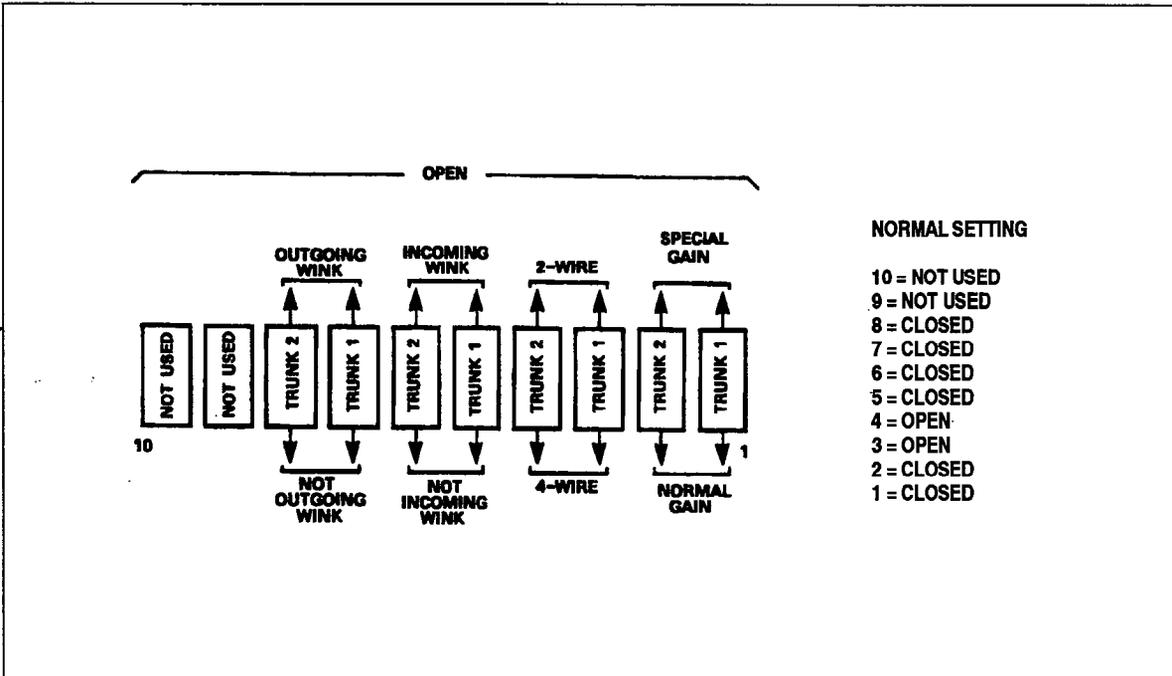


Figure A2-11 Trunk Control Switch Settings

### Install DID/Tie Trunk Card

When you have completed Chart A2–8:

- The DID/tie (direct inward dial/tie) trunk card will be unpacked and inspected.
- The trunk busy switches will be set.
- The trunk impedance switches will be set.
- The trunk control switches will be set.
- The DID/tie trunk card will be installed in analog peripheral bays 4 and 5.

**Note:** The DID/tie trunk card provides two direct inward dial trunks or loop tie trunks. The DID/tie trunk card is shown in Figure A2–12.

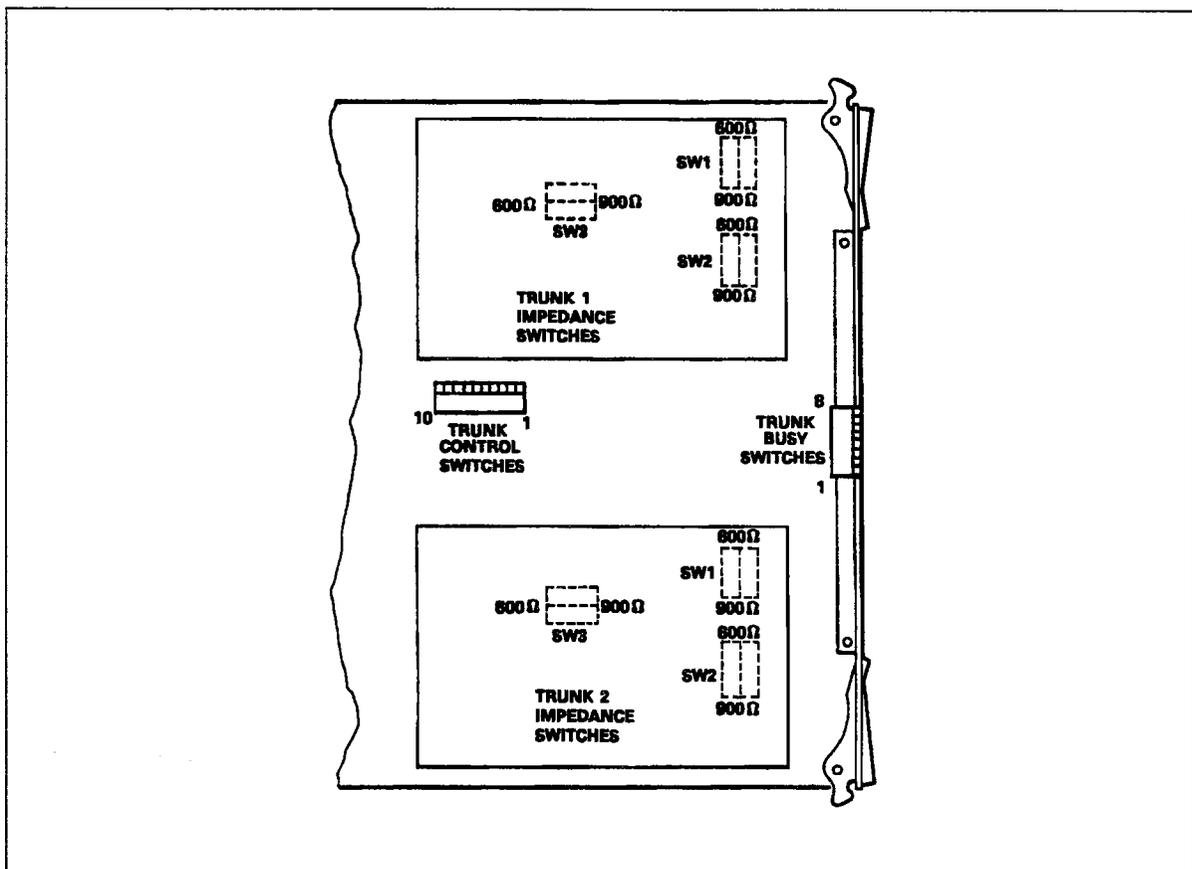


Figure A2–12 DID/Tie Trunk Card

**Chart A2-8 Install DID/Tie Trunk Card**

Step	Action	Comments
	<b>Follow General Procedures</b>	
1.	Identify trunk circuit by card position, type and circuit number.	
2.	Follow the general procedures for handling circuit cards.	Given in Chart 5-1 and Chart A2-2.
	<b>Unpack and Inspect</b>	
3.	Wearing the antistatic wrist strap, unpack and inspect the DID trunk card.	The card is shown in Figure A2-12.
4.	Complete repair tag, repack, and return any damaged or incorrect items.	
	<b>Set Trunk Busy Switches</b>	There are eight trunk busy DIP switches on the trunk card faceplate.
5.	Set switches 7 and 8 to OUTGOING IDLE or OUTGOING BUSY as required for the trunks.	Normal setting is closed (outgoing idle), as described in Table A2-3.
6.	Set switches 5 and 6 to INCOMING IDLE or INCOMING BUSY as required for the trunks.	Normal setting is open (incoming busy), as described in Figure A2-13.
7.	Set switches 3 and 4 to STOP DIAL or NOT STOP DIAL as required for the trunks.	Normal setting is closed (not stop dial).  <b>Stop dial</b> means there can be a delay in transmitting dialed digits. If the delay is more than 4.5 seconds, the PABX assumes the call has been answered and sends the digits.
8.	Set switches 1 and 2 (BG-PULS) to LOOP PULSING or BATTERY AND GROUND PULSING as required for the trunks.	Normal setting is closed (loop pulsing).  <b>Loop pulsing:</b> When this is set, Tip becomes 98 V, and Ring becomes 0 V. Since the distant party has normal battery feed, the effective Tip-Ring voltage drop is 98 V. This allows for longer loop dialing.
	<b>Set Trunk Impedance Switches</b>	
9.	Set SW1, SW2, and SW3 switches to 600 ohms or 900 ohms as required for the trunks.	For 600- or 900-ohm operation.
	<b>Set Trunk Control Switches</b>	There are 10 trunk control switches in the middle of the board.
10.	Set switches 1, 2, (switch B) and 3 and 4 (switch A) as required for the trunk(s).	Shown in Figure A2-14 and Table A2-3.

Chart A2-8 Install DID/Tie Trunk Card  
(continued)

Step	Action	Comments
11.	Set the incoming wink switches incoming wink switch(es) (switches 5 and 6) to INCOMING WINK or NOT INCOMING WINK as required by the trunk(s).	The normal setting is closed (NOT INCOMING WINK). <b>Incoming wink:</b> a 180-msec assertion pulse on the M lead that signals the calling party that the trunk is ready to accept digits.
12.	Set the outgoing wink switch(es) (switches 7 and 8) to OUTGOING WINK or NOT OUTGOING WINK as required by the trunk(s).	The normal setting is closed (NOT OUTGOING WINK). <b>Outgoing wink:</b> The trunk waits for a 100-msec assertion pulse on the M lead before sending digits.
13.	Do not set switches 9 and 10.	These switches are not used.
<b>Install DID/Tie Trunk Card</b>		
14.	Slide the DID/Tie trunk card into its slot(s).	Trunk cards should be installed in highest numbered slots.

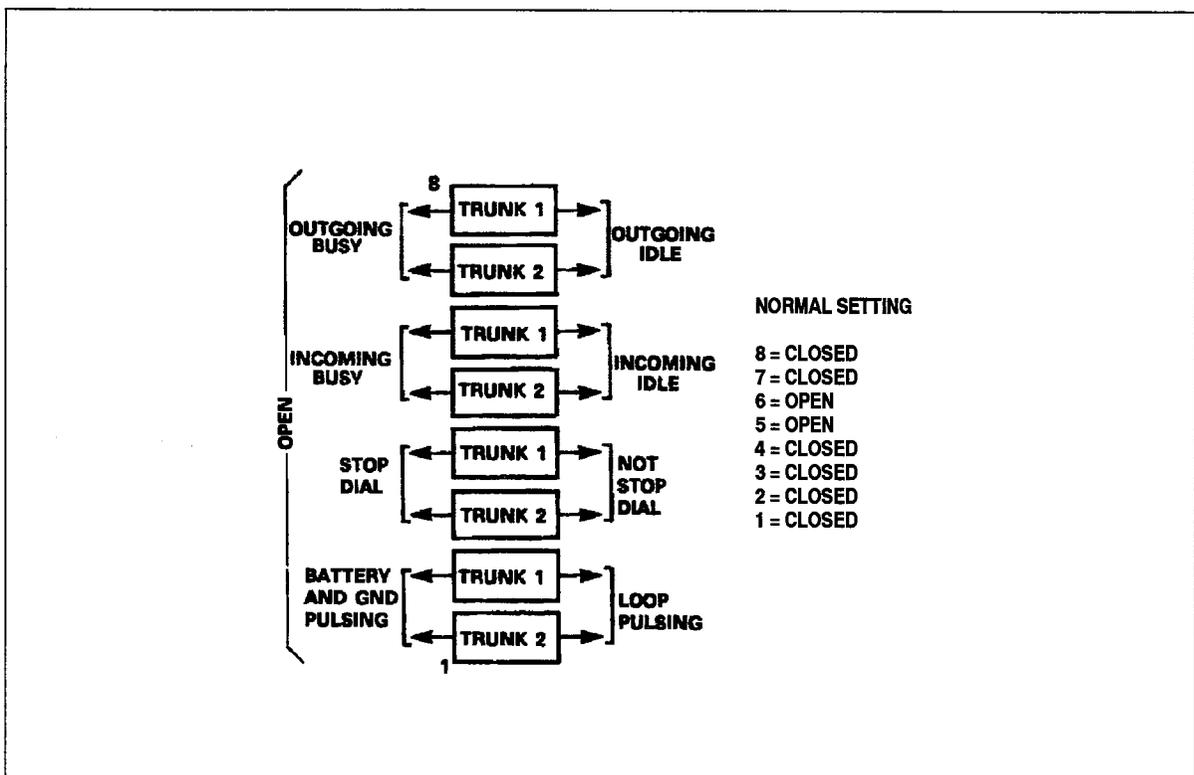


Figure A2-13 Trunk Busy Switch Settings

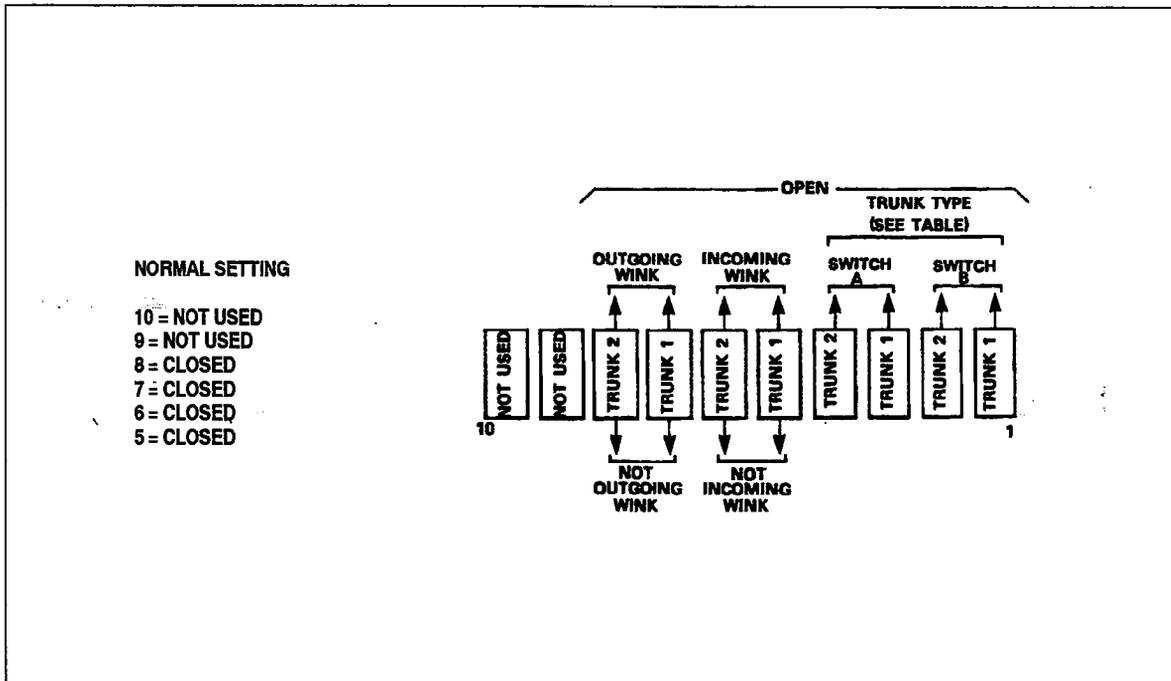


Figure A2-14 Trunk Control Switch Settings

Table A2-3 Settings for Switches A and B

Trunk Type	Switch A	Switch B
DID trunk	CLOSED	CLOSED
Loop tie trunk	CLOSED	OPEN
Incoming dial – outgoing auto	OPEN	CLOSED
Not used	OPEN	OPEN

## Bring Upgraded SX-200 DIGITAL System Into Service

### Cable to Cross-connect Field and Power Up Control Cabinet

A2.7 The upgraded SX-200 DIGITAL PABX, 456-port configuration, is cabled to the cross-connect field and powered up in the same manner as the 336-port configuration. The procedures for bringing the SX-200 DIGITAL PABX into service are described in Section 9: Bring System into Service, of this practice. Refer to the following charts to cable to the cross-connect field and power up the Control cabinet:

- Chart 9-2: Connect Cables Between PABX and Cross-connect Field
- Chart 9-3: Power Up Control Cabinet

Existing station and trunk connections should be kept the same for both systems. This minimizes wiring changes. These stations can be located beside the SX-200 DIGITAL PABX to make testing easier. It also minimizes disruption to the existing PABX. Stations, trunks and features must be added to the database. Procedures for CDE changes are described in Practice 9109-096-210-NA: Customer Data Entry.

**WARNING**

The fans in the upper back door of the 456-port Control cabinet are high-air-flow devices. Loose foreign objects placed near the fans can be pulled into the impellers. Service and installation personnel must keep a safe distance away from the fans to prevent loose parts of clothing or hair from becoming entangled in the fans. The covers over the fans prevent accidental contact with rotating parts and must always be installed.

### Reconfigure SX-200 PABX Cabinet as Peripheral Cabinet

This chart provides the procedure to follow for upgrading an existing SX-200 PABX cabinet to a new SX-200 DIGITAL PABX Peripheral Cabinet. When you have completed Chart A2-9:

- The original SX-200 cabinet will be powered down.
- It will be reconfigured as a peripheral cabinet.
- The "new" peripheral cabinet will be added to the system.

**Notes:** 1. Expansion is provided by adding the new Control cabinet. The control cards from the SX-200 PABX are removed except for the Scanner Card.

2. The following circuits must be disconnected from the SX-200 PABX:
- music on hold source
  - paging voice lines
  - paging control lines
  - night bell control lines

3. The upgrade is completed at a time when there is no traffic.

**Chart A2-9 Reconfigure SX-200 PABX Cabinet as Peripheral Cabinet**

Step	Action	Comments
<b>Power Down SX-200 PABX</b>		
1.	Unlock and open the front door of the operating Control cabinet.	
2.	Set the main cabinet ac power input switch to OFF.	Located on lower half of rear door of the operating Control cabinet.
3.	Disconnect the main ac power input to the cabinet.	
4.	Unlock and open rear door.	
<b>Remove Circuit Cards</b>		
5.	Wearing the antistatic wrist strap, remove the following circuit cards from the old SX-200 PABX: <ul style="list-style-type: none"> <li>- console</li> <li>- RCP</li> <li>- tone</li> <li>- IPC</li> <li>- memory (if present in position 21 or 22)</li> <li>- receiver</li> <li>- RAD</li> <li>- RAC</li> </ul>	Existing station and trunk cards, and the Scanner card, remain in their original positions.
6.	Package the cards in antistatic bags and shipping cartons for return to the supplier.	
<b>Remove Cables and Interface Boards</b>		
7.	From the rear of the cabinet, remove the following: <ul style="list-style-type: none"> <li>- console cables</li> <li>- intershelf cables P101 and P102</li> <li>- printer cable</li> </ul>	
8.	Remove console interface boards.	The shelf must be loosened and moved forward to access the screws in the boards.
9.	Replace the antistatic wrist strap.	
<b>Connect Printer Cable to SX-200 DIGITAL PABX</b>		
10.	Connect the printer cable, if present, to the printer port on the back of the cabinet.	
<b>Remove Consoles</b>		
11.	Remove all existing SX-200 PABX consoles from the system.	

**Chart A2-9 Reconfigure SX-200 PABX Cabinet as Peripheral Cabinet  
(continued)**

Step	Action	Comments
	<b>Connect PFT Card in Peripheral Cabinet</b>	
12.	Connect a PFT monitor cable between P18 of the interconnect card , and TB1-7 of the PFT card in the SX-200 cabinet (now the SX-200 DIGITAL peripheral cabinet).	<b>Note:</b> In the SX-200 DIGITAL PABX, TB1-7 is called TB401-7.  An SX-100 cabinet can be upgraded to an SX-200 DIGITAL cabinet by following this chart; however, there cannot be a Bay 5. In an SX-100 cabinet, the PFT monitor cable should be connected between P18 of the Interconnect Card and J14.
	<b>Install Circuit Cards in Peripheral Cabinet</b>	
13.	Add Peripheral Control Card to Bay 4 slot 20 and the Digital Interface Card to Bay 4 (and Bay 5) slot 18	
14.	If peripheral shelf card assignments are to be changed, reposition the cards at this time.	Existing station and trunk assignments in the SX-200 cabinet should not be changed at this time. This minimizes wiring changes.
15.	Add new cards.	
	<b>Connect PCM Cables in Peripheral Cabinet</b>	
16.	Connect the PCM cables.	
	<b>Install Features in Control Cabinet</b>	
17.	Install miscellaneous features such as music on hold, paging, and night bells.	These features were removed from the SX-200 cabinet.
	<b>Power Up Peripheral Cabinet</b>	
18.	Plug the line cord into the ac receptacle.	AC power LED on the back door power supply is on.
19.	Turn on breaker at rear of cabinet on the back door power supply.	
20.	Open the front door of the peripheral cabinet.	
21.	On the maintenance panel, set the system power switch to ON.	SYSTEM POWER LED lights. Power supply EQUIPMENT SHELF POWER LED lights.
22.	Close and lock the front door.	

### **Install Diskettes on Disk Drives**

When the system has been powered up, floppy disks can be installed on the system. Refer to the following charts for the appropriate procedures:

- Chart 9-5: Install Diskettes into Disk Drives on the *SX-200* DIGITAL PABX
- Chart 9-7: Check System Initialization

Where alternative procedures are provided for different configurations, follow the instructions for the 336-port configuration in the above charts.

### A3. UPGRADE A 336–PORT SYSTEM TO A 672–PORT SYSTEM

A3.1 When you have completed Chart A3–1:

- The existing Control cabinet will be converted to the peripheral cabinet for a 672–port system.

**Notes:** 1. When you have finished this chart, installation of the 672–port system will not be complete. Refer to Section 3 for installation procedures for the 672–port system.

2. The Upgrade Kit contains:

- blanking panel (narrow)
- blanking panel (wide)
- conversion hardware
- adapter plate
- peripheral cardfile with one backplane
- EDG cable 75 cm (30 in.)
- bay number labels

**Chart A3–1 Upgrade a 336–port Basic System to a 672–port System**

Step	Action	Comments
	<b>Power Down System</b>	
1.	Unlock and open the front door of the operating Control cabinet.	
2.	Unlock the disk drive doors and latches.	The drives must not be active when diskettes are removed.
3.	Remove any diskettes from the disk drives.	
4.	Set to off, the main cabinet ac power input switch.	Located on lower half of rear door of the operating Control cabinet.
5.	Disconnect the main ac power input to the cabinet.	
6.	Unlock and open rear door.	
7.	Remove the line cords from the bay power supply cards.	
8.	Cut the tie wraps holding power cords to the sides of both card files.	
	<b>Remove Cables</b>	
9.	Identify and remove the PCM cables from the backplane.	
10.	Identify and remove the telecommunication cables from the backplane.	

**Chart A3-1 Upgrade a 336-port Basic System to a 672-port System  
(continued)**

Step	Action	Comments
	<b>Remove Cards</b>	The cards are reused in the new 672-port system.
11.	Wearing the antistatic wrist strap, remove all the cards from the cabinet.	Described in Section 2.
12.	Store each card in an antistatic bag.	
13.	Keep in a safe place until needed.	
14.	Replace the antistatic wrist strap.	
	<b>Remove Shelf</b>	This peripheral shelf is reused in Step 43.
15.	Remove the two screws from the panel above the upper shelf (if present).	Screws are used in Step 36.
16.	Identify and remove all ground connections to each bay.	
17.	Disconnect the ground wires from the cabinet. (Leave them attached to the bay.)	
18.	Disconnect the PCM cables.	
19.	Disconnect the ground wires attached to the control shelf. (Do not disconnect them from the peripheral shelf backplane.)	
20.	Remove the screws at the front of the shelf.	
21.	Slide the shelf out.	
	<b>Remove Maintenance Panel</b>	
22.	Remove the maintenance panel connectors from the rear panel. (Do not disconnect them from the control shelf.)	
23.	Using 4-32 self-tapping screws and washers, install the small blanking panel in the back panel to cover the unused maintenance connector holes.	
	<b>Remove PFT Cards</b>	
24.	Wearing the antistatic wrist strap, remove the PFT cards and the intercard wiring harnesses.	
25.	Store each card in an antistatic bag.	
26.	Keep in a safe place until needed.	
27.	Replace the antistatic wrist strap.	

**Chart A3–1 Upgrade a 336–port Basic System to a 672–port System  
(continued)**

Step	Action	Comments
	<b>Remove Control Shelf</b>	This control shelf is not reused.
28.	Disconnect the ground wires from the cabinet. (Leave them attached to the control shelf.)	
29.	Remove the maintenance panel and place it diagonally across the control shelf.	
30.	Tie wrap the panel to the control shelf.	
31.	Remove the temperature sensor assembly (if present) and tie wrap it, and its wiring harness, to the control shelf.	
32.	Remove the screws at the front, and slide the control shelf, and attached assemblies, out of the cabinet.	Screws are used in Step 43.
	<b>Remove Ground</b>	
33.	Remove the #6 AWG ground wire from its lug on the cabinet ground stud.	This ground wire will be reconnected to the new 672–port Control cabinet.
34.	Remove the lug.	
35.	Replace the other washers and nuts on the stud until needed.	
	<b>Install Peripheral Shelf</b>	The shelf must have two backplanes to allow grounding connections to be extended to the upper backplane.
36.	Slide the shelf into the cabinet at the position of the former control shelf, and fasten with eight hex–head screws.	Removed in Step 20.
37.	Install the smaller blanking panel at the top of the shelf using two screws removed in Step 15.	This panel replaces the maintenance panel.
38.	Connect the two safety ground wires to the cabinet rails using #10–32 screws.	
39.	Connect the DG black ground wire to the main ground stud in the lower left cabinet base. If there is no stud, attach it to the cabinet side rail.	
40.	Connect the EDG braided ground wire to the main ground stud in the left side of the cabinet base.	
41.	<i>Cabinets with one ground stud on right:</i> Use the 30–cm (12–in) EDG braided ground wire from the removed control shelf to connect the bottom right DG stud of Bay 4 to the cabinet ground stud.	As seen from the rear.

**Chart A3-1 Upgrade a 336-port Basic System to a 672-port System  
(continued)**

Step	Action	Comments
42.	<p><i>Cabinets with one ground stud on right:</i> Use the 75-cm (30-in) ground cable supplied in the kit to connect the top left corner EDG ground stud of Bay 4 to the cabinet ground stud.</p>	As seen from the rear.
	<p><b>Replace Upper Shelf</b></p>	Both peripheral shelves are the same; backplanes are optional.
43.	<p><i>If an upper shelf was present,</i> slide it back into position above the lower shelf, and fasten the front with eight 10-32 screws removed in Step 32.</p> <p><b>Reconnect Ground</b></p>	
44.	<p>Reconnect all the ground wires to cabinet and to ground studs.</p> <p><b>Label Bays</b></p>	
45.	<p>Attach bay number labels to each inside cardfile at the back of the cabinet.</p> <p><b>Install Blanking Panel</b></p>	
46.	<p>Install the larger blanking panel at the top front of the cabinet using two 10-32 screws from the kit.</p> <p><b>Install Cover Plate</b></p>	
47.	<p>Remove the cover plate on the right side of the cable exit panel at the back of the cabinet.</p>	
48.	<p><i>If the cable exit panel was flat,</i> replace the cover plate with the cable adapter plate.</p>	
49.	<p>Fasten the plate with six 6-32 self-tapping screws and external tooth lockwashers.<sup>1</sup></p>	The plate must be positioned with the cable hole towards the bottom.

<sup>1</sup> The original Control cabinet has now been made into a peripheral cabinet for the new 672-port system. The control shelf from the original Control cabinet is not reused. (The 672-port Control cabinet comes with a control shelf installed.) The digital peripheral shelf (if present) in the original Control cabinet has been moved to the position formerly occupied by the control shelf, and is now digital peripheral Bay 4 in the new 672-port system.

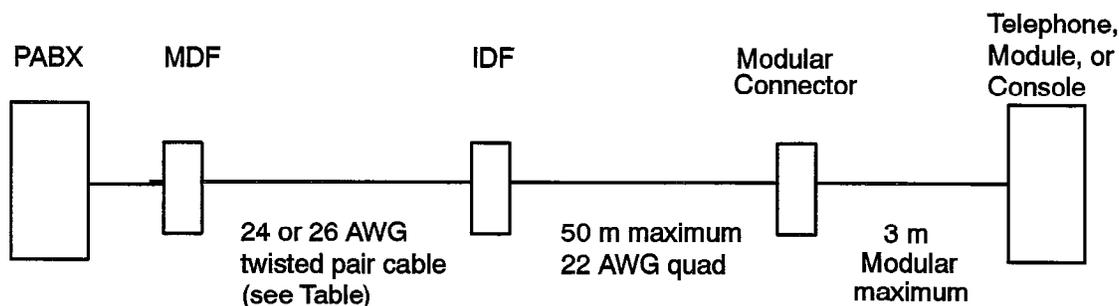
# Appendix B.

## PERIPHERAL DEVICE CONNECTION TO THE DIGITAL LINE CARD

### B1. LOOP LENGTH SPECIFICATIONS

B1.1 The following rules for loop lengths between the Digital Line Card within the PABX and the *SUPERSET 3 DN*, *SUPERSET 4 DN*, *SUPERSET 401*, *SUPERSET 410*, *SUPERSET 420*, and *SUPERSET 430* telephones, *SUPERSET DSS* module, or *SUPERCONSOLE 1000* Attendant Console must be followed for proper operation of the device:

Maximum loop length (twisted pair) 24 or 26 AWG	see Table B-1
Maximum length of quad cable (22 AWG)	50 m (160 ft)
Modular Line Cord	3 m (10 ft)



**Table B-1 Loop Lengths for Digital Peripheral Devices**

Peripheral Device	Maximum Loop Length	
	Without Bridge Tap	With Bridge Tap
<i>SUPERSET 3 DN Mk1 (9183-000-001)</i>	1000 m	not permitted
<i>SUPERSET 3 DN Mk2 (9183-000-200)</i>	1000 m	1000 m
<i>SUPERSET 4 DN Mk1 (9184-000-001)</i>	1000 m	not permitted
<i>SUPERSET 4 DN Mk2 (9184-000-200)</i>	1000 m	1000 m
<i>SUPERSET 401</i>	1000 m	1000 m
<i>SUPERSET 410</i>	1000 m	1000 m
<i>SUPERSET 420</i>	1000 m	1000 m
<i>SUPERSET 430</i>	1000 m	1000 m
<i>SUPERSET DSS Module</i>	1000 m	1000 m
DATASET 1101	1000 m	1000 m
DATASET 1102	2000 m	1000 m
DATASET 1103	2000 m	1000 m
DATASET 2102	2000 m	1000 m
DATASET 2103	2000 m	1000 m
<i>SUPERCONSOLE 1000 console</i>	1000 m	1000 m

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Issue 1  
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**SX-200® DIGITAL PABX**

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# Customer Data Entry

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## 1.

**INTRODUCTION****General**

- 1.1 After the successful mechanical installation of the SX-200® DIGITAL PABX (refer to Practice 9109-096-200-NA, Installation Information), the system is ready for programming. This Practice describes the Customer Data Entry (CDE) package and outlines the procedures for entering Customer Data Entry Mode.

**CDE Package Grouping**

- 1.2 The system is programmed in groups. Classes of Service group together users with the same COS restrictions. Pickup Groups assemble users in a department. Hunt Groups classify users together with a common knowledge about how to handle certain calls. Trunks are grouped together with common incoming answering points and common outgoing characteristics.

Tenant Groups also relate to this grouping theme. Tenant Groups facilitate separate attendant services for different areas of a corporation. These services include handling "DIAL 0" calls locally, routing and recalling incoming trunk calls as required and locally switching to Night Service Mode.

One variant of this multi-tenant operation occurs when each group may be separate customers that cannot access each other's trunks. Another variant occurs when DID Trunk service handles incoming calls into a number of different customers. For this plan, each customer requires identification of its incoming calls.

**Scope of Document**

- 1.3 This is a programming guide – the document does not describe SX-200 DIGITAL PABX features. Refer to Practice 9109-096-105-NA, Features Description, for complete descriptions of all features.

**Reason for Issue**

- 1.4 This Section has been issued to describe Customer Data Entry procedures and forms for Generic 1001, Generic 1002, Generic 1003, Generic 1004 and Generic 1005.



## 2.

## EQUIPMENT USED FOR CUSTOMER DATA ENTRY

The programming of the system is supported by four devices: the two Floppy Disk Drives, the Attendant Console and an ASCII CRT terminal (*VT100*<sup>™</sup> compatible).

### ASCII Terminal

- 2.1 A terminal is required for remote programming. A modem is connected to the REMOTE (DCE) connector on the cabinet's lower rear panel. On some variants, this connector is located on the Maintenance Panel. The modem is connected, usually by telephone, to a modem connected to the remote terminal.

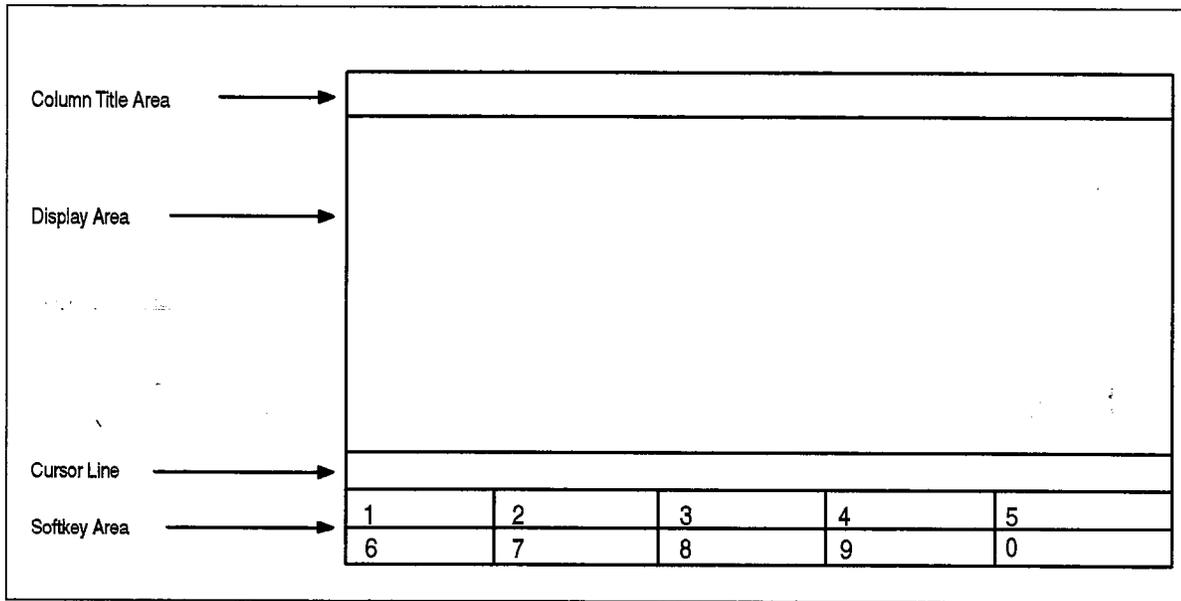
The terminal can also be used for local programming, instead of the Attendant Console. For local programming, the terminal is connected via an RS-232 connection to the LOCAL (DTE) connector on the Maintenance Panel.

**Note:** The *SX-200* FD has a maintenance connector located on the rear plate of the control node.

A *VT100* compatible terminal displays the full screen version of the CDE forms. This consists of the header line, 12 lines of data, the command line and two rows of softkeys. Softkeys are selected by pressing the ESC key followed by the softkey number. There are 10 softkeys numbered 1 through 9, then 0.

Figure 2-1 shows the 4 main screen areas of a typical CDE form on a terminal interface; they are:

1. The column title area: this is used to title the columns of information in the CDE form.
2. The display area: this area is used to display up to 12 lines of information. The cursor (the line of data between the 2 angle brackets > and <) points to the line of information which may be modified.
3. The cursor line: this area repeats the line of data marked by the cursor, and contains data which may be modified.
4. The softkey area: this is usually 2 lines, and contains the softkeys used to perform actions within the form.



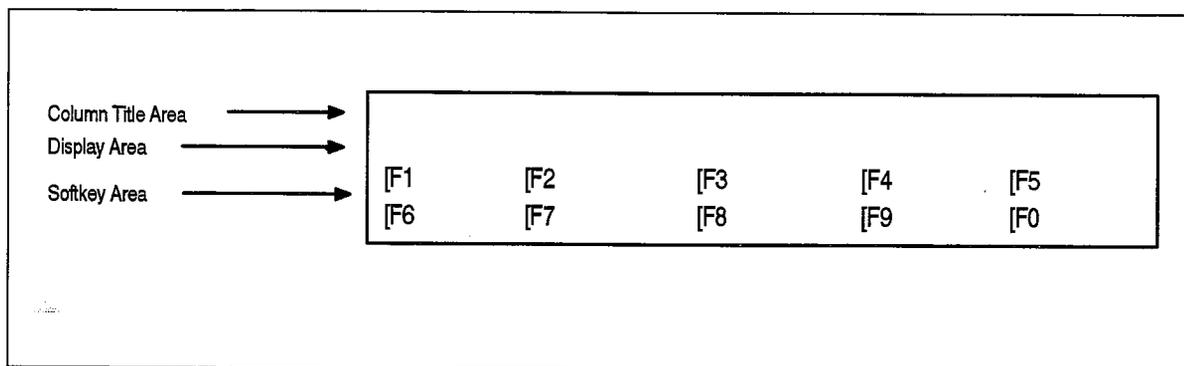
**Figure 2–1 CDE Terminal Display Areas**

### Attendant Console

2.2 On-site Customer Data Entry can be performed via the Attendant Console. The Console’s softkeys and display facilitate this task. The display has four lines of 80 characters. These lines are: the header line, the command line (which displays the data that can be edited) and two lines for the 10 softkeys. Note that there are some forms which have two header lines and only one line for the softkey display.

Figure 2–2 shows the 3 main screen areas of a typical CDE form on a terminal interface; they are:

1. The column title area: this is used to title the columns of information in the CDE form.
2. The cursor line: this area repeats the line of data marked by the cursor, and contains data which may be modified.
3. The softkey area: this is usually 2 lines, and contains the softkeys used to perform actions within the form.



**Figure 2-2 CDE Console Display Areas**

### Levels of Access to Customer Data Entry

2.3 The system provides five password protected levels of CDE access. These levels are, in descending order of priority:

- Installer
- Maint 1
- Maint 2
- Supervisor
- Attendant

The access for any of these levels (except Installer) can be set to 'read/write access', 'no access' or 'read only access' for each CDE form.

An attendant may be restricted, for example, to moves of station numbers and review of Pickup Groups only. Similarly, a maintenance person may be given access to Class-of-Service modifications and station/*SUPERSET*<sup>™</sup> telephone additions but not to ARS programming. Installers must be able to access the entire database.

When programming from a console, the user can exit CDE Mode (for Call Handling) by pressing any hardkey on the Attendant Console. Pressing the FUNCTION key and then the APPLICATION softkey automatically returns the console to CDE Mode.



## 3.

**OPERATION****Loading of System Software**

- 3.1 When initializing the system, the following steps are necessary for correct operation:
1. Bay 2 or Bay 0 (672-port systems) power supply must be on before the two diskettes are inserted.
  2. Position diskette A in Bay 2 disk drive and diskette B in Bay 1 disk drive; refer to the illustration on the disk drive door for proper diskette insertion. Refer also to Practice 9109-096-200-NA, Installation Information, for the power-up procedures.
  3. The SX-200 FD requires the control node power supply be on before the two diskettes are inserted.
  4. For the SX-200 FD, position diskette A in the upper disk drive and diskette B in the lower disk drive. Refer to Practice 9109-096-200-NA, Installation Information, for the power-up procedures.

**CAUTION**

Bay power supply must not be turned on or off while diskettes are in place.

**CDE Access from a terminal**

- 3.2 The login procedure for initial CDE access (from a terminal) consists of four basic steps. These steps are:
1. Specify the terminal type:
    - 1- VT100 COMPATIBLE
    - 2- TTY TYPE (suppresses graphic characters)
    - 3- IBM PC
  2. Select the function:
    - 1- MAINTENANCE
    - 2- CDE
    - 6- QUIT
  3. Enter the level of access:

INSTALLER,  
MAINT1,  
MAINT2,  
SUPERVISOR or  
ATTENDANT
  4. Enter the password (the default password is 1000).



FORMS				
01 = SYSTEM CONFIGURATION			02 = FEATURE ACCESS CODES	
ENTER FORM NUM:				
[F6 QUIT	[F7 TOP	[F8 BOTTOM	[F9	[F0

**Figure 3-2 Available Forms: Attendant Console Display**

The lower command line displays ENTER FORM NUMBER:. Select a form by entering a valid form number. It is not necessary to have the desired form number displayed on the upper command line. Press the ENTER softkey.

## Form Editing

### General

- 3.4 The forms in the CDE package have several columns and lines of information. On the Attendant Console, or on a terminal that has cursor control keys, the left and right arrow keys ( ← and → ) move the cursor from field to field on the command line. On a terminal, the **TAB** and **DEL** keys perform an equivalent function. Note that both the **DEL** and left arrow keys delete edited data as the cursor moves left. The up and down arrow keys move the cursor up and down the form. On a terminal, the **LINE FEED** key also moves the cursor down the form. Note also that the **RETURN** key on a terminal performs the same function as the ENTER softkey. On the Attendant Console, cursor movement is indicated by the underscore character ( \_ ). On the terminal, cursor movement is indicated by a flashing solid block and by a line pointer (represented by > < characters at the ends of the screen line).

### From the Top Level CDE Form

On the terminal interface, the line at the cursor position is displayed on the command line. Press the cursor control keys to move the cursor through the list a line at a time. When the cursor reaches the bottom (or top) data line, the list will scroll up (or down) if there are more items on the list to display. Press the **TOP** or **BOTTOM** softkeys to move immediately to the top or bottom of the list.

On the console interface, the word **FORMS** is on the header line. Under this are two command lines and one row of softkeys. See Figure 3-2. The upper command line displays the names and numbers of the first two available forms. Press the cursor control keys to display the names and numbers of subsequent forms, two at a time. Press the **TOP** or **BOTTOM** softkeys to move immediately to the top or bottom of the list. Refer to Table 3-1 for the complete list of available forms for each software generic.

## Exit from CDE

- 3.5 To exit from CDE, press the **QUIT** softkey at the Forms level. The terminal returns to the application level; the system is now ready for another application (such as Maintenance).

Table 3-1 Customer Data Entry Forms

Number (Generic 1001)	Number (All Other Generics)*	Form Name
01	01	System Configuration
02	02	Feature Access Codes
03	03	COS Define
04	04	System Options/System Timers
05	05	Tenant Interconnection Table
06	06	Tenant Night Switching Control
07	07	Console Assignments
08	08	Attendant LDN Assignments
09	09	Stations/SUPERSET Telephones
10	10	Pickup Groups
11	11♣	Data Circuit Descriptor
12	12♣	Data Assignment
13	13	Trunk Circuit Descriptors
14	14	Non-Dia-In Trunks
15	15	Dia-In Trunks
16	16	Trunk Groups
17	17	Hunt Groups
18	18	Miscellaneous System Ports
19	19	Call Rerouting Table
20	20	ARS: COR Group Definition
21	21	ARS: Day Zone Definition
22	22	ARS: Modified Digit Table
23	23	ARS: Route Definition
24	24	ARS: Route Lists
25	25	ARS: Route Plans
26	26	ARS: Digit Strings
	27	ARS: Maximum Dialed Digits
27	28	Form Access Restriction Def'n.
	29♣	DTE Profile
29	30	Device Interconnection Table
30	31	System Abbreviated Dial Entry
31	32	CDE Data Print
32	33	Account Code Entry
	34♣	Directed IO
	35	Global Find Access Code
	36**	Modem Assignment
	37**	Guest Rm SUPERSET Keys Template
	38***	ACD Keys Template
	39***	ACD Agent Groups
	40***	ACD Supervisors
	41***	ACD Paths
	42**	T1 Link Descriptors
	43**	T1 Link Assignment
	44**	Network Synchronization
	45****	Key System Telephones
	46****	Key System Toll Control

\* "All Other Generics" refers to Generic 1002, Generic 1003, Generic 1004, and Generic 1005.

\*\* These Forms are not available in Generic 1002, Generic 1005 FPKG 1 and Generic 1005 LIT96.

\*\*\* Not available in Generic 1002, Generic 1003 (Non-ACD), Generic 1005 FPKG 1 and Generic 1005 LIT96.

\*\*\*\* Forms 45 and 46 are available only in Generic 1004.

♣ These Forms are not available in Generic 1005 FPKG 1 and Generic 1005 LIT96.

## Softkeys Available in Most CDE Forms

- 3.6 The following softkeys appear in most forms. They have the same purpose, regardless of which form they appear in.

**QUIT:** Pressing the QUIT softkey exits from the current form and returns the display to the previous – another form, or the level where the forms are selected (see Figure 3–1). Also, if another softkey was activated, pressing the QUIT softkey returns the display to the previous state.

**CANCEL:** This softkey appears after a programming error has occurred. Pressing the CANCEL softkey returns the display to the level where the programming error was made. The CANCEL softkey appears with an error message. Refer to Appendix A for a list of these error messages.

**BAY/SLT/CCT:** Instead of moving the line pointer to the desired line of the form, the programmer can call it up directly by specifying the bay, slot and circuit. Pressing the BAY/SLT/CCT softkey displays Bay: Slot: Circuit: on the command line. The cursor appears to the right of the Bay: prompt. A single digit specifies the bay location. When a valid digit has been entered, the TAB or => cursor key can move the cursor to the Slot field. If the programmer enters an invalid number, the system inhibits subsequent cursor movement. Use the DEL or <= cursor key to delete the incorrect entry. When the slot number has been entered, the ENTER softkey appears.

**DELETE:** This softkey appears when the command line is displaying data. Pressing the DELETE softkey followed by the ENTER softkey removes the selected entry from the form.

**ENTER:** This softkey appears only after data for an entry has been modified. Pressing the ENTER softkey stores the change in the database. **Note:** in some forms, it is necessary to press ENTER for every change. Form 01 is one exception to this rule.

**TOP:** Pressing the TOP softkey moves the line pointer to the first line of the form. The command line displays the first line.

**BOTTOM:** Pressing the BOTTOM softkey moves the line pointer to the last line of the form. The command line displays this line.

**\*\* MORE \*\*:** When the MORE softkey is pressed, a new set of softkeys are displayed. Most forms with this softkey have two sets of softkeys; some forms have three.



## 4.

**CDE FORM DESCRIPTIONS****Form 01 – System Configuration**

4.1 This form specifies the intended location of each peripheral card for the system (see Figure 4–1). If the peripheral cards are installed before the system is programmed, this form enables the configuration of the system according to the actual installation. If the system is programmed prior to the peripheral card installation, this form acts as a guide during the installation process. If the installed card type does not match the card type in the PROGRAMMED field, then that device does not function, and the card alarm LED will flash. When the system is programmed, the CDE software uses the PROGRAMMED field of this form to generate a list of physical location (bay, slot and circuit) numbers that can be programmed in subsequent forms. These forms include:

- Form 07, Console Assignments
- Form 08, Attendant LDN Assignments
- Form 09, Station and *SUPERSET* Telephones
- Form 12, Data Assignment
- Form 14, Non-Dial-In Trunks
- Form 15, Dial-In Trunks
- Form 18, Miscellaneous System Ports
- Form 36, Modem Assignment
- Form 43, T1 Link Assignment
- Form 44, T1 Network Synchronization
- Form 45, Key System Telephones

When a device is assigned to a physical location, the system first checks the appropriate card type in this form.

23:58 28-NOV-89			alarm status = MAJOR		
BAY	SLT	CCT	PROGRAMMED	INSTALLED	COMMENTS
01	01	-	ONS LINE CARD		
01	02	-			
01	03	-			
01	04	-	LS/GS TRUNK CARD		
01	05	-	UNIVERSAL CARD		
01	05	01	CONSOLE MODULE		-----
01	05	02			-----
01	05	03			-----
01	05	04	MUSIC PAGER MODULE		-----
01	06	-	UNIVERSAL CARD		
01	06	01	E & M TRUNK MODULE		-----
01	06	02	E & M TRUNK MODULE		-----
01	01	-	ONS LINE CARD		
1-LINE CARDS		2-TRUNK CARDS	3-UNIVERSAL	4-SYSTEM TYPE	5-CONFIGURE
6-QUIT		7-BAY/SLT/CCT	8-DELETE	9-VERIFY DATA	0-

Figure 4-1 Form 01 Layout

**Field Description**

**BAY, SLT and CCT:** These fields specify the physical location of each card type. The circuit number represents the physical location of each module on the Universal Card.

**PROGRAMMED:** Specifies the intended location of the required card types. Data can be assigned to the PROGRAMMED field before the cards are installed.

**INSTALLED:** The data in the INSTALLED field reflects the actual installed cards. The system updates this field; the installer cannot edit it.

**COMMENTS:** This field stores additional data (a maximum of 20 characters), for the programmer's reference. The system does not use this information for call processing.

**Softkeys**

**LINE CARDS:** Programs the selected card slot as a line card. For digital bay equipment, 4 softkeys are presented: ONS LINE, OPS LINE, DIGITAL LINE and COV LINE. For analog bay equipment, 2 more softkeys are presented: STATION and SUPERSET.

**ONS LINE:** Programs the selected card slot as an ONS Line Card. Pressing the ENTER softkey completes the selection and the PROGRAMMED field displays the ONS LINE CARD prompt.

**OPS LINE:** Programs the selected card slot as an OPS Line Card. Pressing the ENTER softkey completes the selection and the PROGRAMMED field displays the OPS LINE CARD prompt. The OPS Line Card is a high power card and is restricted to the upper slots of any digital bay.

**DIGITAL LINE:** Programs the selected card slot as a DIGITAL line card. Pressing the ENTER softkey completes the selection and the PROGRAMMED field displays the DIGITAL LINE prompt.

**COV LINE:** Programs the selected card slot as a COV Line Card. Pressing the ENTER softkey completes the selection and the PROGRAMMED field displays the COV LINE prompt. The COV Line Card is a high power card and is restricted to the upper slots of any digital bay.

**STATION:** Programs the selected card slot as a Station Line Card. Pressing the ENTER softkey completes the selection and the PROGRAMMED field displays the STATION LINE CARD prompt. The Station Line Card is an analog bay card and is restricted to analog bay programming.

**SUPERSET:** Designates the selected card slot as a *SUPERSET* Line Card. Pressing the ENTER softkey completes the selection and the PROGRAMMED field displays the *SUPERSET* LINE CARD prompt. The *SUPERSET* Line Card is an analog bay card and is restricted to analog bay programming.

**TRUNK CARDS:** Programs the selected card slot as a trunk card. If the slot is in a digital peripheral bay, three softkeys appear for selection of trunk card type: LS/GS TRUNK, 6 CCT DID and T1 TRUNK. For analog bay equipment, 3 different softkeys are presented: CO TRUNK, E&M TRUNK and DID/TIE.

**LS/GS TRUNK:** Programs the selected card slot as a LS/GS Trunk Card. Pressing the ENTER softkey completes the selection and the PROGRAMMED field displays the LS/GS TRUNK CARD prompt.

**T1 TRUNK:** Programs the selected card slot as a T1 Trunk Card. Pressing the ENTER softkey completes the selection and the PROGRAMMED field displays the T1 TRUNK CARD prompt. T1 Trunk cards can be programmed in slot 6 in digital bays only (exception – Combo Bay 2: slot 4 only). Only 1 T1 Trunk card is permitted per bay.

**6 CCT DID:** Programs the selected card slot as a DID Trunk Card. Pressing the ENTER softkey completes the selection and the PROGRAMMED field displays the DID TRUNK CARD prompt. The 6 CCT DID card is a high powered card and is restricted to the upper slots of any digital bay. The system generates an error message if this card is placed in any other slot.

**CO TRUNK:** Programs the selected card slot as a CO Trunk Card. Pressing the ENTER softkey completes the selection and the PROGRAMMED field displays the CO TRUNK CARD prompt. The CO Trunk Card is an analog bay card and is restricted to analog bay programming.

**E & M TRUNK:** Programs the selected card slot as an E&M Trunk Card. Pressing the ENTER softkey completes the selection and the PROGRAMMED field displays the E & M TRUNK CARD prompt. The E&M Trunk Card is an analog bay card and is restricted to analog bay programming.

**DID/TIE:** Programs the selected card slot as a DID/Loop Tie Trunk Card. Pressing the ENTER softkey completes the selection and the PROGRAMMED field displays DID/TIE TRUNK CARD prompt. The DID/Loop Tie Trunk Card is an analog bay card and is restricted to analog bay programming.

**UNIVERSAL:** Designates that card slot as the Universal Card. Three further softkeys are presented for the programming of the Universal card modules: MUSIC PAGER, E&M MODULE and CONSOLE. Note that the Universal Card can only be assigned to those card slots rated for high power consumption (these are denoted by a square symbol on the card shelf; low power slots are denoted by a circle symbol).

**Note:** The system automatically programs DTMF Receivers where they are installed, provided nothing is already programmed for that circuit. These circuits must be in place in order to program night bell relays and alarms in CDE Form 18.

**MUSIC PAGER:** Programs the selected module as a Music on Hold/Pager Module. The PROGRAMMED field displays MUSIC PAGER MODULE. Each MOH/Pager Module has a power rating of 1. Therefore, a Universal Card can support four of these modules.

**E&M MODULE:** Programs the selected module as an E&M module. The PROGRAMMED field displays E&M. Each E&M module has a power rating of 3 (a maximum of three per Universal Card).

**CONSOLE:** Programs the selected circuit as a Console Module. The PROGRAMMED field displays CONSOLE MODULE. Since the Universal Card has a power rating of 10, and each Console Module has a power rating of 5, a Universal Card can support a maximum of two Console Modules.

**SYSTEM TYPE:** There are 5 system variants, two of which are interchangeable:

- 336-Port – This variant is digital and cannot be changed.
- 456-Port – This variant can be interchanged with the 480-port.
- 480-Port – This variant can be interchanged with the 456-port.
- 672-Port – This variant is digital and cannot be changed.
- SX-200 FD – This variant is digital and cannot be changed.

The SYSTEM TYPE softkey appears only on 336, 456, or 480-port systems. On these systems the programmer cannot select the 672-port or the FD variant. **Note:** the 672-port variant is not available with Generic 1001 or Generic 1002.

**Note:** The SX-200 FD is only available with Generic 1005.

Pressing the SYSTEM TYPE softkey identifies the current system type and displays a prompt requesting the user to enter the new system type via one of two softkeys available (**480-PORT**, **336-PORT**, **456-PORT**). Entering a new system type, and pressing the ENTER softkey, resets the system and the following is displayed on the command line:

Update is in progress and SYSTEM RESET will follow. Please wait.

**CONFIGURE:** Before the system can function properly, the PROGRAMMED field must match the INSTALLED field. Pressing the CONFIGURE softkey matches the PROGRAMMED field to the INSTALLED field. Note that devices can be assigned to the

cards in the PROGRAMMED field but the card type cannot change. The CONFIGURE softkey cannot be pressed if any device is specified (e.g., defining a station in Form 09, Station/*SUPERSET* Telephones). When a new peripheral card is added to the system, it is necessary to manually update the PROGRAMMED field. The INSTALLED field updates upon exiting and re-entering this form.

**VERIFY DATA:** Pressing the VERIFY DATA softkey begins a series of system tests on the database. The command line displays a message as each test completes successfully. These messages are:

```
PLID TO SWID CONVERSION SUCCESSFUL
ALL RECEIVERS ARE IN VALID STATES
ALL HUNT GROUPS ARE VALID
ALL TRUNK GROUPS ARE VALID
ALL PICKUP GROUPS ARE VALID
ALL SUPERSET KEYS ARE VALID
ALL TRUNK NUMBERS ARE VALID
DISK TO RAM DATA BASE COMPARISON INITIATED. PLEASE WAIT.....
DISK DATA BASE IS (VALID)/(CORRUPTED)
```

If a test fails, the command line displays an error message and creates a maintenance log. Refer to Practice 9109-096-350-NA, Troubleshooting. When all tests are complete, the form reverts to the original softkey display.

The standard softkeys **BAY/SLT/CCT**, **CANCEL**, **DELETE**, **ENTER**, **\*\*MORE\*\*** and **QUIT** are also provided. **Note:** Before a card can be deleted, any devices programmed on the card, or associated with circuits on the card must be deleted or disassociated first, using the appropriate form.

## Form 02 – Feature Access Codes

4.2 This form specifies the Feature Access Codes for the system (see Figure 4–2). Feature Access Codes can be a maximum of five digits (except Callback Busy and Executive Busy Override access codes which must be only one digit). Generally, the codes must be unique; they cannot match any listed directory number or other access code in the system (two exceptions: the Callback Busy and Executive Busy Override access codes). See Table 4–1 for a complete list of the access codes. To check assigned access codes, refer to Form 35, Global Find Access Code. The system updates this form each time a code is entered during CDE.

4:09 PM 14-NOV-91		alarm status = MAJOR		
FEATURE	FEATURE NAME	ACCESS CODE		
01	Account Code Access	75		
02	Auto-Answer Activation			
03	Call Forwarding - All Calls	61		
04	Call Forwarding - Internal Only	65		
05	Call Forwarding - External Only	62		
06	Call Forwarding - I'm Here	*8		
07	Call Forwarding - Cancel I'm Here	**8		
08	Dial Call Pickup	*6		
09	Directed Call Pickup	**6		
10	Do Not Disturb	60		
11	Extension General Attendant Access	0		
12	Paging Access To Default Zone(s)	#1		
05	Call Forwarding - External Only	62		
1-	2-	3-	4-TOP	5-BOTTOM
6-QUIT	7-FEATURE NUM	8-DELETE	9-	0-

**Figure 4–2 Form 02 Layout**

### Field Description

**FEATURE:** Lists the feature numbers in numerical order. The FEATURE field cannot be modified.

**FEATURE NAME:** Lists the names of the features. The FEATURE NAME field cannot be modified.

**ACCESS CODE:** Displays the access code for each feature.

### Softkeys

**Feature Num:** Allows the user to select a Feature Access Code by number. Pressing this key clears the command line and positions the cursor after the ENTER FEATURE NUM: prompt. Entering the 1– or 2–digit feature number displays that access code with its name on the command line. The cursor moves to the start of the ACCESS CODE field on the command line ready for a new access code entry.

The standard softkeys **CANCEL**, **DELETE**, **ENTER**, **BOTTOM**, **TOP**, and **QUIT** are also provided, where applicable.

**Parameters**

Please note: the following are not feature descriptions; refer to Practice 9109-096-105-NA, Features Description, for complete descriptions.

**Account Code Access:** This code is dialed prior to the entry of an independent account code.

**Auto-Answer Activation:** This code is dialed prior to the activation (dial 1), or deactivation (dial 2), of the Auto Answer feature.

**Call Forwarding – All Calls:** Allows an extension to forward internal and external calls either: ALWAYS (dial 01), BUSY (dial 02), NO ANSWER (dial 03) or BUSY/NO ANSWER (dial 04). This is available when COS Option 260 – Call Forward Internal/External Split is disabled. The NO ANSWER option allows an extension to forward calls that are not answered within a selected time-out period. Available in Generic 1004 and Generic 1005.

**Call Forwarding – Internal Only:** Allows an extension to forward internal calls either: ALWAYS (dial 01), BUSY (dial 02), NO ANSWER (dial 03) or BUSY/NO ANSWER (dial 04). This is available when COS Option 260 – Call Forward Internal/External Split is enabled. Available in Generic 1004 and Generic 1005.

**Call Forwarding – External Only:** Allows an extension to forward external calls either: ALWAYS (dial 01), BUSY (dial 02), NO ANSWER (dial 03) or BUSY/NO ANSWER (dial 04). This is available when COS Option 260 – Call Forward Internal/External Split is enabled. Available in Generic 1004 and Generic 1005.

**Call Forwarding – I'm Here:** Allows an extension to redirect its calls to another extension from that other extension.

**Call Forwarding – Cancel I'm Here:** Allows a station user to cancel Call Forwarding – I'm Here, from the other station. Available in Generic 1004 and Generic 1005.

**Call Forwarding – Busy:** Allows a station to forward calls when busy. Available in Generic 1001, Generic 1002 and Generic 1003.

**Call Forwarding – Don't Answer:** Allows a station to forward calls that are not answered within a selected time-out period. Available in Generic 1001, Generic 1002 and Generic 1003.

**Call Forwarding – Busy/Don't Answer:** Allows a station to forward calls when either busy, or when not answered within a selected time-out period. Available in Generic 1001, Generic 1002 and Generic 1003.

**Call Forwarding – Follow Me:** Allows a station to forward calls unconditionally. Available in Generic 1001, Generic 1002 and Generic 1003.

**Dial Call Pickup:** Allows a station to retrieve calls ringing other stations in the same pickup group. Stations using this feature must be programmed in Form 10 – Pickup Groups.

Table 4-1 Feature Access Codes

Feature Numbers For			Feature Names
Generic 1001	Generic 1002 Generic 1003	Generic 1004 Generic 1005	
01	01	01	Account Code Access
02	02	02	Auto-Answer Activation
—	—	03	Call Forwarding – All Calls
—	—	04	Call Forwarding – Internal Only
—	—	05	Call Forwarding – External Only
07	07	06	Call Forwarding – I Am Here
—	—	07	Call Forwarding – Cancel I Am Here
03	03	—	Call Forwarding – Busy
04	04	—	Call Forwarding – Don't Answer
05	05	—	Call Forwarding – Busy / Don't Answer
06	06	—	Call Forwarding – Follow Me
08	08	08	Dial Call Pickup
09	09	09	Directed Call Pickup
10	10	10	Do Not Disturb
11	11	11	Extension General Attendant Access
12	12	12	Paging Access To Default Zone(s)
13	13	13	Paging Access To Specific Zones
14	14	14	TAFAS – Any
15	15	15	TAFAS – Local Tenant
16	16	16	Hold Pickup Access (Attendant Hold Slots)
17	17	17	Console Lockout Access Code
18	18	18	Maintenance Functions (Test Line)
19	19	19	Direct Inward System Access
20	20	20	Callback Busy <<single digit>>
21	21	21	Call Hold
22	22	22	Call Hold Retrieve (Local)
23	23	23	Call Hold Retrieve (Remote)
24	24	24	Abbreviated Dial Access
25	25	25	Clear All Features
26	26	26	<i>SUPERSET 4</i> Telephone Loopback Test
27	27	27	Tone Demonstration
—	28	28**	ADL Call Setup
—	29	29**	ADL Disconnect
—	30	30	RESERVED
30	31	31	Executive Busy Override <<single digit>>
31	32	32	Automatic Wakeup
32	33	33	Call Park
33	34	34	Node ID
34	35	35	Maid In Room
35	36	36	<i>SUPERSET 4</i> Tel. Room Status Display

\* Not available in Generic 1002.

\*\* Not available in Generic 1005 FPKG1 or Generic 1005 LIT96.

\*\*\* Not available in Non-ACD Generic Loads.

**Table 4-1 Feature Access Codes  
(continued)**

Feature Numbers For			Feature Names
Generic 1001	Generic 1002 Generic 1003	Generic 1004 Generic 1005	
36	37	37	Direct To ARS
—	38 *	38	UCD Agent Login / Logout
—	39 *	39	Analogue Network Accept Caller's Extension
—	40 *	40	<i>SUPERSET</i> 4 Tel. Maid In Room Status Display
—	41	41	Send Message
—	42	42	Call Message Sender of Oldest Message
—	43	43	Callback – No Answer
—	44 ***	44 ***	ACD Login / Logout
—	45 ***	45 ***	ACD Silent Monitoring
—	—	46	Flash Over Trunk
—	—	47	Program Feature Key
—	—	48	Key System – Direct Paging Access
—	—	49	Key System – Group Page Meet-Me-Answer
—	—	50	Key System – Direct CO Line Select
—	—	51	Key System – Store Personal Speed Call
—	—	52	Key System – Retrieve Personal Speed Call
—	—	53	Double Flash Over Trunk

\* Not available in Generic 1002.  
 \*\* Not available in Generic 1005 FPKG1 or Generic 1005 LIT96.  
 \*\*\* Not available in Non-ACD Generic Loads.

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**Directed Call Pickup:** Allows a station to retrieve calls ringing other stations. The user must dial the access code, followed by the extension number of the ringing station.

**Do Not Disturb:** Allows a station to prevent any incoming calls from ringing. The calling party receives whatever is programmed in Form 19 – Call Rerouting Table. This code is dialed prior to the activation (dial 1), or deactivation (dial 2) code.

**Extension General Attendant Access:** This code (usually 0) allows a station to access an attendant directly, without knowing the specific extension number or an LDN number of a specific attendant as defined in CDE Form 19.

**Paging Access to Default Zone(s):** Allows a station to access the default paging zone equipment. The paging equipment must be programmed in Form 18 – Miscellaneous System Ports, and COS Option 312 must be set to a default value.

**Paging Access to Specific Zones:** Allows a station to access specific paging zones. The access code is dialed, followed by the number corresponding to the paging zone number. The station must have access to the zone(s) via COS Options 303 through 311 (paging zone 1 through 9).

**TAFAS – Any:** Allows a station to answer incoming calls ringing at common alerting devices (night bells) in any tenant group, provided COS option 248 has been enabled.

**TAFAS – Local Tenant:** Allows a station to answer incoming calls ringing at common alerting devices (night bells) within the station's tenant group, provided COS option 249 has been enabled.

**Hold Pickup Access:** Allows a station to connect to a held call in an attendant console hold slot. Typically, the attendant will relay the digits to dial: the Hold Pickup Access code, the console/subattendant ID number, followed by the hold slot number, through the system's zone paging equipment.

**Console Lockout Access Code:** Allows an attendant to render the console "harmless" (typically, while left unattended). The console is returned to its normal state by re-entering the code.

**Maintenance Functions:** Allows the test line telephone to access the available test line functions. Refer to Practice 9109–096–353–NA, General Maintenance Information, for further details.

**Direct Inward System Access:** This is the DISA security code. Refer to Practice 9109–096–105–NA, Features Description, under *Trunk Operation – DISA*, for further information.

**Callback Busy:** Allows an extension to set a callback on another (busy) extension. The user then hangs up.

**Call Hold:** Allows an extension to put a call on hold and go on-hook. The extension may then be used to make other calls.

**Call Hold Retrieve – Local:** Allows a user to retrieve a held call at the extension where the call was originally held.

**Call Hold Retrieve – Remote:** Allows a user to retrieve a held call from any extension. The user must dial the Call Hold Retrieve – Remote Feature Access Code, followed by the number of the extension where the call was originally held.

**Abbreviated Dial Access:** Allows users to dial pre-programmed index numbers rather than having to dial entire digit strings (which can be up to 26 digits in length). The original numbers and their corresponding index numbers must be programmed into Form 31 – System Abbreviated Dial (Form 30 in Generic 1001).

**Clear All Features:** Allows the user to clear features currently activated at the extension with a single access code. The features affected are: all flavors of Call Forwarding, Do Not Disturb and Callbacks.

**SUPERSET 4 Telephone Loopback Test:** Allows a *SUPERSET 4* telephone user to perform a loopback test on the set. Going on-hook terminates the test.

**Tone Demonstration:** Allows a user to listen to all of the possible tones available on the system. Going on-hook terminates the demonstration.

**ADL Call Setup:** Allows an Associated Data Line (ADL) configured extension to originate a data call. Refer to Practice 9109–096–105–NA, Features Description, for

further information. Not available in Generic 1001, Generic 1005 FPKG1 and Generic 1005 LIT96.

**ADL Disconnect:** Allows an ADL configured extension to disconnect a data call. Refer to Practice 9109-096-105-NA, Features Description, for further information. Not available in Generic 1001, Generic 1005 FPKG1 and Generic 1005 LIT96.

**Executive Busy Override:** Allows an extension to override busy extensions by dialing a single code while listening to busy tone.

**Automatic Wakeup:** Allows an extension user to set up a wakeup call without talking to an attendant. The user dials the Automatic Wakeup code, followed by the time (in 24-hour format – 2 hour digits followed by 2 minute digits).

**Call Park:** Allows an extension to park an active call, and go on-hook. The extension may not make other calls, but may access paging equipment.

**Node ID:** Allows a uniform numbering plan in a network of *SX-200* DIGITAL systems. Refer to Practice 9109-096-105-NA, Features Description, under "Analog Networking" for further information.

**Maid In Room:** Allows a maid to change the status of the room using the telephone in the room. The maid dials the Maid In Room code, followed by one of: 1-maid in room, 2-maid not in room, 3-room clean, 4-room to be inspected.

**SUPERSET 4 Room Status Display:** Allows *SUPERSET 4* and *SUPERSET 4™* DN users to view room status information. Refer to Practice 9109-096-602-NA, Hotel/Motel Feature Package Description, for further information.

**Direct To ARS:** Allows an extension to access ARS immediately, without dialing ARS leading digits. The system automatically dials the Direct To ARS code upon the set going off-hook, or after an account code.

**UCD Agent Login/Logout:** Allows a UCD agent to log in and out of a UCD agent hunt group, to control the arrival of calls from the hunt group. This code is dialed prior to the login (dial 1), or logout (dial 2) code. Not available in Generic 1001 or Generic 1002.

**Analog Network Access Callers Extension:** Used by the system to display caller's extension numbers on display sets during cross-node network calls. This code is entered into the ARS: Modified Digit Table. Refer to Practice 9109-096-105-NA, Features Description, under "Analog Networking" for further information. Not available in Generic 1001 or Generic 1002.

**SUPERSET 4 Maid In Room Stat. Display:** Allows a *SUPERSET 4* or *SUPERSET 4*DN station to view room status information. Not available in Generic 1001 or Generic 1002.

**Send Message:** Allows an extension user to send a message to another extension. The message is in the form of one of: a flashing lamp, a display indication, or a distinctive ringing pattern. Refer to Practice 9109-096-105-NA, Features Description, under "Messaging – Call Me Back", for further information. Not available in Generic 1001.

**Call Message Sender of Oldest Message:** Allows an extension to call the sender of the oldest message without having to dial the extension number. Not available in Generic 1001.

**Callback – No Answer:** Allows an extension to set a callback on an extension that does not answer, while listening to ringback. Not available in Generic 1001.

**ACD Login/Logout:** Allows an ACD position to log in and out at a *SUPERSET 4* telephone. Refer to Practice 9109–096–620–NA, *ACD TELEMARKETER®* Application Package, for further details. Not available in Generic 1001, Generic 1002, Generic 1005 FPKG1 and Generic 1005 LIT96.

**ACD Silent Monitoring:** Allows an ACD supervisor to silently monitor calls of ACD agents. Refer to Practice 9109–096–620–NA, *ACD TELEMARKETER* Application Package, for further details. Not available in Generic 1001, Generic 1002, Generic 1005 FPKG1 and Generic 1005 LIT96.

**Flash Over Trunk:** Allows an extension to access Central Office *CENTREX* features (sends a flash out over a trunk). Available in Generic 1004 and Generic 1005.

**Program Feature Key:** Allows users of *SUPERSET 3™*DN and *SUPERSET 4*DN sets to program feature keys on their own sets, from their own sets. This eliminates the need to access CDE through the console or terminal interface to make these changes. Available in Generic 1004 and Generic 1005.

**Key System – Direct Paging:** Allows a key system set to directly page another (idle) key system set through the set's speaker. The user can page a specific set, or the entire page group. Page groups are programmed in Form 45 – Key System Telephones. Available in Generic 1004 and Generic 1005.

**Key System – Group Page – Meet Me Answer:** Allows a key system extension to respond to a group page by dialing a single access code. Available in Generic 1004 and Generic 1005.

**Key System – Direct CO Line Select:** Allows a key system extension to access a specific trunk. The user dials the code, followed by the trunk number. Available in Generic 1004 and Generic 1005.

**Key System – Store Personal Speed Call:** Allows a key system extension to store up to 5 dial access personal speed call numbers. Available in Generic 1004 and Generic 1005.

**Key System – Retrieve Personal Speed Call:** Allows a key system extension to make a call using previously stored dial access Personal Speed Call numbers. Available in Generic 1004 and Generic 1005.

**Double Flash Over Trunk:** Allows a Centrex extension to be reconnected to the *CENTREX* extension that it put on softhold while attempting to reach a second *CENTREX* extension. Available in Generic 1004 and Generic 1005.

### Form 03 – COS Define

- 4.3 This form defines the Classes of Service for the system (see Figure 4–3 for the form layout). Classes of Service group together stations with common feature operations and restrictions. The SX–200 DIGITAL PABX accommodates a maximum of 50 Classes of Service. Each device (including attendants, data devices and all trunks) are supplied with a Class of Service. COS options are listed in groups. Refer to Table 4–2 for the total list of COS options.

[COS: 1 ] OPTION (DISPLAYING ENABLED )		STATUS	OPTION NUM
Attendant-Timed Recall (NO ANS) 0-disable 5-240 s		30	115
Attendant-Timed Recall (HOLD) 10-240 seconds		30	116
Attendant-Timed Recall (CAMPON) 0-disable 5-240 s		30	117
Attendant Call Forward No Answer Timer 10-240 s		30	118
Attendant Setup Time/Date		ENABLED	122
Alarm Call		ENABLED	202
Call Forwarding - Busy		ENABLED	206
Call Forwarding - Don't Answer		ENABLED	207
Call Forwarding - External		ENABLED	208
Call Forwarding - Follow me		ENABLED	209
Call Hold And Retrieve Access		ENABLED	211
Can Flash If Talking To An Incoming Trunk		ENABLED	212
Attendant-Timed Recall (NO ANS) 0-disable 5-240 s		<input type="checkbox"/> 30	115
1-	2-COPY COS	3-COS NUMBER	4-TOP
5-BOTTOM	6-QUIT	7-OPTION NUM	8-SHOW DISABLE
9-COS NAME	0-		

Figure 4–3 Form 03 Layout

#### Field Descriptions

The header line indicates the Class of Service being programmed and which set of options are selected for either the enabled or disabled options list. The command line displays the current indexed option. When Form 03 – COS Define is selected, the command line displays the first enabled option of the first Class of Service.

**OPTION NAME:** This field lists the option titles. The actual option names cannot be modified. The option names are classified into two groups: enabled options and disabled options.

**STATUS:** This field displays the status of each option; either DISABLED, ENABLED or a timer value.

**OPTION NUM:** This field displays the number of each Class of Service option. The actual option number cannot be modified.

#### Softkeys

**DISABLE/ENABLE:** This softkey enables and disables COS options. The DISABLE softkey appears when the form shows the enabled options list. Pressing the DISABLE softkey followed by pressing the ENTER softkey twice disables the selected option. The ENABLE softkey appears when the form shows the disabled options list. Pressing

the ENABLE softkey followed by pressing the ENTER softkey twice enables the selected option.

- Notes**
1. For those COS options which have a status other than 'ENABLED' or 'DISABLED', this softkey has no function or indication.
  2. If the ENTER softkey is not pressed twice after each selection, softkeys 2 and 3 are not available until the data is completely entered.

**COPY COS:** Pressing the COPY COS softkey copies the contents of one Class of Service to another. This is useful when two Classes of Service are similar. The command line displays the COPY FROM COS prompt; the user enters the 1- or 2-digit COS number. The command line then displays the TO COS prompt; the user enters the second 1- or 2-digit COS number. Pressing the ENTER softkey twice completes the copy process.

**COS NUMBER:** Pressing the COS NUMBER softkey prompts the user for a COS number (one or two digits) which selects a specific COS number. The header line displays the new COS number.

**OPTION NUM:** This softkey selects a specific COS option. Pressing the OPTION NUM softkey displays the ENTER OPTION NUM: prompt on the command line. The selection is completed by entering a valid option number (100 to 908). The command line displays that COS option name, status and number.

**SHOW DISABLE/SHOW ENABLE:** This softkey has two functions: it displays the disabled or enabled COS options for the selected COS. Pressing the SHOW DISABLE softkey displays the currently disabled COS options. This softkey now shows the SHOW ENABLE prompt and softkey 1 displays the ENABLE prompt. Pressing the SHOW ENABLE softkey shows those COS options that are enabled. This softkey returns to the SHOW DISABLE prompt and softkey 1 displays the DISABLE prompt. Note: Those options with a status other than "ENABLED" or "DISABLED" are listed when the SHOW ENABLE softkey is pressed.

**COS NAME:** When the programmer presses the COS NAME softkey, the system requests a name for the Class of Service. The COS name can be up to 8 characters in length. COS Name is not available in Generic 1001 or Generic 1002.

The standard softkeys **CANCEL**, **ENTER**, **BOTTOM**, **TOP**, and **QUIT** are also provided, where applicable.

Table 4-2 Class Of Service Options

COS Option Numbers For			Class Of Service Option Name
Generic 1001	Generic 1002 Generic 1003	Generic 1004 Generic 1005	
100	100	100	Attendant Bell Off
101	101	101	Attendant O/G Restriction/Room Status Setup
102	102	102	Attendant Display of System Alarms
103	103	103	Attendant DISA Code Setup
104	104	104	Attendant Flexible Night Service Setup
105	105	105	Attendant Guest Room Key
106	106	106	Attendant New Call Tone
107	107	107	Attendant Automatic Call Forward – No Answer
108	108	108	Attendant Audible Lockout Alarm
109	109	109	Attendant Serial Call
110	110	110	Attendant Abbreviated Dial Confidential Number Display
111	111	111	Attendant Abbreviated Dial Programming
112	112	112	Attendant Station Busy-Out
113	113	113	Attendant Call Block Key
114	114	114	Attendant Trunk Busy-Out
115	115	115	Attendant – Timed Recall (No Answer) 5 –240 Sec; 0=Disabled
116	116	116	Attendant – Timed Recall (Hold) 5 – 240 Seconds; 0=Disabled
117	117	117	Attendant – Timed Recall (Camp On) 5 – 240 Sec; 0=Disabled
118	118	118	Attendant Call Forward – No Answer Timer 10 – 240 Sec.
119	119	119	Attendant Tone Signalling
—	120	120	Attendant Conference Disable
—	121*	—	Attendant Hold Position Security
—	—	121	Attendant Station Do Not Disturb
—	122*	—	Attendant Multi-New Call Tone
—	—	122	Attendant Setup Time/Date
—	—	123	Attendant Call Forward Setup and Cancel
—	—	124	Attendant Hold Position Security
—	—	125	Attendant Multi-New Call Tone
—	—	126	RESERVED
—	—	150	Sub-Attendant Station Setup Advisory Messages
—	—	151	RESERVED
—	—	152	RESERVED
—	—	153	RESERVED
200	200	200	Account Code, Forced Entry – External Calls
201	201	201	Account Code, Forced Entry – Long Distance Calls
202	202	202	Alarm Call
203	203	203	Broker's Call
204	204	204	Call Block Applies (Room To Room)
205	—	—	Call Distribution Agent Position
—	205	205	Flash For Waiting Call
206	206	206	Call Forwarding – Busy
207	207	207	Call Forwarding – Don't Answer
208	208	208	Call Forwarding – External
209	209	209	Call Forwarding – Follow Me

\* Not available in Generic 1002 except in software load D09 and above.

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\*\* Not available in Generic 1005 FPGK1 / LIT96. \*\*\* Not available in Generic 1002.

♥ Not available in Generic 1004. ♥♥ Not available in Generic 1004 or Generic 1005 FPGK1 / LIT96.

**Table 4-2 Class Of Service Options  
(continued)**

COS Option Numbers For			Class Of Service Option Name
Generic 1001	Generic 1002 Generic 1003	Generic 1004 Generic 1005	
210	210	210	Call Forwarding Inhibit on Dial-In Trunks
211	211	211	Call Hold and Retrieve Access
212	212	212	Can Flash If Talking to an Incoming Trunk
213	213	213	Can Flash If Talking to an Outgoing Trunk
214	214	214	Cannot Dial a Trunk after Flashing
215	215	215	Cannot Dial a Trunk if Holding or in Conference with One
216	216	216	Data Security
217	217	217	Direct To ARS
218	218	218	Directed Call Pickup
219	219	219	Discriminating Dial Tone
220	220	220	Do Not Disturb
221	221	221	Clear All Features
222	222	222	Call Forward Inhibit on Hold Timeout
223	223	223	Flash Disable
224	224	224	Flash for Attendant
225	225	225	Hold Pickup (Attendant Paged Access)
226	226	226	Inward Restriction (DID)
227	227	227	Lockout Alarm Applies
228	228	228	Manual Line (Dial 0 Hotline)
229	229	229	COV Voice Mail Port
230	230	230	Message Register Overflow Alarm
231	231	231	Message Waiting Setup – Bell
232	232	232	Message Waiting Setup – Lamp
233	233	233	Never a Consultee
234	234	234	Never a Forwardee
235	235	235	Originate Only
236	236	236	Outgoing Trunk Callback
237	237	237	Outgoing Trunk Camp-On
238	238	238	Override Security
239	239	239	Priority Dial 0
240	240	240	Line Privacy
241	241	241	Receive Only
242	242	242	Repeated Camp-On Beep
243	243	243	Non-Busy Extension
244	244	244	Room Status Display
245	245	245	Abbreviated Dialing Access
805	246	246	SMDR – Extended Record
808	247	247	SMDR – Record Meter Pulses
246	248	248	TAFAS Any Access
247	249	249	TAFAS Access Tenant
248	250	250	TAFAS Access During Day Service
249	251	251	Transfer Dial Tone
250	252	252	Broker's Call with Transfer
251	253	253	Call Forward – Don't Answer Timer (2 – 6 Rings)

\* Not available in Generic 1002 except in software load D09 and above.

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\*\* Not available in Generic 1005 FPGK1 / LIT96. \*\*\* Not available in Generic 1002.

♥ Not available in Generic 1004. ♥♥ Not available in Generic 1004 or Generic 1005 FPGK1 / LIT96.

**Table 4-2 Class Of Service Options  
(continued)**

COS Option Numbers For			Class Of Service Option Name
Generic 1001	Generic 1002 Generic 1003	Generic 1004 Generic 1005	
252	254	254	Call Hold Recall Timer (PBX Telephones) 1 - 10 Minutes
253	255	255	Repeated Camp-On Beeps Timer (5 - 15 Seconds)
254	256	256	UCD Music On Hold Timer (0 - 50 Minutes)
—	—	257	Flash Over Trunk
—	258 *	258	Display Prime as Forwarder
—	259 *	259	Message Sending
—	—	260	Internal / External Split Call Forwarding
—	—	261 **	ONS Voice Mail Port
—	—	262	RESERVED
—	—	263	RESERVED
—	—	264	RESERVED
—	—	265	RESERVED
300	300	300	Automatic Callback
301	301	301	Camp-On
302	302	302	Flash-in Conference
303	303	303	Paging Zone 1 Access
304	304	304	Paging Zone 2 Access
305	305	305	Paging Zone 3 Access
306	306	306	Paging Zone 4 Access
307	307	307	Paging Zone 5 Access
308	308	308	Paging Zone 6 Access
309	309	309	Paging Zone 7 Access
310	310	310	Paging Zone 8 Access
311	311	311	Paging Zone 9 Access
312	312	312	Paging Default (0 - 9) (0 Gives All Enabled Zones)
313	313	313	CO Trunk to CO Trunk Connect
314	314	314	CO Trunk to TIE Trunk Connect
415	315	315	CO Trunk to DID Trunk Connect
316	316	316	TIE Trunk to TIE Trunk Connect
317	317	317	TIE Trunk to DID Trunk Connect
318	318	318	DID Trunk to DID Trunk Connect
319	319	319	Extension Non-CO Trunk to Trunk Connect
—	320	320	Transparent Multi-Console Operation
—	321	321	RESERVED
—	322	322	RESERVED
—	323	323	RESERVED
—	324	324	RESERVED
—	325	325	RESERVED
—	326	326 **	Account Code, Forced Entry - Data Internal Calls
—	327	327 **	Account Code, Forced Entry - Data External Calls
—	328	328 **	Account Code, Forced Entry - Data Long Distance Calls
—	—	329	RESERVED
—	—	330	RESERVED
—	—	331	RESERVED

\* Not available in Generic 1002 except in software load D09 and above.

\*\* Not available in Generic 1005 FPKG1 / LIT96. \*\*\* Not available in Generic 1002.

♥ Not available in Generic 1004. ♥♥ Not available in Generic 1004 or Generic 1005 FPKG1 / LIT96.

**Table 4-2 Class Of Service Options  
(continued)**

COS Option Numbers For			Class Of Service Option Name
Generic 1001	Generic 1002 Generic 1003	Generic 1004 Generic 1005	
400	400	400	Contact Monitor
401	401	401	Call Park
402	402	402	Long Loop (Off-Premise Extensions Only)
403	403	403	Trunk Recall Partial Inhibit
---	404 *	404	Recording Failure to Hangup Timer (1 - 255 Seconds)
---	405	405	RESERVED
---	406	406	RESERVED
---	407	407	RESERVED
500	500	500	Override
501	501	501	Override Announce
---	502	502 ♥♥	Display ANI/DNIS Information
---	503	503	RESERVED
---	---	504	RESERVED
600	600	600	<i>SUPERSET</i> Tel. - Auto-Answer
601	601	601	<i>SUPERSET</i> Tel. - Auto-Hold Disable
602	602	602	<i>SUPERSET</i> Tel. - Background Music
603	603	603	<i>SUPERSET</i> Tel. - Disconnect Alarm
604	604	604	PBX <i>SUPERSET</i> Tel. - Automatic Outgoing Line
605	605	605	<i>SUPERSET</i> Tel. - Message Program
606	606	---	<i>SUPERSET</i> Tel. - Sub-Attendant
---	---	606	<i>SUPERSET</i> Tel. - Enhanced Answering Position
607	607	607	<i>SUPERSET</i> Tel. - Associated Modem Line
608	608	608	<i>SUPERSET</i> Tel. - Room Status Display
609	609	609	<i>SUPERSET</i> Tel. - Night Service Switching
---	610 *	610	<i>SUPERSET</i> Tel. - Guest Room Template (0 - 3) (DN)
---	611	611	<i>SUPERSET</i> Tel. - Limited New Call Ring
---	612	612	<i>SUPERSET</i> Tel. - Headset Operation
---	613	613	Display ANI Information Only
---	614	614	RESERVED
---	615	615	RESERVED
---	650 ***	650 **	ACD - Agent Template (0 - 3; 0 = Disable)
---	651 ***	651 **	ACD - Supervisor Template (0 - 3; 0 = Disable)
---	652 ***	652 **	ACD - Senior Supervisor Template (0 - 3; 0 = Disable)
---	653 ***	653 **	ACD - Agent Always Auto-Answer
---	654	654	RESERVED
---	655	655	RESERVED
---	656	656	RESERVED
---	657	657	RESERVED
---	658	658	RESERVED
---	---	680	Key System - Direct CO Access
---	---	681	Key Set/Sub Att. - Call Hold Notify Timer (0 - 600 s)
---	---	682	Key System - Auto Answer - Internal Calls
---	---	683 ♥	Key System - Direct Paging Handsfree Answerback
---	---	684	RESERVED

\* Not available in Generic 1002 except in software load D09 and above.

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\*\* Not available in Generic 1005 FPGK1 / LIT96. \*\*\* Not available in Generic 1002.

♥ Not available in Generic 1004. ♥♥ Not available in Generic 1004 or Generic 1005 FPGK1 / LIT96.

**Table 4-2 Class Of Service Options  
(continued)**

COS Option Numbers For			Class Of Service Option Name
Generic 1001	Generic 1002 Generic 1003	Generic 1004 Generic 1005	
700	700	700	SMDR - Does Not Apply
701	701	701	No Dial Tone
702	702	702	SMDR - Overwrite Buffer
---	703	703	Message Register Applies
---	704 *	704 **	Incoming / Internal Modem Pooling Access
---	705 *	705	Automatic Overflow From Attendant
---	706	706	RESERVED
---	707	707	RESERVED
---	---	708	RESERVED
---	---	709	RESERVED
---	---	710	RESERVED
800	800	800	ANI Applies
801	801	801	Incoming Trunk Call Rotary
802	802	802	Limited Wait for Dial Tone
803	803	803	SMDR - Drop Calls < n Digits (0 ... 11, 0 = disable)
804	804	804	SMDR - Drop Incomplete Outgoing Calls
---	805	805	Trunk No Dial Tone Alarm
807	806	806	SMDR - Record Incoming Calls
---	807	807	SMDR - Display Private Speedcall
810	808	808	Special DISA
811	809	809	Standard Ring Applies
812	810	810	DISA During Night Service Only
---	811	811 ♥♥	ANI/DNIS Trunk
---	812 ***	812 **	Loop Start Trunk to ACD Path Connect
---	813	813	RESERVED
---	814	814 ♥♥	SMDR - Record ANI/DNIS
---	---	815	RESERVED
---	---	816	RESERVED
---	900	900 **	Data Station Queuing
---	901	901 **	DTRX Herald
---	902	902 **	DTRX Message Code
---	903	903 **	DTRX Message Code Text
---	904	904 **	DTRX Complete Message Text
---	905	905 **	DTRX Herald Text Select (1-4)
---	906	906 **	DATA SMDR - Does Not Apply
---	907	907 **	DATA SMDR - Extended Record
---	908	908 **	DATA SMDR - Overwrite Buffer
---	909	909	RESERVED
---	910	910	RESERVED
---	---	911	RESERVED

\* Not available in Generic 1002 except in software load D09 and above.

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\*\* Not available in Generic 1005 FPGK1 / LIT96. \*\*\* Not available in Generic 1002.

♥ Not available in Generic 1004. ♥♥ Not available in Generic 1004 or Generic 1005 FPKG1 / LIT96.

## Parameters

Please note: the following are not feature descriptions; refer to Practice 9109-096-105-NA, Features Description, for complete descriptions.

**Attendant Bell Off:** Allows the attendant to mute the console ringer.

**Attendant O/G Restriction/Room Status Setup:** Allows the attendant to restrict outgoing calls. This feature is part of the Hotel/Motel feature package.

**Attendant Display of System Alarms:** Allows the attendant to receive and view alarm logs at the console without logging in to maintenance.

**Attendant DISA Code Setup:** Allows the attendant to change the DISA access code, without accessing CDE.

**Attendant Flexible Night Service Setup:** Allows the attendant to change the night service assignment for non-dial-in trunks.

**Attendant Guest Room Key:** Allows the attendant to access Hotel/Motel features via the *GUEST ROOM* softkey. This feature is part of the Hotel/Motel feature package.

**Attendant New Call Tone:** Allows the attendant to be notified of incoming calls by a single tone burst, while engaged in a call.

**Attendant Automatic Call Forward – No Answer:** Allows unanswered calls to be rerouted to a secondary answer point. The call is automatically rerouted after it rings for a pre-determined length of time. See COS Option 118 – Attendant Automatic Call Forward – No Answer Timer.

**Attendant Audible Lockout Alarm:** Allows for an audible alarm to ring at the console when a suitably programmed station goes into the lock-out state.

**Attendant Serial Call:** Allows the attendant to force an incoming trunk call to recall to the console after the trunk is released from the call.

**Attendant Abbr. Dial Confidential Number Display:** Allows the attendant to view abbreviated dial numbers which have been programmed as "confidential".

**Attendant Abbreviated Dial Programming:** Allows the attendant to program numbers into the system's abbreviated dial table.

**Attendant Station Busy Out:** Allows the attendant to busy out (and return to service) any station in the system.

**Attendant Call Block Key:** Allows the attendant to block station to station (room to room) calls. This feature is part of the Hotel/Motel feature package.

**Attendant Trunk Busy Out:** Allows the attendant to busy out (and return to service) any trunk in the system.

**Attendant Timed Recall (No Ans):** This sets the no answer recall timer. If set to 0, the feature is disabled.

**Attendant Timed Recall (Busy):** This sets the busy recall timer. If set to 0, the feature is disabled.

**Attendant Timed Recall (Campon):** This sets the campon recall timer. If set to 0, the feature is disabled.

**Attendant Call Forward – No Answer Timer:** This sets the Call Forward – No Answer timer for the Attendant Automatic Call Forward Feature.

**Attendant Tone Signalling:** Allows the console to transmit DTMF tones during an established call.

**Attendant Conference Disable:** Disallows the console from making conference calls.

**Attendant Hold Position Security:** This option gives the Attendant error beeps when the Attendant is on a call and presses a HOLD key that is already in use.

**Attendant Station Do Not Disturb:** Allows attendant or sub-attendant to change DND status on a station in its tenant group.

**Attendant Setup Time/Date:** Allows attendant or sub-attendant to set the system time and/or date.

**Attendant Multi – New Call Tone:** When at least one call is waiting to be answered by an Attendant who is busy on a call, the Console will get a short beep at the programmed interval (provided Attendant New Call Tone is enabled).

**Attendant Call Forward Setup/Cancel:** Allows attendant or sub-attendant to change the call forward status of a station in its tenant group.

**Sub-Attendant Station Setup Advisory Message:** Allows a subattendant to set up advisory messages on sets within the tenant group.

**Account Code Forced Entry – External Calls:** Forces an extension to enter an account code before allowing external calls.

**Account Code Forced Entry – Long Distance Calls:** Forces an extension to enter an account code before allowing long distance calls.

**Alarm Call:** Allows an extension to be programmed to ring at a specific time.

**Broker's Call:** Allows an extension flash to be interpreted as a swap rather than a conference attempt.

**Call Block Applies:** Allows the extension to be affected when the attendant applies the Call Block feature. This feature is part of the Hotel/Motel feature package.

**Call Distribution Agent Position:** Allows a *SUPERSET* telephone to be used as a UCD agent position, with a headset (Generic 1001 only). In other generics, COS Option 612 is used to allow headset operation regardless of the application.

**Flash For Waiting Call:** Allows a user to place a call (2-party or multi-party) on consultation hold and connect to a waiting call, via a flash of the switchhook. This is not available in Generic 1001.

**Call Forward – Busy:** Allows the extension to set up call forwarding on busy.

**Call Forward – Don't Answer:** Allows the extension to set up call forwarding on no answer.

**Call Forward – External:** Allows the extension to set up call forwarding to external numbers.

**Call Forward – Follow Me:** Allows an extension user to set up call forwarding from another station.

**Call Forward Inhibit On Dial In Trunks:** Prevents calls from Dial-In trunks from being forwarded to stations with this item in their COS.

**Call Hold and Retrieve Access:** Allows the extension to use the Call Hold and Call Hold Retrieve access codes.

**Can Flash If Talking To An Incoming Trunk:** Allows an extension to flash the switchhook when connected to an incoming trunk.

**Can Flash If Talking To An Outgoing Trunk:** Allows an extension to flash the switchhook when connected to an outgoing trunk.

**Cannot Dial a Trunk After Flashing:** Prevents an extension from accessing a trunk after flashing the switchhook.

**Cannot Dial a Trunk if Holding or in Conf With One:** Prevents an extension from accessing a trunk if that extension already has a trunk on hold, or is in conference with a trunk.

**Data Security:** Prevents the system from transmitting any intrusion or warning tones on an established call.

**Direct To ARS:** Allows an extension to be routed directly to ARS upon going off-hook. The system automatically dials the ARS Leading Digit String.

**Directed Call Pickup:** Allows the extension to dial the Directed Call Pickup access code, and answer a call ringing at another extension.

**Discriminating Dial Tone:** Allows an extension to have a special distinctive dial tone, informing the user that feature(s) are active.

**Do Not Disturb:** Allows the extension to prevent incoming calls from ringing.

**Clear All Features:** Allows an extension to turn off all features currently active. These features include all flavors of Call Forwarding, Do Not Disturb and Callbacks.

**Call Forwarding Inhibit on Hold Timeout:** Causes call forward no answer to be ignored when a held party times out and begins ringing back the holding set.

**Flash Disable:** Prevents an extension from using any feature that required the use of the switchhook flash.

**Flash For Attendant:** Allows an extension to ring the attendant immediately upon flashing the switchhook.

**Hold Pickup:** Allows an extension to connect to a caller waiting in an attendant console hold slot position.

**Inward Restriction:** Prevents an extension from receiving incoming calls from DID trunks.

**Lockout Alarm Applies:** Causes an alarm to be raised at the attendant console when the set goes into the *lockout* state.

**Manual Line:** Causes an off-hook origination to ring the attendant. Calls are received in the normal manner.

**COV Voice Mail Port:** Causes the port to be designated as an interface to a COV Voice Mail system. Refer to 9150-953-019-NA, VX Voice Processor Installation and Repair Manual VX-200/VX-400/VX-800 Systems.

**Message Register Overflow Alarm:** Allows an alarm to be raised at the attendant console, and a maintenance log to be generated when the extension's message register overflows.

**Message Waiting Setup – Bell:** Allows the attendant to set up a message waiting condition on a extension not equipped with a lamp.

**Message Waiting Setup – Lamp:** Allows the attendant to set up a message waiting condition on an extension equipped with a lamp.

**Never a Consultee:** Prevents other extensions calling when they have a consultation hold in progress.

**Never a Forwarder:** Prevents an extension from having calls forwarded to it by another extension.

**Originate Only:** Prevents an extension from receiving any calls, unless they are forwarded.

**Outgoing Trunk Callback:** Allows Callback – Busy on outgoing trunks.

**Outgoing Trunk Camp-On:** Allows Camp-On on outgoing trunks.

**Override Security:** Prevents other extensions from overriding calls.

**Priority Dial 0:** Provides a second class of dial-0 access to the attendant. This class may then have its own LDN appearance on the attendant console(s).

**Line Privacy:** Prevents one *SUPERSET* telephone from overriding the key line being used by another *SUPERSET* telephone.

**Receive Only:** Prevents an extension from initiating calls.

**Repeated Camp-On Beeps:** Provides for repeated notification beeps, indicating that a trunk is camped on.

**Non-Busy Extension:** Causes calls to the busy extension to override automatically, and join the conversation.

**Room Status Applies:** Allows an extension to have its room status changed – this feature is part of the Hotel/Motel feature package.

**Abbreviated Dialing Access:** Allows access to the system Abbreviated Dialing tables.

**SMDR – Record Meter Pulses:** Allows meter pulses received from the Central Office to be counted, and recorded.

**TAFAS Access During Day Service** (prior to Generic 1004 this is known as **TAFAS Any Access**): Allows the extension to answer incoming calls appearing at night bells, regardless of the tenanting.

**TAFAS Tenant Access:** Allows an extension to answer incoming calls appearing at night bells, providing that they are within the same tenant group.

**TAFAS Any Access:** Allows an extension to answer incoming calls appearing at night bells, only during day service.

**Transfer Dial Tone:** Allows an extension to have a special distinctive dial tone, informing the user that there is a call on consultation hold.

**Broker's Call With Transfer** (prior to Generic 1003 this is known as **Transfer With Privacy**): Same as Broker's Call, except that a transfer is possible when the extension goes on-hook.

**Call Forward Don't Answer Timer:** Sets the number of times the set will ring before the call is forwarded.

**Call Hold Recall Timer:** Sets the time between when a call was placed on hold, and when the held call recalls.

**Repeated Campon Beeps Timer:** Sets the period for the repeated campon beeps.

**UCD Music On Hold Timer:** Sets the length of time an incoming UCD caller hears music before being routed to an overflow answer point.

**Flash Over Trunk:** Allows an extension to send a switchhook flash out on a trunk.

**Display Prime as Forwarder:** Allows the option of displaying the forwarder's extension or logical line access code when a call is forwarded.

**Message Sending:** Allows telephone sets to send Call Me Back messages to other extensions.

**Internal/External Split Call Forwarding:** Allows an extension to split call forward setup between internal calls and external calls.

**ONS Voice Mail Port:** Causes an ONS line port to be designated as an interface to an ONS Voice Mail system. ONS Voice Mail functionality is only included in ACD Loads. Refer to Practice 9109-096-105-NA, Features Description. Not available in Generic 1005 FPKG1 or Generic 1005 LIT96.

**Automatic Callback:** Allows an extension to arrange for a call to a busy extension to be completed when that extension becomes idle.

**Camp-On:** Allows an extension to notify a busy extension (via a beep) that communication is desired. The camped-on call rings when the called party goes on-hook.

**Flash-In Conference:** Allows an extension to create 4 or 5 party conferences.

**Paging Zone Access:** Allows an extension to have access to one or more paging zones. Zones 1 through 9 are programmable.

**Paging Default:** Sets the default paging zone for the station. 0 enables all zones.

**CO Trunk to CO Trunk Connect:** Allows an extension to connect 2 CO trunks together.

**CO Trunk to Tie Trunk Connect:** Allows an extension to connect a CO trunk and a Tie trunk together.

**CO Trunk to DID Trunk Connect:** Allows an extension to connect a CO trunk and a DID trunk together.

**Tie Trunk to Tie Trunk Connect:** Allows an extension to connect 2 Tie trunks together.

**Tie Trunk to DID Trunk Connect:** Allows an extension to connect a Tie trunk and a DID trunk together.

**DID Trunk to DID Trunk Connect:** Allows an extension to connect 2 DID trunks together.

**Extension Non-CO Trunk to Trunk Connect:** Allows an extension to connect any non-CO type trunk to any other trunk.

**Transparent Multi-Console Operation:** Allows consoles within a tenant group to read/cancel messages set by other consoles in the group. Also, any console in the group can answer recalls for any other console.

**Account Code, Forced Entry – Data Internal Calls:** Requires an extension to enter an account code before making internal data calls. Not available in Generic 1005 FPKG1 or Generic 1005 LIT96.

**Account Code, Forced Entry – Data External Calls:** Requires an extension to enter an account code before making external data calls. Not available in Generic 1005 FPKG1 or Generic 1005 LIT96.

**Account Code, Forced Entry – Data Long Dist Calls:** Requires an extension to enter an account code before making long distance data calls. Not available in Generic 1005 FPKG1 or Generic 1005 LIT96.

**Contact Monitor:** Allows a line circuit port to be used as an alarm contact relay. See Practice 9109–096–105–NA, Features Description, for further information.

**Call Park:** Allows an extension to park a call and go on-hook. New calls may not be received or originated, but paging equipment may be accessed.

**Long Loop:** Designates the OPS port as having a loop length of over 2 km. This adds a compromise balance network into the circuit.

**Trunk Recall Partial Inhibit:** Prevents a trunk from ringing the extension back while the extension is dialing, and goes on hook (phantom ringback).

**Recording Failure to Hangup Timer:** Sets the time a recording device has to hang up. If the timer expires before the device hangs up, it is placed into the *Do Not Disturb* state.

**Override:** Allows an extension to override (intrude into the conversation of) a busy extension.

**Override Announce:** Allows an overriding party to call or override to the Call Announce port of a *SUPERSET 4* telephone, rather than intruding into the conversation.

**Display ANI/DNIS Information:** Allows the display of ANI and/or DNIS digits on *SUPERSET* telephones and consoles. Not available in Generic 1005 FPKG1, Generic 1005 LIT96 and Generic 1004.

***SUPERSET* Telephone – Auto Answer:** Allows incoming calls to ring briefly, then are automatically answered in Hands Free mode.

***SUPERSET* Telephone – Auto Hold Disable:** Disables the auto-hold feature. Auto hold allows a user to press another line appearance key, automatically placing a caller on the original line on hold.

***SUPERSET* Telephone – Background Music:** Allows a set to play music (from MOH) over the set speaker, when idle.

***SUPERSET* Telephone – Disconnect Alarm:** Allows for an alarm indication (log message is generated) when the set is unplugged.

***SUPERSET* – Immediate Line Select:** See *SUPERSET* Telephone – Automatic Outgoing Line for more information.

**PBX *SUPERSET* Telephone – Automatic Outgoing Line** (called ***SUPERSET* – Immediate Line Select** in Generic 1001, 1002, 1003): Allows a set to automatically select the first free line when the user begins dialing. If disabled, the user must first either go off-hook, or press a line appearance key. Note that this does not apply to *SUPERSET 401* telephone sets.

**SUPERSET Telephone – Message Program:** Allows changing/programming of advisory messages from the set.

**SUPERSET – Subattendant** – See *SUPERSET Telephone – Enhanced Answering Position* for more information

**SUPERSET Telephone – Enhanced Answering Position** (called **SUPERSET – Subattendant** in Generic 1001, 1002, 1003): Allows a *SUPERSET* telephone to be used as an enhanced answering position (see Practice 9109–096–105–NA, Features Description, under *Sub-Attendant – Enhanced Answering Position*).

**SUPERSET Telephone – Associated Modem Line:** Allows a *SUPERSET 4* or *SUPERSET 4DN* telephone to be associated with an ONS port connected to modem. The telephone can initiate either a data call or voice call. Simultaneous voice and data calls are permitted.

**SUPERSET Telephone – Room Status Display:** Allows a *SUPERSET 4* or *SUPERSET 4DN* telephone to check room status. This feature is part of the Hotel/Motel feature package.

**SUPERSET Telephone – Night Service Switching:** Allows a *SUPERSET 4* or *SUPERSET 4DN* telephone to change the night service status of the system or a tenant group.

**SUPERSET Tel. – Guest Rm Template (0–3) (DN)** (called **SUPERSET – 3DN/4DN Guest Room Templates** in Generic 1003): Allows certain configurations of Speed Dial keys and Feature Keys. Not available to the *SUPERSET 401™*. See Practice 9109–096–602–NA, Hotel/Motel Feature Package Description. This feature is part of the Hotel/Motel feature package.

**SUPERSET Telephone – Limited New Call Ring:** Limits the new call ring for sets which have a high amount of traffic on one or more line appearances.

**SUPERSET Telephone – Headset Operation:** Allows a *SUPERSET* telephone to be used as with a headset.

**Display ANI Information Only:** Allows ANI digits only (never DNIS digits) to be displayed on *SUPERSETS*. Not available in Generic 1005 FPKG1, Generic 1005 LIT96 and Generic 1004.

**ACD – Agent Template:** Allows certain configurations of Speed Dial keys and Feature Keys. See Practice 9109–096–620–NA, *ACD TELEMARKETER* Application Package. Not available in Generic 1005 FPKG1 or Generic 1005 LIT96.

**ACD – Supervisor Template:** Allows certain configurations of Speed Dial keys and Feature Keys. See Practice 9109–096–620–NA, *ACD TELEMARKETER* Application Package. Not available in Generic 1005 FPKG1 or Generic 1005 LIT96.

**ACD – Senior Supervisor Template:** Allows certain configurations of Speed Dial keys and Feature Keys. See Practice 9109–096–620–NA, *ACD TELEMARKETER* Application Package. Not available in Generic 1005 FPKG1 or Generic 1005 LIT96.

**ACD – Agent Always Auto–Answer:** Allows an ACD agent to be in auto answer mode at all times. See Practice 9109–096–620–NA, *ACD TELEMARKETER* Application Package. Not available in Generic 1005 FPKG1 or Generic 1005 LIT96.

**Key System – Direct CO Access:** Allows a key set to directly access a CO trunk using Feature Access Code 50.

**Key Set/Sub Att – Call Hold Notify Timer:** Sets the time between when a call was placed on hold on a programmable hold key and when the held call recalls.

**Key System – Auto Answer – Internal Calls:** Allows a *SUPERSET 3DN* or a *SUPERSET 4DN* key system set user to respond handsfree to a directed page call.

**Key System – Direct Paging Handsfree Answerback:** Allows a *SUPERSET 410™*, *SUPERSET 420™* or a *SUPERSET 430™* key system set user to access the handsfree answerback feature for directed page calls. Not available in Generic 1004.

**SMDR – Does Not Apply:** Prevents calls from having SMDR records.

**No Dial Tone:** Inhibits dial tone.

**SMDR – Overwrite Buffer:** Allows older records to be overwritten by newer records when the SMDR buffer becomes full. If disabled, a full buffer will result in further calls requiring SMDR to not be allowed.

**Message Register Applies:** Causes the system to count and report (SMDR) the number of outgoing calls made by a station and the number of incoming meter pulses received. This feature is part of the Hotel/Motel Feature Package.

**Incoming/Internal Modem Pooling Access:** Allows a modem user to make a call to a Dataset. Not available in Generic 1005 FPKG1 or Generic 1005 LIT96.

**Automatic Overflow from Attendant:** Allows incoming calls not answered within a pre–determined period to be rerouted to a recording device while remaining in the answer queue.

**ANI Applies:** Provides for ANI information being transmitted on outgoing trunks.

**Incoming Trunk Call Rotary:** Instructs a trunk to ignore incoming DTMF digits.

**Limited Wait For Dial Tone:** Instructs a trunk to wait a pre–determined period for dial tone from the far end before sending digits.

**SMDR – Drop Calls < n Digits:** Prevents SMDR from reporting on calls which are less than a pre–determined length.

**SMDR – Drop Incomplete Outgoing Calls:** Prevents incomplete outgoing calls from generating an SMDR report.

**Trunk No Dial Tone Alarm:** Allows the system to raise an alarm if dial tone cannot be detected on it. The system will also take such a trunk out of service.

**SMDR – Record Incoming Calls:** Causes incoming trunk calls to be recorded by SMDR.

**SMDR – Display Private Speedcall:** Controls the display of private speedcall numbers in SMDR.

**SMDR – Extended Record:** Allows for 8 additional columns in the record to accommodate 12–digit account codes and the system identifier. This increases the number of characters for an SMDR record to 88.

**Special DISA:** Allows for DISA users to enter verified account codes rather than the DISA access code. (Feature Access Code 19).

**Standard Ring Applies:** Allows for incoming trunks to provide standard ringing cadence; ignoring of the Discriminating Ringing feature.

**DISA During Night Service Only:** Allows for a trunk to be a DISA trunk only when the system (or tenant group) is in night service.

**ANI/DNIS Trunk:** Allows an incoming trunk to receive ANI/DNIS information. Trunks must use DTMF signalling, have a wink timer and one of the following trunk circuit descriptors: “T1 E&M”, “T1 E&M DISA”, “T1 DID/TIE” or “T1 TIE DISA”. Not available in Generic 1005 FPKG1, Generic 1005 LIT96 and Generic 1004.

**Loop Start Trunk to ACD Path Connect:** Allows loop start DISA trunks to access ACD. Not available in Generic 1005 FPKG1 or Generic 1005 LIT96.

**SMDR – Record ANI/DNIS:** Allows ANI/DNIS information to be reported in the SMDR trunk record. Not available in Generic 1005 FPKG 1, Generic 1004 or Generic 1005 LIT96.

**Data Station Queuing:** Allows queuing on to busy data stations. Not available in Generic 1005 FPKG1 or Generic 1005 LIT96.

**DTRX Herald:** Allows a programmable message to appear when connection is made to the DTRX. Not available in Generic 1005 FPKG1 or Generic 1005 LIT96.

**DTRX Message Code:** Allows for DTRX message codes to be displayed. See Practice 9109–096–105–NA, Features Description, under Data Transceiver, for further information. Not available in Generic 1005 FPKG1 or Generic 1005 LIT96.

**DTRX Message Code Text:** Allows for DTRX status messages to be displayed. See Practice 9109–096–105–NA, Features Description, under Data Transceiver, for further information. Not available in Generic 1005 FPKG1 or Generic 1005 LIT96.

**DTRX Complete Message Code Text:** Allows for DTRX message codes and status messages to be displayed. See Practice 9109–096–105–NA, Features Description, under Data Transceiver, for further information. Not available in Generic 1005 FPKG1 or Generic 1005 LIT96.

**DTRX Herald Text Select:** Allows for a choice of DTRX herald messages. See Practice 9109-096-105-NA, Features Description, under Data Transceiver, for further information. Not available in Generic 1005 FPKG1 or Generic 1005 LIT96.

**DATA SMDR – Does Not Apply:** Prevents data calls from having SMDR records. Not available in Generic 1005 FPKG1 or Generic 1005 LIT96.

**DATA SMDR – Extended Record:** Allows for the system identifier to be included in the SMDR record. Not available in Generic 1005 FPKG1 or Generic 1005 LIT96.

**DATA SMDR – Overwrite Buffer:** Allows older records to be overwritten by newer records when the SMDR buffer becomes full. If disabled, a full buffer will result in further calls requiring SMDR to not be allowed. Not available in Generic 1005 FPKG1 or Generic 1005 LIT96.

## Form 04 – System Options/System Timers

- 4.4 This form specifies the system's options and timers that are system wide. See Table 4-3 for the complete list and Figure 4-4 for the form layout.

System Options (Displaying ENABLED Options)		STATUS	OPTION NUM	
24 Hour Clock		ENABLED	01	
Automated Attendant		ENABLED	16	
Discriminating Ringing		ENABLED	17	
Host Command Interface		ENABLED	19	
Incoming to Outgoing Call Forward		ENABLED	21	
SMDR Indicate Long Calls		ENABLED	28	
SUPERSET Telephone Last Number Redial		ENABLED	29	
RESERVED		ENABLED	30	
Switch-Hook Flash		ENABLED	38	
DATA SMDR Indicate Long Calls		ENABLED	39	
Message Register Follows Talker		ENABLED	40	
Automatic Call Distribution		ENABLED	41	
24 Hour Clock		ENABLED	01	
1-DISABLE	2-	3-	4-TOP	5-BOTTOM
6-QUIT	7-OPTION NUM	8-SHOW DISABLE	9-	0-

Figure 4-4 Form 04 Layout

### Field Description

The header line indicates which set of options are selected; either the enabled or disabled options. Note that the system timers are included with the enabled options.

**STATUS:** This field specifies which options are enabled, disabled or the value of the timers.

**OPTION NUM:** This field lists the option number for each option or timer.

### Softkeys

**DISABLE/ENABLE:** This softkey has two functions: it disables or enables System Options. The DISABLE softkey appears when the form shows the enabled options. Pressing the DISABLE softkey disables the selected option. The STATUS field shows the DISABLED prompt. The ENABLE softkey appears when the form displays the disabled options. Pressing the ENABLE softkey enables the selected option. The STATUS field shows the ENABLED prompt. **Note:** The enable (or disable) process is completed by pressing the ENTER softkey.

**VARIABLE:** This softkey appears only when System Option 55 is selected (displayed on the command line). Pressing the VARIABLE softkey sets the status of System Option 55 to Variable; the STATUS field shows the VARIABLE prompt. The selection is completed by pressing the ENTER softkey. Account Codes entered into Form 33, Account Code Entry, can be from 1 to 12 digits in length.

**INTERNAL:** This softkey appears only when System Options 57 and 58 are selected (displayed on the command line). Pressing the INTERNAL softkey sets the status of System Options 57 and 58 to Internal (for telephones with "Room Status" enabled) and only internal calls can be made. The selection is completed by pressing the ENTER softkey. The INTERNAL prompt disappears from the softkey display and the STATUS field now displays the INTERNAL prompt to indicate this selection.

**LOCAL:** This softkey appears only when System Options 57 and 58 selected (displayed on the command line). Pressing the LOCAL softkey sets the status of System Options 57 and 58 to Local (for telephones with "Room Status enabled) and only internal and local calls can be made. The selection is completed by pressing the ENTER softkey. The LOCAL prompt disappears from the softkey display and the STATUS field now displays the LOCAL prompt.

**LONG DIST:** This softkey appears only when System Options 57 and 58 are selected (displayed on the command line). Pressing the LONG DIST softkey enables long distance calls. For telephones with "Room Status" enabled, internal, local and long distance calls can be made. The selection is completed by pressing the ENTER softkey. The LONG DIST prompt disappears from the softkey display and the STATUS field displays the LONG DIST prompt.

**OPTION NUM:** This softkey selects a specific System Option or System Timer. Pressing the OPTION NUM softkey displays the ENTER OPTION NUM: prompt on the command line. The selection is completed by entering a valid option number (1 to 58). The command line displays that System Option (or System Timer) name, status and number.

**SHOW DISABLE/SHOW ENABLE:** This softkey has two functions: it displays the disabled or enabled System Options. Pressing the SHOW DISABLE softkey displays the currently disabled System Options; the softkey now shows the SHOW ENABLE prompt. Pressing the SHOW ENABLE softkey shows those System Options that are enabled; the softkey returns to the SHOW DISABLE prompt. Note: Those options with a timer value are listed when the SHOW ENABLE softkey is pressed.

**ENTER TIME:** This softkey only appears when System Timer 56, Auto Room Status Conversion/Auto Wakeup Print Timer, is selected (displayed on the command line). Pressing the ENTER TIME softkey, displays the ENTER TIME (HH:MM): prompt on the command line. The time selection is completed by entering the time (00:00 to 23:59 are valid) in a 24-hour format and then pressing the ENTER softkey.

The standard softkeys **CANCEL**, **ENTER**, **BOTTOM**, **TOP**, and **QUIT** are also provided.

Table 4-3 System Options and Timers

Option Numbers For			System Options / System Timers
Generic 1001	Generic 1002 Generic 1003	Generic 1004 Generic 1005	
01	01	01	24 Hour Clock
—	02	02	Message Lamp test
—	03	03	Single Paging Amplifier
04	04	04	Message Waiting and Message Register Clear Print
05	05	05	Verified Account Codes
—	06	06	Analogue Networking SMDR
—	07	07	Cancel 24-Hour Message Waiting
—	—	08	5-Digit SMDR
09	09	09	Attendant Call Block
10	10	10	Attendant Conference Beeps
11	11	11	Automatic Wakeup
12	12	12	Automatic Wakeup Alarm
13	13	13	Automatic Wakeup Print
14	14	14	Automatic Wakeup Music
15	15	15	Data Demultiplexer
16	16 *	16 **	Automated Attendant
17	17	17	Discriminating Ringing
18	18	18	Discriminating Ringing Always
—	—	19 **	Mitel Application Interface
20	20	20	Holiday Messages
21	21	21	Incoming to Outgoing Call Forward
22	22	22	Last Party Clear - Dial Tone
23	23	23	Message Register Count Additional Supervisions
24	24	24	Message Register Audit
25	25	25	Message Register Zero After Audit
26	26	26	No Overlap Outpulsing
27	27	27	Room Status Audit
28	28	28	SMDR Indicate Long Call
29	29	29	SUPERSET Telephone Last Number Redial
30	30	30	RESERVED
31	31	31	Satellite PBX
32	32	32	Outgoing Call Restriction
33	33	33	Room Status
34	34	34	Auto Room Status Conversion / Auto Wakeup Print
—	35	35 **	Property Management System
—	36	36	End Of Dial Character (#)
—	37	37	Calibrated Flash
—	38	38	Switch-Hook Flash
—	39	39 **	DATA SMDR Indicate Long Calls
—	40	40	Message Register Follows Talker

\* Not available in Generic 1002.

\*\* Not available in Generic 1005 FPGK1 or Generic 1005 LIT96.

♣♣ Not available in Generic 1003 (Non-ACD) and Generic 1002.

**Table 4-3 System Options and Timers  
(continued)**

Option Numbers For			System Options / System Timers
Generic 1001	Generic 1002 Generic 1003	Generic 1004 Generic 1005	
—	41 ♣♣	41 **	Automatic Call Distribution (ACD)
—	42 ♣♣	42 **	ACD Silent Monitoring
—	43 ♣♣	43 **	ACD Silent Monitoring Beeps
—	44 ♣♣	44 **	ACD Reports
—	45	45	RESERVED
35	46	46	Digit Translation Plan (0 – 3)
36	47	47	ARS Unknown Digit Length Time-out (2 – 15 Seconds)
37	48	48	Limited Wait For Dial Tone (1 – 15 Seconds)
38	49	49	Pseudo Answer Supervision Timer (10 – 60 Seconds)
39	50	50	Dialing Conflict Timer (2 – 10 Seconds)
40	51	51	Final Ring Time-out (1 – 30 Minutes)
41	52	52	Minimum Flash Timer (20 – 50 ms; in 10 ms increments)
42	53	53	Maximum Flash Timer (20 – 150 ms; in 10 ms increments)
43	54	54	DISA Answer Timer (1 – 8 Seconds)
44	55	55	Account Code Length (Variable or 4 – 12 Digits)
45	56	56	Auto Room Status Conversion / Wakeup Print Timer
46	57	57	Vacant / Reserved Room Default Call Restriction
—	58	58	Occupied Room Default Call Restriction
—	59 ♣♣	59 **	Receivers Reserved for Non-Auto-Attendant Use
—	60	60	Tone Plan
61	61	61	RESERVED
62	62	62	RESERVED
63	63	63	RESERVED
64	64	64	RESERVED
65	65	65	RESERVED

\* Not available in Generic 1002.

\*\* Not available in Generic 1005 FPGK1 or Generic 1005 LIT96.

♣♣ Not available in Generic 1003 (Non-ACD) and Generic 1002.

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### Parameters

Please note: the following are not feature descriptions. Refer to Practice 9109-096-105-NA, Features Description, for complete descriptions.

**24 Hour Clock:** If enabled, system runs on 24-hour clock. If disabled, system runs on 12-hour clock.

**Message Lamp Test Enable:** When enabled, allows testing of telephone message lamps by the system.

**Single Paging Amplifier:** Enable if system has only one paging amplifier output. Allows one user at a time to access the paging feature.

**Message Waiting & Message Register Clear Print:** If enabled, a message is printed on the default printer whenever a message register is cleared or a message waiting is cancelled.

**Verified Account Codes:** Enable if verified account codes are to be used.

**Analog Networking SMDR:** Enable if SMDR records are to be kept for calls made via analog networking.

**Cancel 24-Hour Message Waiting:** Allows the system to automatically cancel message waiting indicators after 24 hours.

**Five-Digit SMDR:** Allows SMDR to record 5 digit telephone extension numbers rather than the usual 4. Used in networking and hotel/motel applications.

**Attendant Call Block:** Allows call blocking on the system. (Hotel/Motel Feature).

**Attendant Conference Beeps:** Allows for warning beeps to be heard by the source and destination parties of a call, before the attendant enters into a conference with them, and during the conference.

**Automatic Wakeup:** Enables the Automatic Wakeup feature.

**Automatic Wakeup Alarm:** Allows an alarm to be raised at the attendant console when a wakeup alarm is unanswered three times.

**Automatic Wakeup Print:** Allows a message to be printed on the default printer whenever a wakeup call is set up, cancelled, answered or honored.

**Automatic Wakeup Music:** Allows music (MOH) to be heard upon answering a wakeup call.

**Data Demultiplexer:** Enable if a Data Demultiplexer is connected to the system's printer port. See Practice 9160-080-300-NA, Data Demultiplexer, for further information.

**Automated Attendant:** Enables the Automated Attendant Feature Package – refer to Practice 9109-096-625-NA, Automated Attendant Application Package, for further information. Not available in Generic 1005 FPKG1 or Generic 1005 LIT96.

**Discriminating Ringing:** Enables the Discriminating Ringing feature.

**Discriminating Ringing Always:** Causes discriminating ringing to be the normal ringing pattern for all calls on the system.

**Mitel Application Interface:** Allows for the use of the Application Platform Package (APP). Not available in Generic 1005 FPKG1 or Generic 1005 LIT96.

**Holiday Messages:** When enabled, the system automatically sets up holiday messages on *SUPERSET 4* and *SUPERSET 4DN* telephones at Christmas and the New Year.

**Incoming to Outgoing Call Forward:** Allows call forwarding to external numbers by incoming trunks.

**Last Party Clear – Dial Tone:** Allows the last party remaining in a call to receive dial tone rather than silence.

**Message Reg. Count Additional Supervisions:** Allows meter pulses to be counted after supervision has been received from an outgoing trunk.

**Message Register Audit:** Allows the attendant to print the message register count for all rooms that have a count greater than zero.

**Message Register Zero After Audit:** Allows the system to automatically clear all message registers after an audit.

**No Overlap Outpulsing:** Forces ARS to collect all dialed digits before outpulsing them on a trunk.

**Room Status Audit:** Allows room status printouts.

**SMDR Indicate Long Calls:** Allows the SMDR record to flag calls which are greater in duration than 5 minutes.

**SUPERSET Telephone Last Number Redial:** Allows *SUPERSET* telephone users and attendants to redial the last manually-dialed number with a single key.

**Satellite PBX:** Enable if the system is to serve as a satellite PBX.

**Outgoing Call Restriction:** Prevent unauthorized trunk calls after a guest has checked out of the room (Hotel/Motel application).

**Room Status:** Allows room status statistics to be maintained by the system.

**Auto Room Stat. Conversion/Auto Wakeup Print:** Allows an automatic change of room status and wakeup audit daily.

**Property Management System:** Enable if system is equipped with a PMS system. Not available in Generic 1005 FPKG1 or Generic 1005 LIT96.

**End of Dial Character:** Allows the user to dial a special character (#) to indicate to the system that there are no more characters coming. This eliminates the end of dial timer.

**Calibrated Flash:** Allows the system to create the proper flash time to prevent confusion between a flash and a hang-up attempt. This applies to rotary-dial telephones, and DTMF sets with flash buttons. Not available in Generic 1001.

**Switch-hook Flash:** Allows stations to flash the switch-hook to access system features.

**Data SMDR Indicate Long Calls:** Provides an identifying character in column 1 of the SMDR report to indicate the approximate length of a call. Not available in Generic 1001, Generic 1005 FPKG1 or Generic 1005 LIT96.

**Message Register Follows Talker:** Allows the last party connected to a trunk to be charged with the register count. Not available in Generic 1001.

**Automatic Call Distribution:** Enables ACD. Not available in Generic 1001, Generic 1005 FPKG1 or Generic 1005 LIT96.

**ACD Silent Monitoring:** Allows silent monitoring of ACD agents by ACD supervisors. Not available in Generic 1005 FPKG1 or Generic 1005 LIT96.

**ACD Silent Monitoring Beeps:** Enables the ACD agent to be notified when being monitored by the ACD supervisor. Not available in Generic 1005 FPKG1 or Generic 1005 LIT96.

**ACD Reports:** Changes SMDR reports into the format required by the *ACD TELEMARKETER* Reporting Package. Not available in Generic 1005 FPKG1 or Generic 1005 LIT96.

**Digit Translation Plan:** Chooses one of 4 available digit translation plans for rotary dial signalling. See Digit Translation, in Practice 9109-096-105-NA, Features Description.

**ARS Unknown Digit Length Time-out:** Sets the time ARS will wait for more digits when dialing a digit string which includes a variable-length account code (2 – 15 sec).

**Limited Wait For Dial Tone:** Sets the time a trunk will wait before outputting digits (1 – 15 sec).

**Pseudo Answer Supervision Timer:** Sets the time a trunk will wait while providing pseudo answer supervision (10 – 60 sec).

**Dialing Conflict Timer:** Sets the time that the system will wait for conflict dialing (2 – 10 sec).

**Final Ring Time-Out:** Sets the time the system will allow an unanswered station to ring (1 – 30 min) before dropping the call.

**Minimum Flash Timer:** Sets the minimum time a set must be on-hook before it is recognized as a flash (20 – 50 ms, in 10 ms increments).

**Maximum Flash Timer:** Sets the maximum time a set can be on-hook to be recognized as a flash. If this time is exceeded, it is recognized as an on-hook hang-up (20 – 150 ms, in 10 ms increments).

**DISA Answer Timer:** Sets the time between seizure of the incoming DISA trunk and the provision of dial tone.

**Account Code Length:** Sets the length of account codes (VARIABLE, or any fixed length between 4 and 12).

**Auto Room Status Conversion/Auto Wakeup Print Timer:** Sets the time when the conversion/audit takes place (the default time is 00:00).

**Vacant/Reserved Room Default Call Restriction:** Sets default call restriction for vacant/reserved rooms; one of INTERNAL, LOCAL or LONG DISTANCE.

**Occupied Room Default Call Restriction:** Sets default call restriction for occupied rooms; one of INTERNAL, LOCAL or LONG DISTANCE.

**Receivers Reserved for Non-Auto-Attendant Use:** Reserves receivers for standard PBX call processing to safeguard against the auto-attendant feature from using all of the available receivers. Not available in Generic 1005 FPKG1 or Generic 1005 LIT96.

**Tone Plan:** Sets the system tone plan – one of NA (North America), HK (Hong Kong), MX (Mexico), MA (Malaysia) or TW (Taiwan).

**Form 05 – Tenant Interconnection Table**

4.5 This form specifies which Tenant Groups may be connected together (see Figure 4-5). The system allows for a maximum of 25 Tenant Groups. Each group specifies its own trunk answering points, attendant answering points and night service status.

2:56 30-NOV-89		alarm status = MAJOR																								
	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	
>	01	0	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	02	*	0	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	03	*	*	0	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	04	*	*	*	0	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	05	*	*	*	*	0	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	06	*	*	*	*	*	0	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	07	*	*	*	*	*	*	0	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	08	*	*	*	*	*	*	*	0	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	09	*	*	*	*	*	*	*	*	0	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	10	*	*	*	*	*	*	*	*	*	0	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	11	*	*	*	*	*	*	*	*	*	*	0	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	12	*	*	*	*	*	*	*	*	*	*	*	0	*	*	*	*	*	*	*	*	*	*	*	*	*
	01	0	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	1-	2-		3-		4-TOP		5-BOTTOM																		
	6-QUIT	7-TENANT NUM		8-DISALLOW		9-		0-																		

**Figure 4-5 Form 05 Layout**

**Field Description**

Initially, the system interconnects all Tenant Groups. The asterisk (\*) character indicates this condition. When the system inhibits Tenant Group interconnection, it is indicated by the period (.) character. The Tenant Group numbers are listed in the header line and the first column. The letter (O) functions as a marker and cannot be modified.

**Softkeys**

**TENANT NUM:** The TENANT NUM softkey allows a user to select a Tenant Group by number. Pressing this softkey displays the ENTER TENANT GROUP NUM: prompt.

Entering the 2-digit tenant number (1 to 25) displays that Tenant Group with a series of '\*' characters (allow interconnection) and '.' characters (disallow interconnection). Cursor movement on the command line is controlled by the right and left cursor control keys.

**DISALLOW/ALLOW:** This softkey has two functions: it enables or disables interconnection between Tenant Groups. Pressing the DISALLOW softkey disables the interconnection between the Row Tenant (displayed by the command line) and the Column Tenant (highlighted by the cursor) in one direction only. For example, when modifying connections for Tenant Group 5 (the command line displays line 5) and the DISALLOW softkey is pressed when the cursor is under the sixth column, then Tenant Group 5 cannot call Tenant Group 6. However, Tenant Group 6 can still call Tenant Group 5. Total interconnection is inhibited only when a '.' (disallow) character is inserted at row 6 (Tenant Group 6) under the fifth column (Tenant Group 5). The softkey now displays the ALLOW prompt. Pressing the ALLOW softkey enables the unidirectional interconnection between the selected Tenant Groups; the '\*' character replaces the '.' character.

The standard softkeys **CANCEL**, **ENTER**, **BOTTOM**, **TOP**, and **QUIT** are also provided.

### Form 06 – Tenant Night Switching Control

- 4.6 In some systems it is necessary for one attendant to control the Night Service switching of more than one Tenant Group. This form specifies which Tenant Groups are switched to Night Service simultaneously and which Tenant has control. **Note:** The system defaults to Tenant Groups switching to Night Service independently of each other. See Figure 4-6 for the form layout.

2:57 30-NOV-89										alarm status = MAJOR																
	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	
>	01	0	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	02	.	0	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	03	.	.	0	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	04	.	.	.	0	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	05	.	.	.	.	0	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	06	.	.	.	.	.	0	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	07	.	.	.	.	.	.	0	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	08	.	.	.	.	.	.	.	0	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	09	.	.	.	.	.	.	.	.	0	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	10	.	.	.	.	.	.	.	.	.	0	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	11	.	.	.	.	.	.	.	.	.	.	0	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	12	.	.	.	.	.	.	.	.	.	.	.	0	.	.	.	.	.	.	.	.	.	.	.	.	.
	01	0	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	1-																			4-TOP					5-BOTTOM	
	6-QUIT								7-TENANT NUM											8-SWITCHED						9-

Figure 4-6 Form 06 Layout

### Field Description

Initially, the system inhibits Tenant Groups from switching each other into Night Service. This condition is indicated by the period (.) character. When the system permits Tenant Groups to switch each other into Night Service, it is indicated by the asterisk (\*) character. The Tenant Group numbers are listed in the header line and the first column. The letter (O) functions as a marker and cannot be modified.

### Softkeys

**TENANT NUM:** The TENANT NUM softkey allows a user to select a Tenant Group by number. Pressing this softkey displays the ENTER TENANT GROUP NUM: prompt. Entering the 1- or 2-digit tenant number displays that Tenant Group with a series of '.' characters (single Tenant Group entry into Night Service) and '\*' characters (multiple Tenant Group entry into Night Service). Cursor movement on the command line is controlled by the right and left cursor control keys.

**SWITCHED/NOT SWITCHED:** This softkey has two functions: it enables or disables multiple Tenant Group switching into Night Service. This softkey displays the SWITCHED prompt when the cursor is at a period (.) character. Pressing the SWITCHED softkey specifies that the Tenant Group being programmed (as indicated by the row number) can switch the other Tenant Group (as indicated by the column number) into Night Service. The system reflects this modification by replacing the '.' character with the '\*' character. The softkey now displays the NOT SWITCHED prompt. Pressing the NOT SWITCHED softkey specifies that the Tenant Group being programmed cannot switch the other Tenant Group into Night Service. The '.' character replaces the '\*' character and the softkey now displays the SWITCHED prompt.

The standard softkeys **CANCEL**, **ENTER**, **BOTTOM**, **TOP**, and **QUIT** are also provided.

## Form 07 – Console Assignments

- 4.7 This form specifies the physical location of each Attendant Console. Refer to Figure 4-7 for the form layout. The system provides an entry line in Form 07 for each Console Module and for each Digital Line circuit in a high power (upper) slot not assigned to a *SUPERSET* Telephone or DATASET. The system can support a maximum of 11 Attendant Consoles. There can be no more than two Console Modules per Universal Card or four per Digital Line Card.

The default location for an Attendant Console is Bay 2, Slot 3, Circuit 1 in 336, 456 and 480-port systems; in 672-port and *SX-200* FD systems it is Bay 1, Slot 5, Circuit 1.

Each Attendant Console is provided with a Class of Service (COS), a Class of Restriction (COR), a Tenant Group number and an extension number. The extension number enables calls between Attendant Consoles. These calls appear on the INTERNAL softkey. Note that the provision of a COR means that Attendant Consoles are not necessarily toll-allowed on all calls.

2:59 30-NOV-89		alarm status = MAJOR					
BAY	SLT	CCT	EXT NUM	COS	COR	TENANT	COMMENTS
1	05	01	1511	01	01	01	
1	08	10					
1	08	11					
1	08	12					
2	03	01	2311	01	01	01	
1	05	01	1511	01	01	01	
1-		2-		3-		4-	5-
6-QUIT		7-BAY/SLT/CCT		8-DELETE		9-	0-

Figure 4-7 Form 07 Layout

### Field Description

**EXT NUM:** This field displays the extension number of each Attendant Console. Calls directed to the console's extension number route to softkey 2 on the Attendant Console.

**COS:** This field lists the Class-of-Service number specification for each console (1 to 50).

**COR:** This field lists the Class-of-Restriction number specification for each console (1 to 25).

**TENANT:** The Tenant Group for each Attendant Console is specified in this field (1 to 25).

**COMMENTS:** This field is reserved for notes about each console. It contains a maximum of 15 alphanumeric characters. The COMMENTS field is stored by the system but not used.

**Softkeys**

The standard softkeys **BAY/SLT/CCT**, **CANCEL**, **DELETE**, **ENTER**, and **QUIT** are provided.

**Form 08 – Console LDN Assignments**

4.8 This form specifies the LDN assignments for the consoles (see Figure 4–8). A maximum of nine LDN assignments can be programmed for each Attendant Console. The attendant LDNs are assigned to the softkeys. Console softkey 1 is reserved for the RECALL function. Each LDN assignment is identified by a directory number. The directory numbers are subject to the same constraints as all Listed Directory Numbers (i.e., number conflicts are not allowed). If there are many Attendant Consoles in one Tenant Group and if “DIAL 0” calls are shared, then a common Listed Directory Number must be specified for the consoles. Note that this form is related to the Form 09 and Form 45 Expand Set Subforms, where LDN keys are programmed for subattendants.

3:12 30-NOV-89		alarm status = MAJOR			
BAY/SLT/CCT : 01_05_01		KEY	DIR NUMBER	LABEL	COMMENTS
		2	222	Internal	
		3	200	LDN 1	
		4	223	LDN 2	
		5	224	LDN 3	
		6	225	LDN 4	
		7	226	LDN 5	
		8	227	LDN 6	
		9	228	LDN 7	
		0	229	LDN 8	
		2	<input type="checkbox"/> 222	Internal	
1-	2-	3-	4-TOP	5-BOTTOM	
6-QUIT	7-BAY/SLT/CCT	8-DELETE	9-NEXT	0-	

**Figure 4–8 Form 08 Layout**

**Field Description**

**BAY/SLT/CCT:** This field specifies the physical location of the Attendant Console being programmed. This form relates to the programmed consoles in Form 07.

**KEY:** This field displays the console softkeys 2 through 10 (10 is displayed as 0). The KEY field cannot be modified.

**DIR NUMBER:** This field is reserved for assigning a directory number for console softkeys 2 to 10. This number (a maximum of five digits) links this form to Form 19 (Call Rerouting Table), and to Form 14 (Non-Dial-In Trunks), where the call type is defined for the directory number. An LDN directory number can only appear once per console. If it is required that two consoles share the same LDN, then both consoles must be in the same Tenant Group.

**LABEL:** This field specifies the actual text that the console LCD displays as softkey prompts. The LABEL field provides for a maximum of 12 characters. The label for console softkey 1 defaults to RECALL and cannot be modified. The label for console softkey 2 defaults to INTERNAL. Softkey 2 is shared between the extension number programmed in the DIR NUMBER field and calls directed to the Attendant Console's extension number (as defined in the EXT NUM field of Form 07, Console Assignments). Console softkeys 2 to 10 can be edited.

**COMMENTS:** This field further specifies the Attendant LDN assignments with text. The COMMENTS field has a maximum of 15 characters. It is stored by the system but not used.

### Softkeys

**NEXT:** Pressing the NEXT softkey displays the physical location (bay, slot and circuit numbers) of the next programmed Attendant Console. If the physical location of the last programmed console is displayed, then pressing this softkey again displays the bay, slot and circuit numbers of the first programmed console.

The standard softkeys **BAY/SLT/CCT**, **CANCEL**, **DELETE**, **ENTER**, **BOTTOM**, **TOP**, and **QUIT** are also provided.

**Form 09 – Stations/*SUPERSET* Telephones**

4.9 This form assigns stations and *SUPERSET* telephones to the system. See Figure 4–9 for the form layout.

3:58 30-NOV-89		alarm status = MAJOR										
BAY	SLT	CCT	TEN	EXTN	COS	COR	TYP	ANNOUNCE	NAME	ASSOC	COMMENTS	
1	01	01	1	1101	1	1	Stn		VAILLANT		Manager	
1	01	02	1	1102	1	1	Stn		ALLING.		Manager	
1	01	03	1	1103	1	1	Stn		O'DELL		Accounts	
1	01	04	1	1104	1	1	Stn		GORBY		Accounts	
1	01	05	1	1105	1	1	Stn		AUVEUNG		Accounts	
1	01	06	1	1106	1	1	Stn		SCOTT D.		Secretary	
1	01	09					Stn					
1	01	10					Stn					
1	01	11	1	1111	1	1	Stn		FERGUSON		Pub Relatns	
1	01	12					Stn					
1	07	01	1	1701	1	1	Cov		CARDINAL		SW Supp.	
1	07	02	1	1702	1	1	Cov		ABBC A		Test	
1	01	06	<input type="checkbox"/> 1	1106	1	1	Stn		SCOTT D.		Secretary	
1-MOVE			2-FIND EXT			3-			4-		5-RANGE	
6-QUIT			7-BAY/SLT/CCT			8-DELETE			9-REVIEW		0-	

**Figure 4–9 Form 09 Layout**

**Field Description**

**BAY, SLOT and CCT:** These fields list the physical location number of each station or *SUPERSET* telephone. They are generated by the system based on what was entered in the PROGRAMMED field of Form 01, System Configuration. This field cannot be modified.

**TEN:** This field lists the Tenant Group number for each station or *SUPERSET* telephone. Default tenant number is one.

**EXT NUM:** This field lists the extension number of each station or the Prime Line extension number of each *SUPERSET* telephone.

**COS:** This field lists the Class-of-Service number for each station or *SUPERSET* telephone. Default COS number is 1.

**COR:** This field lists the Class-of-Restriction number for each station or *SUPERSET* telephone. Default COR number is 1.

**TYP:** When a station is being programmed, the TYP field displays **STN**. For a *SUPERSET* telephone, the field displays **SET**. For a *SUPERSET DSS™* module, **BLF** is displayed. For a *SUPERSET 4DN* programmed as an enhanced sub-attendant, (Generic 1004 only) **SUB** is displayed. When a physical location (Bay, Slot and Circuit) is defined as a Call Announce Port, **CAP** is displayed. The Call Announce Port can be a Station Circuit, a *SUPERSET* Telephone Circuit, a COV Circuit or OPS Circuit. Hardware restrictions prevent an ONS Circuit from being a Call Announce Port and only

a *SUPERSET* telephone can own one. This field can be modified for DNIC circuits only; it is generated by the system based on what was entered in the PROGRAMMED field of Form 01, System Configuration.

**Note:** For Generic 1005 only, the following differences apply to the TYP field:

For a *SUPERSET* telephone, the TYP field will display **COV** for a *SUPERSET 3™* and a *SUPERSET 4*, **DN** for a *SUPERSET 3DN* and a *SUPERSET 4DN*, **401** for a *SUPERSET 401*, **410** for a *SUPERSET 410*, **420** for a *SUPERSET 420* and **430** for a *SUPERSET 430*. For a *SUPERSET 4DN* or a *SUPERSET 430* programmed as an enhanced sub-attendant, **SUB** is displayed.

**ANNOUNCE:** This field is reserved for programming the call announce port to *SUPERSET* telephones. Refer to Practice 9109-096-105-NA, Features Description, for details on the CALL ANNOUNCE feature.

**NAME:** This field is reserved for a set name up to 10 characters long. The name's first letter must NOT be \*. This is not available in Generic 1001 or Generic 1002.

**ASSOC:** Associates the device in the TYP field with another device. A *SUPERSET* telephone can be associated with a modem (enter the ONS port extension number), and a *SUPERSET DSS* module can be associated with an attendant console, subattendant or a *SUPERSET* telephone (enter the extension number). A modem may be associated with more than one *SUPERSET* telephone, but a *SUPERSET* telephone may be associated with only one modem. Two *SUPERSET DSS* modules can be associated to the same device, but a *SUPERSET DSS* module can be associated with only one device. For further information, refer to Practice 9109-096-105-NA, Features Description, under Associated Modem Line, Busy Lamp Field, or Line Types and Appearances. The device in the TYP field device may be disassociated with the device in the ASSOC field simply by entering another device extension number, or erasing the existing extension number (enter a space). **Note:** This field is updated automatically if the extension number of the associated device is changed. This field is not available in Generic 1001 or Generic 1002.

**BLF:** This field is seen only in Generic 1001 and Generic 1002, and is not used.

**COMMENTS:** This field is reserved for additional data (a maximum of 15 characters). It is stored by the system but not used.

### Softkeys

**MOVE:** This softkey relocates a device via its bay slot, and circuit numbers. When the MOVE softkey is pressed, the command line requests the FROM location (BAY: SLOT: CCT:). When the location is specified and the ENTER softkey is pressed, the command line requests the TO location. The new location is designated and the ENTER softkey is pressed. Note entering invalid numbers inhibits cursor movement.

**FIND EXT:** This softkey selects a device by its extension number. Pressing the FIND EXT softkey displays the ENTER EXTENSION NUM: prompt on the command line. The selection is completed by entering an extension number of a station or the Prime Line

number of a *SUPERSET* telephone. The selected device information appears on the command line.

**EXPAND SET:** Pressing this softkey displays the Expand Set subform. Refer to *Expand Set Subform*. **Note:** This softkey is valid only when reviewing or programming a *SUPERSET* telephone or a *SUPERSET DSS* module, and appears only when the TYP field on the command line says SET, BLF or SUB.

**Note:** For Generic 1005 only, this softkey appears only when the TYP field on the command line says COV, DN, 410, 420, 430, BLF or SUB.

**RANGE:** This softkey facilitates block programming for consecutive stations and *SUPERSET* telephones. Pressing this softkey displays the prompt: FROM BAY: SLOT: CIRCUIT:. Enter valid Bay, Slot and Circuit numbers for the first device and press the ENTER softkey. The system then prompts TO BAY: SLOT: CIRCUIT:. Enter valid Bay, Slot and Circuit numbers for the last device and press the ENTER softkey. Enter Tenant Group, Extension Number, COS and COR for the first device, if this has not been done already. Press the ENTER softkey. The system automatically assigns incremented extension numbers, the same COS, COR and Tenant Group numbers to the rest of the devices in the block. **Note:** A range program cannot be done over a *SUPERSET DSS* module circuit.

**Note:** For Generic 1005 only, when range programming on COV circuits, the system will automatically fill in COV in the TYP field. When range programming on DNIC circuits, the DEVICE TYPE softkey will appear when the extension number for the first circuit is assigned. The following device types are offered: 3/4DN, SS401, SS410, SS420 and SS430.

**REVIEW:** Pressing the REVIEW softkey displays a new form (refer to *Review List Subform*). This form lists all programmed appearances of the selected extension number (or the Prime Line number) on other *SUPERSET* telephones. This key appears only when an extension has been defined.

**DEVICE TYPE:** Allows the line circuit to be programmed as one of: SUB ATT, BLF or *SUPERSET*. This softkey appears only when a circuit is not programmed. Programming any other fields "freezes" the device type at its current value. After this, only the fields valid for that device type are available. The device type can be changed by deleting all of the programmed entries – the DEVICE TYPE softkey will then reappear.

**BLF:** Sets the TYP field to **BLF**, and designates the device type as a *SUPERSET DSS* module.

**SUB ATT:** Sets the TYP field to **SUB** and designates the device type as a Subattendant. (Enhanced Subattendant for Generic 1004 only). For further information, see Subattendant – Enhanced Functions, in Practice 9109–096–105–NA, Features Description.

**SUPERSET:** Sets the TYP field to **SET**, and designates the device type as a normal *SUPERSET* telephone.

**Note:** For Generic 1005 only, the DEVICE TYPE softkey allows the line circuit to be programmed as one of: SUB ATT, BLF, 3/4DN, SS401, SS410, SS420 or SS430.

**SUB ATT:** Sets the TYP field to **SUB** and designates the device type as an Enhanced Subattendant. **Note:** This refers to a *SUPERSET 4DN* and a *SUPERSET 430* only. For further information, see Subattendant – Enhanced Functions, in Practice 9109–096–105–NA, Features Description.

**3/4DN:** Sets the TYP field to **DN** and designates the device type as either a *SUPERSET 3DN* or a *SUPERSET 4DN*.

**SS401:** Sets the TYP field to **401** and designates the device type as a *SUPERSET 401*.

**SS410:** Sets the TYP field to **410** and designates the device type as a *SUPERSET 410*.

**SS420:** Sets the TYP field to **420** and designates the device type as a *SUPERSET 420*.

**SS430:** Sets the TYP field to **430** and designates the device type as a *SUPERSET 430*.

The standard softkeys **BAY/SLT/CCT**, **CANCEL**, **DELETE**, **ENTER**, **\*\*MORE\*\*** and **QUIT** are also provided. **Note:** Generally, before a card can be deleted, any devices programmed on the card, or associated with circuits on the card must be deleted or disassociated first, using the appropriate form. An exception to this is a console may be deleted when there is a *SUPERSET DSS* module associated with it in Form 09; the module then becomes a stand-alone module.

### Expand Set Subform for Form 09

4.10 This form appears when the EXPAND SET softkey is pressed in the Station/*SUPERSET* Telephones form. It is used to program *SUPERSET* telephones line appearances and feature keys. Refer to Figure 4-10 for the form layout. This form is not available to the *SUPERSET 401*.

3:36 30-NOV-89		alarm status = MAJOR						
KEY	TYPE	DIR	RING	SEC	DSS	EXT NUM	TRK NUM	LABEL
01	Prime	In/Out	Immed	No		1701		
02	Multiple	In/Out	Immed	No		1104		
03	Multiple	I/C	Delay	No		1105		
04	Multiple	In/Out	None	No		1106		
05	Personal	O/G	None	No				
06	DTS	In/Out	Immed	No			2	
07	Speed Dial							
08	Speed Dial							
09	Speed Dial							
10	Speed Dial							
11	Speed Dial							
12	Speed Dial							
06	DTS	In/Out	Immed	No			2	
1-BOTH WAY		2-IN ONLY		3-		4-		5-
6-QUIT		7-KEY		8-DELETE		9-REVIEW		0-

Figure 4-10 Form 09 Expand Set Subform Layout

#### Field Description

**KEY:** This field lists the *SUPERSET* Telephone Line Select key numbers and cannot be modified. If the expanded set is one of 2 *SUPERSET DSS* modules associated with another device, the key numbers are preceded by a 1 or a 2, indicating that the module is the first or second module associated with that device. The key numbers on a *SUPERSET DSS* Module (Generic 1003, Generic 1004 and Generic 1005) correspond to those in Figure 4-11.

**Note:** The *SUPERSET 410* has 6 programmable keys; *SUPERSET 420* and *SUPERSET 430* each have 12 programmable keys. The error message "Invalid key for set in use" will appear if the user attempts to program keys 7 to 12 of a *SUPERSET 410* which has been installed on a circuit which has been programmed for a *SUPERSET 420* or a *SUPERSET 430*.

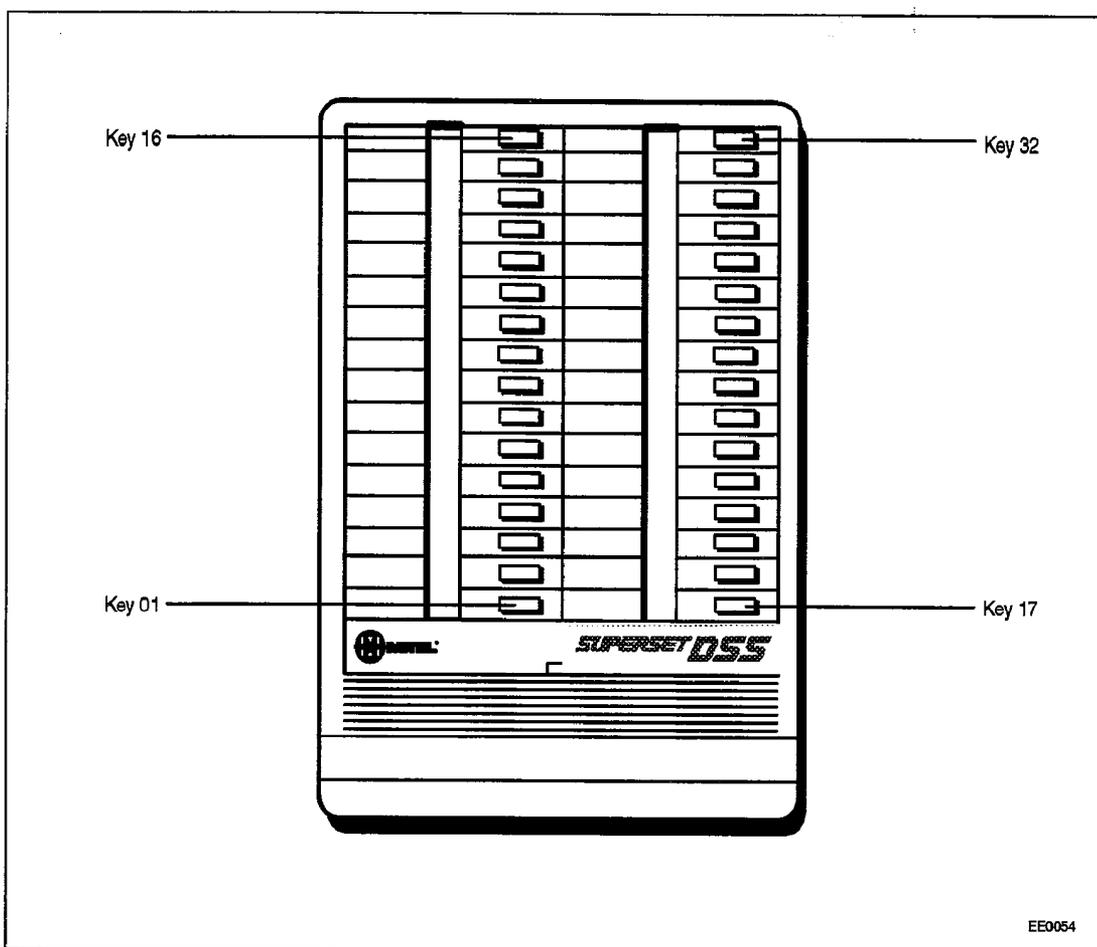
**TYPE:** This field lists the key function. If it is a Speed Dial key, the default assignment, the words "Speed Dial" are shown. If it is a line appearance, the line type is shown. If it is a feature key, the feature name is shown. If the line is a BLF Appearance or a DSS Key, the key type is "Busy Lamp".

**DIR:** If the key is a line appearance, the directional variant of the line (In/Out or Incoming) is shown. This field appears in Generic 1004 and Generic 1005.

**DIRECTION:** Same as **DIR**. This field appears in Generic 1001, Generic 1002 and Generic 1003.

**RING:** If the key is a line appearance, the ringing variant of the line (Immed, Delay, or None) is shown.

**SEC:** If the key is a line appearance, this field indicates (Yes or No) whether the secretarial variant is enabled. For a Busy Lamp key, setting this field to YES causes an immediate release when the DSS key is pressed. This field appears in Generic 1004 and Generic 1005.



**Figure 4-11 SUPERSET DSS Module Key Locations For Programming**

**SECRETARIAL:** Same as **SEC**. This field appears in Generic 1001, Generic 1002 and Generic 1003.

**DSS:** A YES in this field indicates that the key is a DSS key. This field does not appear in Generic 1001, and it is not used in Generic1002.

**EXT NUM:** This field contains the extension number of the line. This applies to the Prime Line, Key lines, Multiple Call lines, Personal Outgoing lines or BLF/DSS lines. When this field is filled for a specific key, no entry is allowed in the corresponding TRUNK NUMBER field. The EXT NUM field is blank if the key directly selects a trunk.

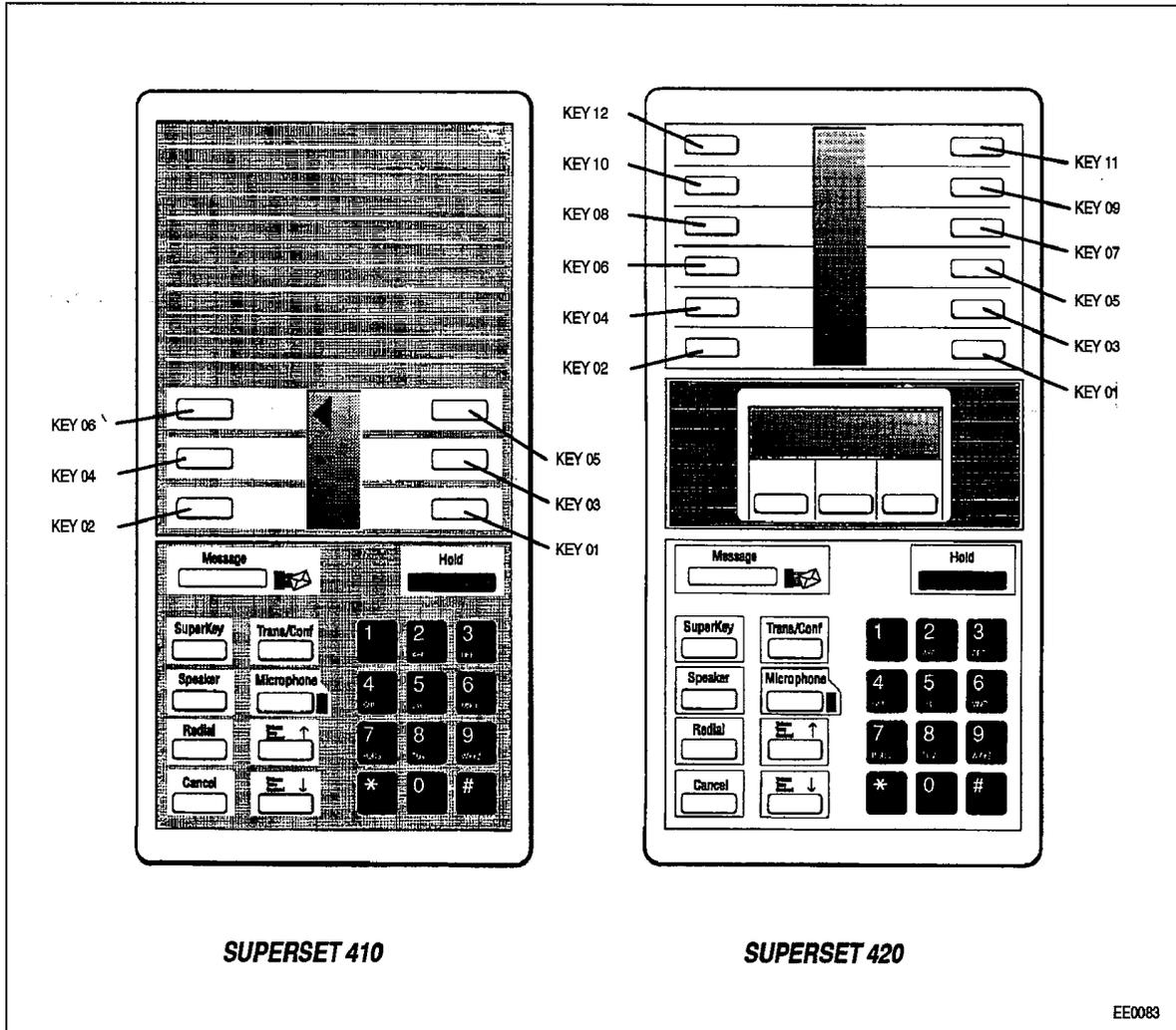
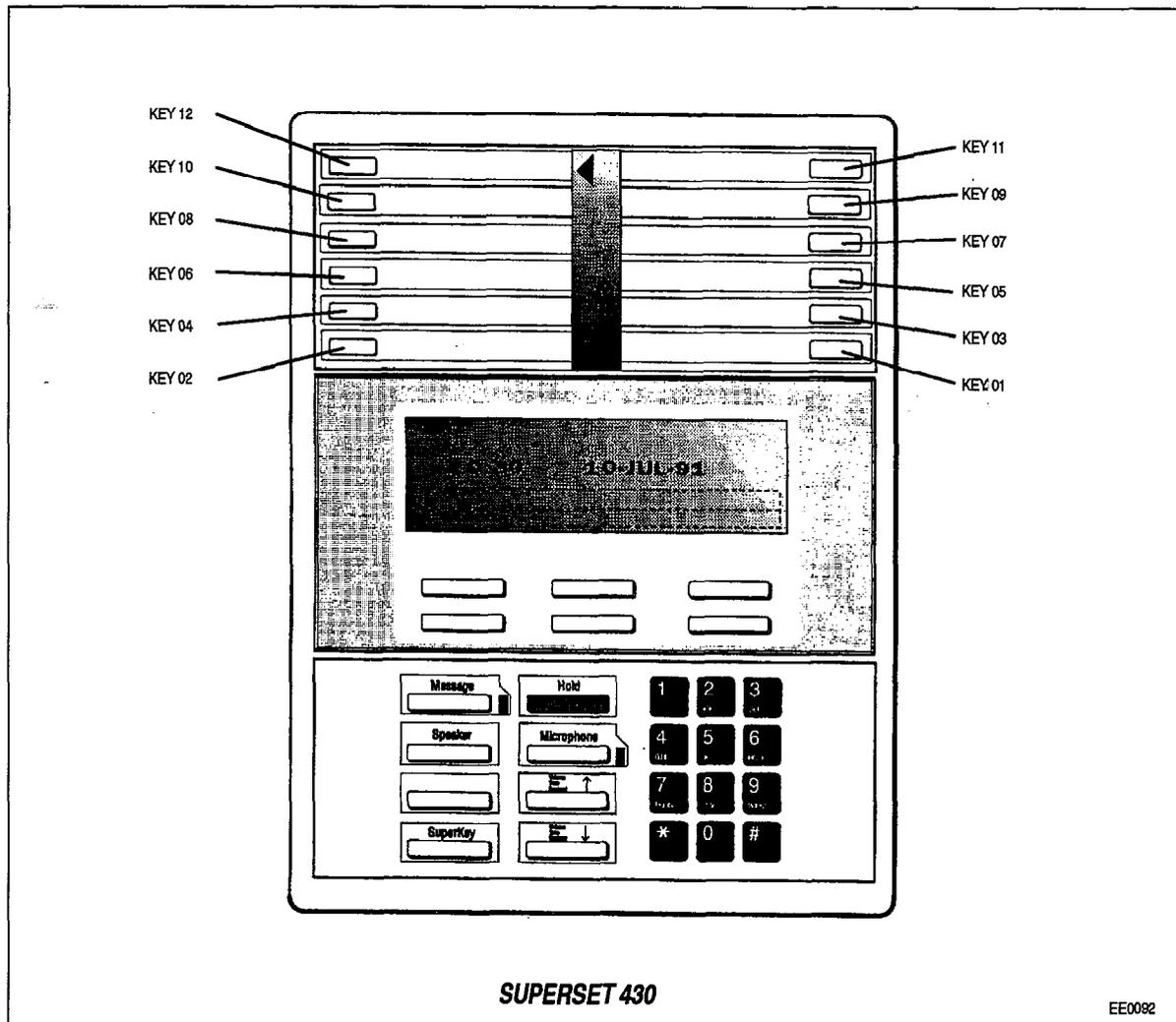


Figure 4-12 SUPERSET 410 and SUPERSET 420 Key Locations For Programming

**TRK NUM:** If the key is assigned as DTS or Private Trunk, this field contains the trunk number. Trunk numbers are defined in Form 14, Non-Dial-In Trunks and Form 15, Dial-In Trunks. Note that when this field is filled for a specific key, no entry is allowed in the corresponding EXT NUM field. This field appears in Generic 1002, Generic 1003, Generic 1004 and Generic 1005.

**TRUNK NUMBER:** Same as TRK NUM. This field appears in Generic 1001 only.

**LABEL:** Only appears if the softkey type is LDN, and the device type is a subattendant. The only exception is, if the softkey type is Recall, the LABEL field is automatically RECALL. For all other LDN softkeys, any character string may be entered up to 12 characters in length. This field appears in Generic 1004 and Generic 1005.



**Figure 4-13 SUPERSET 430 Key Locations For Programming**

### Softkeys

**KEY LINE:** Pressing this softkey assigns the selected *SUPERSET* key as a Key Line appearance. "Key" appears in the TYPE field. Then use the TAB or => key to move the cursor to the DIRECTION field.

**PERSONAL O/G:** This softkey appears after the \*\* MORE \*\* softkey is pressed. Pressing the PERSONAL O/G softkey designates the selected *SUPERSET* key as a personal outgoing line. No other fields can be edited. Press the ENTER softkey. "Personal" appears in the TYPE field. "Outgoing" appears in the DIRECTION field. "None" appears in the RING field.

**MULTI-CALL:** Pressing this softkey assigns the selected *SUPERSET* key as a Multiple Call Line appearance. "Multiple" appears in the TYPE field. Then use the TAB or => key to move the cursor to the DIRECTION field.

**PRIVATE TRK:** This softkey appears after the \*\* MORE \*\* softkey is pressed. Pressing PRIVATE TRK designates the selected *SUPERSET* key as a Private Line.

**FEATURE:** Pressing this softkey assigns the selected *SUPERSET* line appearance key as a feature access key. This softkey appears only if the set is a *SUPERSET 3DN*, *SUPERSET 4DN*, *SUPERSET 410*, *SUPERSET 420* or *SUPERSET 430* telephone. The following softkeys appear when the cursor is at the TYPE field and the FEATURE softkey is pressed:

- AUTO ANSWER
- DO NOT DIST (Do Not Disturb)
- PRIVACY REL (Privacy Release)
- OVERRIDE
- PA PAGING
- CAMPON
- MUSIC
- CALL FORWARD
- CALL PICKUP
- NIGHT ANSWER
- CALLBACK
- SWAP (Trade Calls)
- CALL/ATTN (Data Call Connect)
- DATA DISC (Data Call Disconnect)
- ACCOUNT CODE
- FORWARD CALL

**Note:** Refer to Practice 9109-096-105-NA, Features Description, for a description of the feature keys available for digital *SUPERSET* telephones.

**BLF/DSS:** Appears after the **\*\* MORE \*\*** softkey is pressed. Programs the selected key as a busy lamp field appearance (for the associated extension number).

**DIR TRK ACC:** Pressing this softkey programs the selected *SUPERSET* key as a Direct Trunk Access line. "DTS" appears in the TYPE field. Then use the TAB or → key to move the cursor to the DIRECTION field.

**KEY:** This softkey selects a *SUPERSET* key by number. Pressing the KEY softkey displays the ENTER KEY NUM: prompt on the command line. Any *SUPERSET* key may be selected except for Key 01 (Prime Line).

**LDN:** Appears after the **\*\* MORE \*\*** softkey is pressed twice. Programs the selected key as an enhanced sub-attendant LDN key. LDN is displayed in the TYPE field. At this point, a ring type can be selected, an extension number entered, and a label entered. The label is displayed on the *SUPERSET 4DN* and the *SUPERSET 430* display. An enhanced sub-attendant may have up to 3 LDN positions. This is available in Generic 1004 and Generic 1005.

**HOLD POS:** Appears after the \*\* MORE \*\* softkey is pressed twice. Programs the selected key as an enhanced sub-attendant hold slot. Hold Slot is displayed in the TYPE field. No other fields may be programmed. An enhanced sub-attendant may have up to 3 hold slots. This is available in Generic 1004 and Generic 1005.

**RECALL:** Appears after the \*\* MORE \*\* softkey is pressed twice. Programs the selected key as an enhanced sub-attendant Recall key. Recall is displayed in the TYPE field. The only other field that may be programmed is the RING field. An enhanced sub-attendant may have only one Recall Key. This is available in Generic 1004 and Generic 1005.

**REVIEW:** Pressing the REVIEW softkey displays a new form (refer to *Review List Subform*). This form displays a list of all programmed appearances of the selected Line Select key on all devices.

**BOTH WAY:** Pressing this softkey enables the selected *SUPERSET* key (line appearance) to originate and receive calls. The DIR / DIRECTION field displays the In/Out indication.

**IN ONLY:** Pressing this softkey restricts the selected *SUPERSET* key (line appearance) to receiving incoming calls only. No call originations are permitted. The DIRECTION field displays "Incoming".

**IMMED RING:** Pressing this softkey programs the selected *SUPERSET* key (line appearance) to ring the *SUPERSET* telephone immediately for incoming calls. The form displays Immed in the RING field to indicate this condition.

**DELAY RING:** Pressing this softkey causes incoming calls to flash the selected key (line appearance) for a programmable period of time and then ring the *SUPERSET* telephone for incoming calls. The Delay indication appears in the RING field.

**NO RING:** Pressing this softkey prevents incoming calls from ringing the *SUPERSET* telephone ringer. Only the line appearance flashes. The None indication appears in the RING field.

**DSS:** Appears only in the DSS field. Enables the DSS key associated with a BLF appearance. The YES indication appears in the DSS field.

**NON DSS:** Appears only in the DSS field. Disables the DSS key associated with a BLF appearance. The NO indication appears in the DSS field.

**NON SECR:** Pressing this softkey disables the secretarial function for the selected *SUPERSET* key (line appearance). The No indication appears in the SECRETARIAL field.

**SECRETARIAL:** Pressing this softkey enables the secretarial function for the selected *SUPERSET* key (line appearance). The Yes indication appears in the SECRETARIAL field. When a Line Select key is set as a secretarial key, then the user can override the DO NOT DISTURB feature on the *SUPERSET* telephone corresponding to that line appearance. For a DSS key, this enables the secretarial option.

The standard softkeys **CANCEL**, **DELETE**, **ENTER**, **\*\* MORE \*\*** and **QUIT** are also provided.

**Review List Subform for Form 09**

4.11 This form appears when the REVIEW softkey is pressed in the Station/*SUPERSET* Telephones Form or the *SUPERSET* Telephone Lines Form. This form can be used at any time to find where any particular extension number or line appears. When entered from the Station/*SUPERSET* Form, this form displays a list of all programmed appearances of the selected extension number. When entered from the Expand Set Subform, the form displays all appearances of the selected key's extension number, trunk number, or Sub Attendant LDN number. See Figure 4-14 for the form layout. Note that the data in this form cannot be modified.

3:44 30-NOV-89		alarm status = MAJOR					
PBX SET : 1701		BAY	SLOT	CCT	EXT NUM	SET TYPE	KEY
		1	07	01	1701	PBX SET	1
		1	07	02	1702	PBX SET	2
		1	08	06	1861	PBX SET	2
		1	07	01	<input type="checkbox"/> 1701	PBX SET	1
1-	2-	3-TRUNK NUMBER		4-LDN NUM		5-	
6-QUIT	7-	8-		9-EXT NUM		0-	

**Figure 4-14 Form 09 Review List Subform Layout**

**Field Descriptions**

The header line displays the selected line appearance access number. For telephones, the type (set, station, subattendant) and application (PBX or KEY system) is shown, along with the extension number. For trunks, the type (trunk number, CO Line CO Line group) is shown along with the trunk number, or leading ARS digits. Extension numbers are also shown for LDNs and logical lines.

**BAY, SLT and CCT:** These fields list the bay, slot and circuit numbers of each extension or *SUPERSET* telephone that has an appearance of the selected line. These fields cannot be modified. The system generates them based on the PROGRAMMED field of Form 01, System Configuration.

**STN/*SUPERSET*:** This field displays the listed device type; STATION indicates an industry standard telephone set and *SUPERSET* indicates a *SUPERSET* telephone. This field is not available in Generic 1004 and Generic 1005 – it is replaced by the SET TYPE field.

**SET TYPE:** This field displays the listed device type. PBX STATION indicates an industry standard telephone; PBX SET indicates a *SUPERSET* telephone within a PBX

tenant group; Key SET indicates a *SUPERSET* telephone within a Key System tenant group; Key SUB-ATT indicates a Sub Attendant for a Key System Tenant group; PBX SUB-ATT indicates a Sub Attendant for a PBX tenant group; and CONSOLE indicates an attendant console.

**KEY:** For listed *SUPERSET* telephones, the KEY field displays the key number where the line appears.

**EXT NUM:** This field displays the prime extension number assigned to a particular Bay/Slot/Circuit.

### **Softkeys**

**TRUNK NUMBER:** This softkey selects a trunk to review by its trunk number. Pressing this softkey displays ENTER TRUNK NUM: prompt on the command line. The trunk selection is completed by entering a valid trunk number (1 – 200), and pressing the ENTER softkey.

**EXT NUM:** This softkey selects an extension to review. Pressing this softkey displays the ENTER EXTENSION NUM: prompt. The selection is completed by entering a valid extension number and then pressing the ENTER softkey.

**LDN NUM:** This softkey selects an LDN to review. Pressing this softkey displays the ENTER LDN NUM: prompt. The selection is completed by entering a valid LDN number and then pressing the ENTER softkey.

The standard softkeys **CANCEL**, **ENTER**, and **QUIT** are also provided.

### Form 10 – Pickup Groups

4.12 This form specifies the members of each Pickup Group. See Figure 4–15 for the form layout. Memberships are specified by the extension number of an industry standard telephone set or the Prime Line number of a *SUPERSET* telephone. Attendant Consoles are not allowed. The *SX-200* DIGITAL PABX supports a maximum of 50 Pickup Groups; each group supports a maximum of 50 members.

3:55 30-NOV-89		alarm status = MAJOR				
[ PICKUP GROUP : 1 ]		EXT NUM	BAY	SLT	CCT	COMMENTS
		1106	01	01	06	Secretary
		1105	01	01	05	Accounts
		1104	01	01	04	Accounts
		1103	01	01	03	Accounts
		1102	01	01	02	Manager
		1101	01	01	01	Manager
		<input type="checkbox"/> 1106	01	01	06	Secretary
1-	2-	3-INSERT		4-	5-PICKUP GROUP	
6-QUIT	7-	8-DELETE		9-EXT NUM	0-	

Figure 4–15 Form 10 Layout

#### Field Descriptions

**EXT NUM:** This field displays the Pickup Group member extension number.

**BAY/SLT/CCT and COMMENTS:** These fields cannot be modified. The form displays the BAY/SLT/CCT and COMMENTS fields from the corresponding lines of Form 09, Station/SUPERSET Telephones.

#### Softkeys

**INSERT:** This softkey adds a new member to the Pickup Group on a new line just above the current line pointer. Pressing the INSERT softkey clears the command line and moves the cursor to the EXT NUM field. Enter a valid extension number and press the ENTER softkey.

**Note:** This softkey only appears if there is data present in this form.

**PICKUP GROUP:** This softkey selects the Pickup Group to be displayed. Pressing the PICKUP GROUP softkey displays the ENTER PICKUP GROUP NUM: prompt on the command line. Enter the Pickup Group number and press the ENTER softkey.

**EXT NUM:** This softkey selects a Pickup Group member by its extension number (or Prime Line number). Pressing the EXT NUM softkey displays the ENTER EXTENSION NUM: prompt on the command line. Entering the extension number displays that member with its bay, slot and circuit location, and (if any) comments. Note that if the selected extension number is not in the current Pickup Group, then the system automatically displays the Pickup Group where the selected device is located.

The standard softkeys **CANCEL**, **DELETE**, **ENTER**, and **QUIT** are also provided.

## Form 11 – Data Circuit Descriptor

- 4.13 A data circuit descriptor specifies the parameters the data processing software and attached DTE (Data Terminal Equipment) require. This form provides 25 programmable descriptors. The main form displays the descriptor numbers and the number of circuits associated with each descriptor (see Figure 4–16). The system generates the data in this form based on the entries in Form 12, Data Assignment. The user can modify only the COMMENTS field. A softkey provides access to the individual parameters of each descriptor via a sub-form.

This form is not available in Generic 1005 FPKG1 or Generic 1005 LIT96.

4:01 30-NOV-89		alarm status = MAJOR		
DESCRIPTOR	NUMBER OF DATA CIRCUITS ASSIGNED		COMMENTS	
01	2		Modems	
02	2		Terminals	
03	1		Net access	
04	0		fax	
05	0			
06	0			
07	0			
08	0			
09	0			
10	0			
11	0			
12	0			
01	2		Modems	
1-	2-	3-	4-	5-
6-QUIT	7-DESC NUMBER	8-SEL. OPTION	9-REVIEW	0-

Figure 4–16 Form 11 Layout

### Field Descriptions

**DESCRIPTOR:** This field lists the circuit descriptors, numbered 01 to 25.

**NUMBER OF DATA CIRCUITS ASSIGNED:** This field records the number of devices assigned to each descriptor.

**COMMENTS:** This field is reserved for additional data (a maximum of 20 characters). It is stored by the system but not used.

**Softkeys**

**DESCRIPTOR NUMBER:** The DESC NUM softkey allows the user to select a DESC NUM by number. Pressing this softkey displays the ENTER DESC NUM: prompt. Entering a valid descriptor number and pressing the ENTER softkey, completes the selection.

**SELECT OPTION:** Pressing this softkey displays a new form. This form provides the options associated with the data circuit that is assigned to a descriptor number. Refer to Table 4-4, Data Circuit Descriptor Options.

**REVIEW:** The REVIEW softkey appears only if at least one circuit has been assigned the descriptor displayed on the command line. Pressing this softkey displays a new form (Review List Subform). This form displays the BAY, SLOT, CIRCUIT and SUBCIRCUIT location of all devices assigned that descriptor.

The standard softkey **QUIT** is also provided.

**Data Circuit Descriptor Options SUBFORM**

4.14 This form appears when the SEL. OPTION softkey is pressed (see Figure 4-17). It lists the programmable parameters of the descriptor. See Table 4-4 for the complete list of options (they are described below, under *Parameters*).

4:05 30-NOV-89		alarm status = MAJOR			
[ DESCRIPTOR NUMBER : 1 ] PARAMETER NAME					VALUE
Session Inactivity Disconnect Timer 0 - 255 minutes					0
Guard Timer 0 - 99 seconds					1
Minimum Baud Rate					110
Default Baud Rate					9600
Maximum Baud Rate					19200
Always Use Default Baud Rate When Called					NO
DTR Off Disconnect Timer 0 - 99 seconds					5
DTR To CTS Delay Timer 0 - 9900 msec ( 100 msec inc )					100
DTR Forced High					NO
RTS Forced High					NO
DSR Is Held High When Device Is Idle					YES
CTS Is Held High When Device Is Idle					YES
Default Baud Rate					<input type="checkbox"/> 9600
1-	1200	2-	2400	3-	4800
4-		5-	** MORE **		
6-	QUIT	7-		8-	19200
9-		0-			

**Figure 4-17 Select Options Subform Layout**

**Field Descriptions**

The header line displays the descriptor number.

**PARAMETER NAME:** This field lists the parameters. For numerical parameters, it lists the valid range of values.

**VALUE:** This field lists the option or numeric value selected for each parameter.

### Softkeys

The standard softkeys **CANCEL**, **DELETE**, **ENTER**, and **QUIT** are also provided. The other softkeys depend on the parameter displayed on the command line (see Parameters for details). Generally, for numeric parameters, only the QUIT softkey appears. When a value is typed in, the ENTER softkey appears. Press ENTER once to terminate the entry, then again to commit it to the database. While the ENTER softkey is present and has not been pressed, the QUIT softkey cancels the new entry and restores the previous value. For parameters with YES and NO options, softkey 1 appears, marked with the option opposite to the current setting.

**Table 4-4 Data Circuit Descriptor Options**

<p>Session Inactivity Disconnect Timer (0-255 minutes)  Guard Timer (0-99 seconds)  Minimum Baud Rate  Default Baud Rate  Maximum Baud Rate  Always Use Default Baud Rate When Called  DTR Off Disconnect Timer  DTR to CTS Delay Timer  DTR Forced High  RTS Forced High  DSR Is Held High When Device is Idle  CTS Is Held High When Device is Idle  Originate a DTRX Call With A Low-&gt;High Transition of DTR  Action Taken If The Idle DTE Has DTR Low (Auto Answer)  Pooled Modem Communication Established Indicator  First Modem Tone  Second Modem Tone  ASYNC: Keyboard Origination Allowed  ASYNC: ADL Auto Baud  ASYNC: Flow Control  ASYNC: XON Character  ASYNC: XOFF Character  ASYNC: Break Key Function  ASYNC: PBX Attention Character  ASYNC: Parity  ASYNC: Character Length  ASYNC: Number of Stop Bits  ASYNC: Autobaud To Host Character 1  ASYNC: Autobaud To Host Character 2  ASYNC: Delay Between Autobaud Characters  DS2100: Operating Mode  SYNC: Rate Adaption Scheme  SYNC: Clock Source</p>
---

Table 4-5 Data Communication Abbreviations

Abbreviation	Term
CTS	Clear To Send
DCD	Data Carrier Detect
DCE	Data Communication Equipment
DSR	Data Set Ready
DTE	Data Terminal Equipment
DTR	Data Terminal Ready
DTRX	Data Transceiver
RI	Ring Indicator
ADL	Associated Data Line

### Parameters

The Data Circuit Descriptor is used by ADL calls, DTRX calls, printer monitors, the PMS port and Pooled Modems. The parameters are ordered so that timers and baud rate options appear at the top of the form. These parameters apply to all data device types. Next are the parameters dealing with EIA leads. These also apply to all data devices but the parameter's meaning can depend on whether a modem adapter is in the RS-232 connection. The last options are device type dependent parameters, usually indicated by a prefix.

**Session Inactivity Disconnect Timer:** The DATASET monitors the time from the last transmitted or received character. If the programmed time period is exceeded, the data call is dropped. This timer has a range of 0 to 255 minutes. It is disabled if set to 0 minutes. Set to 0 for synchronous operation.

**Guard Timer:** After a DATASET has disconnected, the Guard Timer keeps the DATASET unavailable for a short time period to allow the far end to clear down. This timer has a range of 0 to 99 seconds in 1 second increments.

**Minimum And Maximum Baud Rate:** These two fields specify the minimum and maximum data rate capacities of the attached device. The maximum baud rate must be set greater than or equal to the minimum baud rate. Valid baud rates are 110, 150, 300, 600, 1200, 2400, 4800, 9600, 19200. If a range of baud rates is specified, it is assumed the system can use any of these baud rates to establish communications. If it is undesirable to have the system change the baud rate, a range should NOT be programmed. That is, the baud rate parameters should all be set equal.

**Default Baud Rate:** The specified default baud rate is used as the initial baud rate for non-autobaud datasets.

**Always Use Default Baud Rate When Called:** When this parameter is enabled, the system will set the baud rate of the destination dataset to the default, even if a range of baud rates has been programmed. The system will not change the data rate when attempting to establish communications.

**DTR Off Disconnect Timer:** This timer specifies how long the system will wait to disconnect the data call after the attached device has dropped DTR. If a modem

adapter is inserted in the RS-232 connection, the system monitors DSR instead. This timer has a range of 0 to 99 seconds, in 1 second increments. **Note:** If the attached device is a Pooled Modem, the timer has no effect; when the Pooled Modem drops DSR, the data call is dropped immediately.

**DTR To CTS Delay Timer:** This timer specifies how long the system waits before asserting CTS to the dataset after the attached device has asserted DTR. The timer has a range of 0 to 9900 milliseconds, in 100 millisecond increments.

**DTR Forced High:** With this option enabled, the system assumes DTR of the attached device is high, regardless of its actual state. If a modem adapter is inserted in the RS-232 connection, this option applies to DSR instead.

**RTS Forced High:** With this option enabled, the system assumes RTS of the attached device is high, regardless of its actual state. If a modem adapter is inserted in the RS-232 connection, this option applies to DCD instead.

**DSR Is Held High When Device Is Idle:** This option specifies the state of system DSR to an idle device, until a data call is connected. When enabled, DSR is held high; when disabled, DSR is held low. If a modem adapter is inserted in the RS-232 connection, this option applies to DTR instead. **Note:** This parameter MUST be enabled to provide Keyboard Origination.

**CTS Is Held High When Device Is Idle:** This option specifies the state of system CTS to an idle device, until a data call is connected. When enabled, CTS is held high; when disabled, CTS is held low. With this parameter disabled, the DTR to CTS Delay Timer is not applicable because CTS will not be asserted until the call is connected. **Note:** This parameter MUST be enabled to provide Keyboard Origination.

**Originate A DTRX Call With A Low → High Transition Of DTR:** With this option enabled, the system initiates a DTRX call when the attached device changes DTR from low to high (e.g. when the attached terminal is turned on). This option is typically enabled for Hotline services.

**Action To Be Taken If The Called DTE Has DTR Low ( Auto Answer ):** This parameter specifies which EIA signal the system applies to an idle DTE which is called and has DTR low. The attached DTE must respond with DTR high within one minute. The options available are:

**Toggle RI:** The system alerts the DTE by toggling RI with a cadence of 2.5 seconds on, 2.5 seconds off. If DTR is high when the DTE is called, the call is barred.

**RAISE DSR:** The system alerts the DTE by raising DSR. If DTR is high when the DTE is called, the call is barred.

**RAISE DCD:** The system alerts the DTE by raising DCD. If DTR is high when the DTE is called, the call is barred.

**REFUSE:** The DTE is only seized when DTR is high. If DTR is low when the DTE is called, the call is barred.

**Pooled Modem Communication Established Indicator:** When the system is establishing data communication between a Pooled Modem and a remote modem, this parameter identifies which EIA lead indicates that communication is established. The options available are DCD and DSR.

**First Modem Tone:** When the system is establishing outgoing communication between a pooled modem and a remote modem, this parameter identifies which modem tone the pooled modem can detect (2025, 2100 or 2225 Hz). Once the system detects the tone, and recognizes it as a valid tone, it connects the call.

**Second Modem Tone:** When the system is establishing outgoing communication between a pooled modem and a remote modem, this parameter identifies a second modem tone the pooled modem can detect (2025, 2100 or 2225 Hz). Once the system detects the tone, and recognizes it as a valid tone, it connects the call.

**ASYNC: Keyboard Origination Allowed (Auto Baud):** The dataset can perform autobaud detection on a carriage return <CR> character. With this option enabled, the system receives a baud rate report from the dataset and attempts to establish the data call at this rate. If the originator's baud rate must be changed, the system notifies the user with a message on the terminal. The following parameters must also be enabled:

- DSR Is Held High When Device Is Idle
- CTS Is Held High When Device Is Idle

**ASYNC: ADL Auto Baud:** With this option enabled, after dialing the ADL access code an ADL caller must enter a carriage return to set the baud rate. With this option disabled, the system attempts to establish the ADL call at the originator's last used baud rate.

**ASYNC: Flow Control:** This parameter specifies the flow control method the dataset uses. The options are CTS, PIN 25HI/CTS, PIN 25LO/CTS, XON/XOFF or NONE.

**Note:** The CTS method of flow control is unidirectional. When instructed to stop the data flow, the dataset drops CTS. The attached DTE should recognize this signal and stop transmitting data. When the dataset is instructed to start the flow again, it raises CTS and the attached DTE should begin transmitting again.

**ASYNC: XON Character:** This character resumes transmission between the dataset and the attached device. It is programmed as the decimal equivalent of the desired ASCII character. The most widely used XON character is Control-Q, whose decimal equivalent is 17.

**ASYNC: XOFF Character:** This character stops transmission between the dataset and the attached device. It is programmed as the decimal equivalent of the desired ASCII character. The most widely used XOFF character is Control-S, whose decimal equivalent is 19.

**ASYNC: Break Key Function:** This parameter specifies the function of the BREAK key. The options are:

**SYS ATT:** the current DTRX data call is dropped and the user is prompted to dial another data call. If the current data call is via ADL, SYS ATT simply drops the call.

**TRANSPARENT:** No action by DTRX. Passed on to destination.

**ASYNC: PBX Attention Character:** This parameter (0–127) specifies the incoming character the dataset expects as the Attention character. When the dataset detects this character, it informs the PABX. If the current data call is via DTRX, the user is prompted to dial another data call; if the call is via ADL, it is simply dropped. The value of the parameter is decimal equivalent of the desired ASCII character. The NUL character (00) should be programmed to disable this feature.

**ASYNC: Parity:** This parameter specifies the parity type of the device attached to the dataset. The options are: mark parity, space parity, even parity, odd parity or no parity. If the character length is set to 8 bits, NO PARITY is assumed.

**ASYNC: Character Length:** This parameter specifies the UART character length, 7 or 8 bits. If 8 bits are selected, NO PARITY is assumed.

**ASYNC: Number Of Stop Bits:** This parameter specifies the number of stop bits per character, 1 or 2.

**ASYNC: Autobaud To Host Character 1 And 2:** These are the characters sent to the attached device when the Dataset is switched to the B-channel. The value of the parameter (0–127) is the decimal equivalent of the desired ASCII character. To disable this feature, program a NULL (00) character into both Autobaud To Host Characters. If Character 1 is non-zero and Character 2 is zero, only Character 1 is sent. However, if Character 1 is zero and Character 2 is non-zero, both characters are sent. This feature is designed for attached devices which can automatically set their baud rate and/or parity from specific characters. If the attached device does not have this capability, one of the following should be done:

- Set Minimum Baud Rate = Maximum Baud Rate = Default Baud Rate
- Enable the "Always Use Default Baud Rate When Called" parameter

With one of the above options selected, the Autobaud To Host characters can still be programmed for other purposes. For example, some data devices return a prompt in response to a carriage return (decimal equivalent = 13).

**ASYNC: Delay Between Autobaud Characters:** This timer specifies the interval between the start of transmission of one autobaud character and the next. It is also applied after the Dataset has disconnected from the D channel and before the first autobaud character is sent to the attached device. The timer has a range of 0 to 1270 msecs in increments of 10 msecs. To disable this timer, set it to 0 msecs.

**DS2100: Operating Mode:** This parameter is for the DATASET 2100 series only. It selects the operating mode of the Dataset, Asynchronous or Synchronous.

**SYNC: Rate Adaptation Scheme:** In synchronous operation of the DATASET 2100, this parameter defines synchronous operation as either Transparent Mode (MiNET) or X.31 Mode.

**SYNC: Clock Source:** This parameter selects the clock source for synchronous operation of the DATASET 2100. The options are:

**INTERNAL:** This option applies when the DATASET 2100 is operated as a DCE. The DTE Transmit clock signal comes from the DATASET's internal baud rate generator which is not synchronized to the PBX timing. The DTE Receive clock signal comes from the DATASET's receiver Phase Locked Loop (PLL). The PLL extracts the timing from the data received from the far end DATASET.

**SYSTEM:** This option applies when the DATASET 2100 is operated as a DCE. Both the DTE Transmit and Receive clock signals come from the DATASET's receiver Phase Locked Loop (PLL). The PLL extracts the timing from the data received from the far end data set.

**TX EXT:** This option applies to both DCE and DTE operation. The DTE Receive clock signal comes from the DATASET's receiver PLL. The PLL extracts the timing from the data received from the far end DATASET. When the DATASET 2100 is operated as a DCE, the DTE Transmit clock signal comes from an external clock signal on RS-232 pin 24 from the attached device. When the DATASET 2100 is operated as a DTE, the external clock signal is derived from the DCE's received data.

**TX & RX EXT:** This option applies when the DATASET 2100 is operated as a DTE. Both the Receive and Transmit data clocks come from the attached DCE. The external Transmit clock is derived from the modem's received data (Pin 17) and is remapped to pin 24 on the dataset via the DCE adapter. The external Receive clock is derived from the modem's transmit data (Pin 15) and is remapped to the dataset pin 18 using the DCE adapter.

## Review List Subform for Form 11

- 4.15 This form appears when the REVIEW softkey is pressed in Form 11 – Data Circuit Descriptor. This form lists all the users of a particular descriptor, identified by their physical location (BAY/SLOT/CIRCUIT). See Figure 4–18 for the form layout.  
**Note:** The data in this form cannot be modified.

[ DESCRIPTOR NUMBER : 1 ]		BAY	SLT	CCT	SCT	COMMENTS
		1	8	1	2	
		1	8	2	2	
		1	8	1	2	
1-	2-	3-	4-	5-		
6-QUIT	7-DESC NUMBER	8-	9-	0-		

**Figure 4–18 Review List Subform Layout**

### Field Descriptions

The header line displays the descriptor number and the location of the descriptor.

**DESCRIPTOR NUMBER:** This field displays the descriptor number selected for review.

**BAY, SLT, CCT, SCT:** These fields list the physical location of each data circuit.

**COMMENTS:** This field displays any additional information that was entered in Form 12. The data in this field is stored by the system but not used.

### Softkeys

**DESC NUMBER:** Pressing this softkey causes the system to request which Descriptor number to display. Complete the entry by pressing ENTER.

The standard softkey **QUIT** is also provided.

### Form 12 – Data Assignment

4.16 When a Digital Line card is programmed in the System Configuration Form, the system creates an entry line for each of its circuits in Form 09, Stations/*SUPERSET* Telephones, Form 45, Key System Telephones and in Form 12, Data Assignment. See Figure 4–19 for the form layout. If the card is in an upper (high power) slot, the system also creates entry lines for its circuits in Form 07, Console Assignments.

This form is not available in Generic 1005 FPKG1 or Generic 1005 LIT96.

When the programmer assigns a Digital Line Card port as a DATASET, the system removes the corresponding line from Form 09 or Form 45. The exception is the DATASET 1101 Data Cartridge; when one of these is programmed, the line in Form 09 remains to allow programming of the Digital *SUPERSET* telephone.

When the programmer assigns a Digital Line Card port as a *SUPERSET* 3DN or a *SUPERSET* 4DN Telephone, the only data device type that can be selected on the corresponding line in Form 12 is the Data Cartridge, DATASET 1101.

When a *SUPERSET* 410, *SUPERSET* 420 or *SUPERSET* 430 is programmed in Form 09 or Form 45, the only data device type available is 1101M.

Digital Line Card ports which appear in Form 07 are removed if assigned as a Digital *SUPERSET* telephone or DATASET. Likewise, a port assigned as a console is removed from Form 09. Then the only data device type that can be selected on the corresponding line in Form 12 is DSCONS, the console printer port.

4:21 30-NOV-89		alarm status = MAJOR										
BAY	SLT	CCT	TYPE	TEN	EXT NUM	COS	CDR	CDN	DTE	AVL	HOTLINE	COMMENTS
1	08	01	DS1103	1	1812	3	1	1	1			1s data port
1	08	02	DS1103	1	1822	3	1	1	1			1s data port
1	08	05	DS2103	1	1852	3	1	3	1			hs data port
1	08	06										
1	08	07										
1	08	08										
1	08	09										
1	08	10										
1	08	11										
1	08	12										
1	08	06	<input type="checkbox"/>									
1-DATA DEV TYP			2-FIND EXT			3-FIND AVL			4-		5-RANGE	
6-QUIT			7-BAY/SLT/CCT			8-			9-		0-	

Figure 4–19 Form 12 Layout

## Field Descriptions

**BAY/SLT/CCT/:** This field specifies the physical location of each device. This list is generated by the system based on what was entered in the programmed field of Form 01, System Configuration. **Note:** This field cannot be modified.

**TYP:** This field identifies the type of data device programmed. The available devices are: DS1101, DS1102, DS1103, DS2102, DS2103, DSCONS and 1101M.

**TEN:** The tenant group for each device is specified in this field.

**EXT NUM:** This field displays the assigned extension number of a data line.

**COS:** This field lists the Class-of-Service number specification of each device (1 to 50).

**COR:** This field lists the Class-of-Restriction number specification of each device (1 to 25).

**CDN:** This field lists the Circuit Descriptor Number assigned to a device (1 to 25).

**DTE:** This field lists the Data Terminal Equipment Profile number (1 to 25). A data device must have a DTE Profile number to access a DTRX. Otherwise, this field should be left blank.

**AVL:** This field lists the Associated Voice Line (directory number) used to associate a DATASET with a Voice set, so the ADL (Associated Data Line) can be used.

**HOTLINE:** This field lists the directory number of the destination DTE.

**COMMENTS:** This field is reserved for additional data (a maximum of 15 characters). It is stored by the system but not used.

## Softkeys

**DATA DEV TYP:** Pressing the DATA DEV TYP softkey displays softkeys which assign the type of data device connected to the circuit displayed on the command line. If a *SUPERSET 3DN* or a *SUPERSET 4DN* telephone is programmed for the circuit, only the DS1101 device type softkey appears. If a *SUPERSET 410*, *SUPERSET 420* or a *SUPERSET 430* telephone is programmed for the circuit, only the 1101M device type softkey appears.

**DS1103:** This softkey appears after the DATA DEV TYP softkey has been pressed. Pressing this softkey assigns the device as an Asynchronous Stand-alone dataset.

**DS1102 CCT1:** This softkey appears after the DATA DEV TYP softkey has been pressed. Pressing this softkey assigns the device type for subcircuit 1 of the port as an Asynchronous Rack Mount Dataset. Because the DATASET 1102 is a dual DATASET, a second line appears for subcircuit 2 of the port.

**DS1102 CCT2:** This softkey appears after the DATA DEV TYP softkey has been pressed on the second line of a port assigned as a DATASET 1102. It is the only softkey

available in this situation. Pressing the DS1102 CCT2 softkey assigns the device type for subcircuit 2 of the port as an Asynchronous Rack Mount Dataset.

**DS1101:** This softkey appears after the DATA DEV TYP softkey has been pressed. Pressing this softkey assigns the device type as a data cartridge.

**DS2102:** This softkey appears after the DATA DEV TYP softkey has been pressed. Pressing this softkey assigns the device type as an Asynchronous/Synchronous Rack Mount DATASET.

**DS2103:** This softkey appears after the DATA DEV TYP softkey has been pressed. Pressing this softkey assigns the device type as an Asynchronous/Synchronous Rack Mount DATASET.

**DSCONS:** This softkey appears after the DATA DEV TYP softkey has been pressed. Pressing this softkey assigns the device type as a Mk 2 Console printer port.

**1101M:** This softkey appears after the DATA DEV TYP softkey has been pressed, followed by the \*\* MORE \*\* softkey. Pressing this softkey assigns the device type as an asynchronous *MiLink* Data Module.

**FIND EXT:** Pressing the FIND EXT softkey displays the ENTER EXTENSION NUM prompt. When a valid extension number of a DATASET is entered, its physical location is displayed on the command line.

**FIND AVL:** Pressing this softkey prompts the user to enter an extension number. When a valid extension number of an associated voice set is entered, and the ENTER softkey is pressed, the physical location of the DATASET which is associated with the selected voice set is displayed on the command line.

**RANGE:** This softkey facilitates block programming of data devices. Pressing this softkey displays FROM BAY; SLOT: and CIRCUIT: TO BAY; SLOT: CIRCUIT: prompts on the command line. The range of devices is then specified by entering valid bay, slot and circuit numbers for the first and last devices. The entry is completed by pressing the ENTER softkey. When the extension number for the first device is entered, the system automatically assigns incremented extension numbers, the same COS, COR, CDN, and DTE for each device in the block. A dual circuit DATASET cannot be included in range programming.

**DELETE FIELD:** This softkey appears when the cursor is positioned in the AVL or HOTLINE field, when a value has been already programmed. Pressing the DELETE FIELD softkey removes the value which is programmed in that field. The deletion is completed by pressing the ENTER softkey.

The standard softkeys **DELETE**, **ENTER**, **BAY/SLT/CCT** and **QUIT** are also provided.

**Form 13 – Trunk Circuit Descriptors**

4.17 Trunk circuit descriptors are similar to Classes of Service. A trunk circuit descriptor specifies the hardware options for each type of Trunk Card. Refer to Figure 4-20 for the form layout. Trunk circuit descriptors are complemented by the switch settings on the 9105/9110 type Trunk Cards. Refer to the Trunk Card Switch Assignments Forms in Practice 9109-096-125-NA, Circuit Card Descriptions; also, refer to the 9105/9110 documentation. The trunk circuit types are as follows:

- |                   |                    |             |
|-------------------|--------------------|-------------|
| 4-Circuit CO      | 6-Circuit DID      | T1 LS/GS    |
| 6-Circuit CO      | DID/TIE            | T1 CO DISA  |
| 4-Circuit DISA    | E&M Trunk CARD     | T1 E&M      |
| 6-Circuit DISA    | E&M Module DISA    | T1 E&M DISA |
| 2-Circuit DID/TIE | 2 Circuit TIE DISA | T1 DID/TIE  |
| E&M Module        |                    | T1 TIE/DISA |

Each circuit descriptor type has its own set of parameters as detailed in Table 4-6, Trunk Hardware Options. The system supports a maximum of 25 trunk circuit descriptors.

4:39 30-NOV-89		alarm status = MAJOR		
DESCRIPTOR	TRUNK TYPE	NUMBER OF TRKS ASSIGNED	COMMENTS	
01	4-CIRCUIT CO	0		
02	4-CIRCUIT CO	0		
03	4-CIRCUIT CO	0		
04	6-CIRCUIT CO	6		
05	6-CIRCUIT CO	0		
06	2-CCT DID/TIE	0		
07	2-CCT DID/TIE	0		
08	2-CCT DID/TIE	0		
09	2-CCT DID/TIE	0		
10	2-CCT DID/TIE	0		
11	4-CIRCUIT DISA	0		
12	4-CIRCUIT DISA	0		
01	<input type="checkbox"/> 4-CIRCUIT CO	0		
1-6 CCT CO	2-6 CCT DISA	3-E&M MODULE	4-6 CCT DID	5- ** MORE **
6-QUIT	7-DESC NUMBER	8-SEL. OPTION	9-EM MOD DISA	0-

**Figure 4-20 Form 13 Layout**

**Field Descriptions**

**DESCRIPTOR:** This field lists the trunk circuit descriptors, numbers 01 to 25 (maximum of 25 different descriptors in total).

**TRUNK TYPE:** This field lists trunk circuit type for each trunk circuit descriptor. Note that the selected trunk type (the one that appears on the command line) is not displayed on the softkeys. T1 Trunks are not available with Generic 1001 or Generic 1002.

**Note:** Trunk type cannot be changed if there are 1 or more trunks assigned to the descriptor.

**NUMBER OF TRKS ASSIGNED:** This field records the number of trunks which use each trunk circuit descriptor. The trunk circuit descriptor can be assigned a new trunk type only if this field is zero. To clear the NUMBER OF TRKS ASSIGNED field, the trunks must first be deassigned. Refer to Form 14 (Non-Dial-In Trunks) and Form 15 (Dial-In Trunks). When a trunk type is assigned to a trunk circuit descriptor, the system prohibits any changes by clearing those softkeys that can alter the trunk types.

**COMMENTS:** This field is reserved for additional data (a maximum of 20 characters). It is stored by the system but not used.

### Softkeys

**6 CCT CO:** Pressing this softkey specifies the selected trunk circuit descriptor as a CO Trunk type.

**4 CCT CO:** This softkey appears when the MORE softkey has been pressed. Pressing this softkey assigns the CO Trunk type to the selected trunk circuit descriptor.

**Note:** This circuit type applies only to the analog bays of 480 and 456 port systems.

**T1 LS/GS:** This softkey appears when the MORE softkey has been pressed for the second time. Pressing this softkey defines the selected trunk circuit descriptor as a T1 Trunk simulating an LS/GS Trunk.

**T1 CO DISA:** This softkey appears when the MORE softkey has been pressed for the third time. Pressing this softkey defines the selected trunk circuit descriptor as a T1 Trunk simulating a CO DISA Trunk.

**6 CCT DISA:** Pressing this softkey assigns the DISA Trunk type to the selected trunk circuit descriptor.

**4 CCT DISA:** This softkey appears when the MORE softkey has been pressed. Pressing this softkey selects the DISA Trunk type for that trunk circuit descriptor.

**Note:** This circuit type applies only to the analog bays of 480 and 456 port systems.

**T1 E&M:** This softkey appears when the MORE softkey has been pressed for the second time. Pressing this softkey defines the selected trunk circuit descriptor as a T1 Trunk simulating an E&M Trunk.

**T1 E&M DISA:** This softkey appears when the MORE softkey has been pressed for the second time. Pressing this softkey defines the selected trunk circuit descriptor as a T1 Trunk simulating an E&M DISA Trunk.

**E&M MODULE:** Pressing this softkey programs the selected trunk circuit descriptor as an E&M Trunk Module.

**E&M TRUNK:** This softkey appears when the MORE softkey has been pressed. Pressing this softkey programs the selected trunk circuit descriptor as an E&M Trunk Card.

**T1 DID/TIE:** This softkey appears when the MORE softkey has been pressed for the second time. Defines the selected trunk circuit descriptor as a T1 trunk simulating a DID/TIE trunk.

**T1 TIE DISA:** This softkey appears when the MORE softkey has been pressed for the third time. Pressing this softkey defines the selected trunk circuit descriptor as a T1 Trunk simulating a TIE/DISA Trunk.

**6 CCT DID:** Pressing this softkey programs the selected trunk circuit descriptor as a DID Trunk.

**DID/TIE:** This softkey appears when the MORE softkey has been pressed. Pressing this softkey specifies the selected trunk circuit descriptor as a DID/Tie Trunk. The TYPE field displays 2-CCT DID/TIE.

**DESC NUM:** Pressing this softkey displays ENTER DESC NUM: prompt. This softkey selects a trunk circuit descriptor number. The selection is completed by entering a valid number (1 to 25).

**SEL. OPTION:** Pressing the SEL. OPTION softkey displays a new form. This form displays the options (parameters) associated with the trunk type that is assigned to that trunk circuit descriptor. Refer to Options Subform.

**EM TRK DISA:** This softkey appears when the MORE softkey has been pressed. Pressing this softkey commits the (E&M) analogue trunk as a DISA trunk.

**EM MOD DISA:** Pressing this softkey programs the selected trunk circuit descriptor as an EM MOD DISA.

**REVIEW:** Pressing the REVIEW softkey displays a new form (Review List Subform). This form displays a list of trunks that use the selected trunk circuit descriptor. Note that this softkey appears only if "NUMBER OF TRKS ASSIGNED" on command line is greater than zero.

**TIE DISA:** This softkey appears when the MORE softkey has been pressed. Pressing this softkey commits the DID/TIE (analog) trunk as a DISA trunk.

The standard softkeys **CANCEL**, **ENTER**, **\*\*MORE\*\*** and **QUIT** are also provided.

### Options Subform for Form 13

4.18 This form appears only when the SEL. OPTION softkey is pressed (see Figure 4-21). This form displays the options (parameters) associated with each trunk type assigned to each trunk circuit descriptor. See Table 4-6 for a list of the possible options, and see *Parameters* for descriptions of them.

4:44 30-NOV-89		alarm status = MAJOR		
[ 4 CCT CO TRUNK: 1 ]		OPTION NAME [SUPERVISION PARAMETER ]	STATUS	
Reverse to Idle			NO	
Far-end gives answer supervision			NO	
Inhibit automatic supervision			NO	
No seize alarm			NO	
No release alarm			NO	
Toll office			NO	
Is this a CO			YES	
DTMF			YES	
Impedance			COMPLEX	
Dictation trunk			NO	
Reverse to Idle			<input type="checkbox"/>	NO
1-YES	2-	3-	4-	5-
6-QUIT	7-	8-	9-	0-

**Figure 4-21 Select Option Subform Layout**

#### Field Descriptions

The header line displays the trunk type, the trunk circuit descriptor number and the type of parameter under observation.

**STATUS:** This field lists the option selected for each parameter.

#### Softkeys

**YES, NO, COMPLEX, 600 OHM, 60/40, IMMEDIATE:** This softkey toggles the status of the parameters.

**30/20, WINK:** This softkey toggles the status of the parameters.

**66/33, DELAY:** This softkey toggles the status of the parameters.

**DELAY INTEG:** This softkey toggles the status of the parameters.

**LOOP FLSH/RING GND:** Toggles between an opened loop current type flash (LOOP FLSH), or a grounded ring type of flash (RING GND).

The standard softkeys **CANCEL**, **ENTER**, and **QUIT** are also provided.

Table 4-6 Trunk Options

## 4-CIRCUIT CO TRUNK and 4-CIRCUIT DISA

Reverse to Idle  
 Far-End Gives Answer Supervision  
 Inhibit Automatic Supervision  
 No Seize Alarm  
 No Release Alarm  
 Toll Office  
 Is this a CO  
 DTMF  
 Save Busy-Out Status  
 Impedance (600 Ohm or Complex)  
 Dictation Trunk

## 6-CIRCUIT CO TRUNK and 6-CIRCUIT DISA

Reverse to Idle  
 Far-End Gives Answer Supervision  
 Inhibit Automatic Supervision  
 No Seize Alarm  
 No Release Alarm  
 Toll Office  
 Is this a CO  
 DTMF  
 Save Busy-Out Status  
 Impedance (600 Ohm or Complex)  
 Post Call Metering (0 => 15 seconds)  
 Calling Party Disconnect Timer (1 => 12 minutes)  
 Dictation Trunk  
 Ignore Remote Disconnect  
 Disconnect Timer (100 => 9900 ms) (100 ms increments)  
 Supervision Direction: Incoming Trunk Calls Also  
 Guard Timer (0 => 3000 ms) (100 ms increments)  
 Ring Cycle Timer (6 => 10 seconds)  
 Ignore Line Reversal During Seizure  
 Ringing Expected  
 Ringing Debounce Timer (5 => 12 seconds)  
 Seize Timer (10 => 60 s) (10 s increments)  
 Flash Timer (200 => 700 ms) (100 ms increments)  
 Flash Type (Loop Flash, Ring Ground)  
 Flash Over Trunk  
 Interdigit Timer (300 => 800 ms) (100 ms increments)  
 Digit Outputting Ratio (60/40, 30/20, 66/33)

## T1 LS/GS TRUNK and T1 CO DISA

No Seize Alarm  
 No Release Alarm  
 Toll Office  
 Is this a CO  
 DTMF  
 Save Busy-Out Status  
 Loop Start or Ground Start (T1 LS, T1 GS)  
 Calling Party Disconnect Timer (1 => 12 minutes)  
 Disconnect Timer 100 => 9900 ms (100 ms inc)  
 Guard Timer (0 => 3000 ms) (100 ms inc)  
 Ring Cycle Timer (6 => 10 s)  
 Ringing Expected  
 Ringing Debounce Timer (5 => 12 seconds)  
 Seize Timer (10 => 60 s) (10 s increments)  
 Flash Timer (200 => 700 ms) (100 ms inc)  
 Flash Type (Loop Flash, Ring Ground)  
 Flash Over Trunk  
 Interdigit Timer (300 => 800 ms) (100 ms inc)

**Table 4-6 Trunk Options  
(continued)**

**E&M MODULE and E&M MODULE DISA**

Reverse to Idle  
 Far-End Gives Answer Supervision  
 Inhibit Automatic Supervision  
 No Seize Alarm  
 No Release Alarm  
 Toll Office  
 Is this a CO  
 DTMF  
 Save Busy-Out Status  
 Impedance \*\* use dip switch on the module to program \*\* (600 Ohm or Complex)  
 E Lead Invert  
 M Lead Invert \*\* required for type 5 operation \*\*  
 Disconnect Timer (150 => 300 ms) (50 ms increments)  
 Release Acknowledge Timer (2000 => 9900 ms) (100 ms inc)  
 Guard Timer (200 => 1000 ms) (100 ms increments)  
 Dictation Trunk  
 Incoming Start Type (Immed, Wink, Delay)  
 Debounce Timer (20 => 150 ms) (10 ms increments)  
 Wink Timer (150 => 300 ms) (50 ms increments)  
 Outgoing Start Type (Immed, Wink, Delay or Delay Integ)  
 Digit Outpulsing Ratio (60/40, 30/20, 66/33)  
 Output Delay Timer (100 => 2000 ms) (100 ms inc)  
 Flash Timer (200 => 700 ms) (100 ms increments)  
 Flash Type (Loop Flash or Ring Ground)  
 Flash Over Trunk  
 Interdigit Timer (300 => 800 ms) (100 ms increments)  
 Wait for Delay Timer (300 => 5000 ms) (100 ms inc)  
 Remote End is a Satellite  
 Remote End is a Satellite with OPS Lines

**2-CCT DID/TIE and 2 CCT TIE DISA**

Reverse to Idle  
 Far-End Gives Answer Supervision  
 Inhibit Automatic Supervision  
 No Seize Alarm  
 No Release Alarm  
 Toll Office  
 Is this a CO  
 DTMF  
 Save Busy-Out Status  
 Impedance (600 Ohm or Complex)  
 Remote End is a Satellite  
 Remote End is a Satellite with OPS Lines

**6-CCT DID**

Reverse to Idle  
 Far-End Gives Answer Supervision  
 Inhibit Automatic Supervision  
 No Seize Alarm  
 No Release Alarm  
 Toll Office  
 Is this a CO  
 DTMF  
 Save Busy-Out Status  
 Impedance (600 Ohm or Complex)  
 Disconnect Timer (150 => 300 ms) (50 ms increments)  
 Release Acknowledge Timer (2-120 seconds)  
 Guard Timer (200 => 1000 ms) (100 ms increments)  
 Start Type (Immed, Wink, Delay)  
 Debounce Timer (20 => 150 ms) (10 ms increments)  
 Wink Timer (150 => 300 ms) (50 ms increments)  
 Remote End is a Satellite  
 Remote End is a Satellite with OPS Lines

**Table 4-6 Trunk Options  
(continued)**

**T1 E&M and T1 E&M DISA**

Reverse to Idle  
 Far-End Gives Answer Supervision  
 Inhibit Automatic Supervision  
 No Seize Alarm  
 No Release Alarm  
 Toll Office  
 Is this a CO  
 DTMF  
 Save Busy-Out Status  
 Disconnect Timer (150 => 300 ms) (50 ms inc)  
 Release Acknowledge Timer (2-240 s) (2 s inc)  
 Guard Timer (200 => 1000) (100 ms inc)  
 Incoming Start Type (Immed, Wink or Delay)  
 Debounce Timer (20 => 150 ms) (10 ms inc)  
 Wink Timer (150 => 300 ms) (50 ms inc)  
 Outgoing Start Type (Immed, Wink, Delay or Delay Integ)  
 Digit Outpulsing Ratio (60/40, 30/20, 66/33)  
 Outpulse Delay Timer (100 => 2000 ms) (100 ms inc)  
 Flash Timer (200 => 700 ms) (100 ms inc)  
 Flash Type (Loop Flash, Ring Ground)  
 Flash Over Trunk  
 Interdigit Timer (300 => 800 ms) (100 ms inc)  
 Wait for Delay Timer (300 => 5000 ms) (100 ms inc)  
 Remote end is a satellite  
 Remote end is a satellite with OPS Lines

**T1 DID/TIE and T1 TIE DISA**

Far-End Gives Answer Supervision  
 Inhibit Automatic Supervision  
 No Seize Alarm  
 No Release Alarm  
 Toll Office  
 Is this a CO  
 DTMF  
 Save Busy-Out Status  
 Disconnect Timer (150 => 300 ms) (50 ms inc)  
 Release Acknowledge Timer (2=> 120 s)  
 Guard Timer (200 => 1000 ms) (100 ms inc)  
 Incoming Start Type (Immed, Wink or Delay)  
 Debounce Timer (20 => 150 ms) (10 ms inc)  
 Wink Timer (150 => 300 ms) (50 ms inc)  
 Outgoing Start Type (Immed, Wink, Delay or Delay Integ)  
 Digit Outpulsing Ratio (60/40, 30/20, 66/33)  
 Outpulse Delay Timer (100 => 2000 ms) (100 ms inc)  
 Flash Timer (200 => 700 ms) (100 ms inc)  
 Flash Type (Loop Flash, Ring Ground)  
 Flash Over Trunk  
 Interdigit Timer (300 => 800 ms) (100 ms inc)  
 Wait for Delay Timer (300 => 5000 ms) (100 ms inc)  
 Remote End is a Satellite  
 Remote End is a Satellite With OPS Lines

**Table 4-6 Trunk Options  
(continued)**

**E&M TRUNK CARD**

Reverse to Idle  
 Far-End Gives Answer Supervision  
 Inhibit Automatic Supervision  
 No Seize Alarm  
 No Release Alarm  
 Toll Office  
 Is this a CO  
 DTMF  
 Save Busy-Out Status  
 Impedance (600 Ohm or Complex)  
 Remote End is a Satellite  
 Remote End is a Satellite with OPS Lines  
 Dictation Trunk

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**Parameters**

**Calling Party Disconnect Timer:** This defines how long the system will wait for the far-end, a ground start trunk, to acknowledge a trunk release.

**Debounce Timer:** This timer specifies the period for which an incoming seizure is to be debounced before being recognized as a valid incoming seizure.

**Dictation Trunk:** If selected, this maintains trunk dialing for the duration of the call. See DICTATION TRUNK.

**Digit Outpulsing Ratio:** This field specifies the break/make ratio during outpulsing. It can be set to 60/40, 66/33, or 30/20.

**Disconnect Timer:** This defines the time a release signal must be continuously present before a call is disconnected. **Note:** For digital DID trunks, the range is 150-300 ms.

**DTMF:** If selected, forces DTMF digits to be transmitted on the trunk when dialing. If not selected, digits are pulsed onto the trunk.

**Save Busy Out Status:** If selected, all trunks in this descriptor type which were in the busy-out state before a system reset will be in that state after the reset. This option applies to Generic 1004 and Generic 1005. **Note:** In Generic 1002 and Generic 1003 this is not an option, but is done automatically. In Generic 1001 this function is not provided.

**E Lead Invert/ M Lead Invert:** These two fields provide the flexibility to specify the polarity of the E and M leads to match the far end connection. M Lead Invert must be enabled for type 5 operation.

**Far-End Gives Answer Supervision:** If selected, answer signals are expected, and acted upon when received on the trunk; answer signals are not generated internally. If not selected, answer signals received are ignored.

**Flash Timer:** This defines the duration of a flash transmitted onto a trunk in a digital bay. Note: this is not programmable for some analog trunks; in these cases, the flash timer is always 200 ms.

**Flash Type:** Specifies whether the flash will be done by opening the current loop (LOOP FLSH) or grounding the ring (RING GRND). This is available in Generic 1004 and Generic 1005.

**Flash Over Trunk:** Enables the Flash Over Trunk feature for the descriptor number. This is available in Generic 1004 and Generic 1005.

**Guard Timer:** This defines how long the system will wait after releasing the trunk before seizing it again for an outgoing call.

**Ignore Line Reversal During Seizure:** If selected, line reversal is not recognized as an incoming seizure.

**Ignore Remote Disconnect:** If selected, release signals from the far-end are ignored. If not selected, release signals cause disconnection of the call.

**Impedance:** "600" should be selected if the trunk is to be connected to a carrier facility, or the cable is short. This setting provides a 600 ohm + 2mF termination impedance match for the incoming line. "Complex" should be selected if the trunk is to be connected directly to cable facilities. This setting provides the standard AT&T complex balance network as a termination impedance for the incoming line.

**Incoming start type:** This field specifies the incoming type of the trunk, which can be set to immediate incoming, wink start incoming, or delay dial incoming. "Wink start incoming" must be set for the following trunk circuit descriptors in order to obtain ANI/DNIS digits: T1 E&M, T1 E&M DISA, T1 DID/TIE or T1 TIE DISA.

**Inhibit Automatic Supervision:** If selected, the system waits for the far-end to provide answer supervision before providing answer supervision to an incoming Tie or DID trunk.

**Is this a CO?:** Select if trunk is to terminate at the Central Office. If NO, a 2dB pad is added in the circuit. Refer to Practice 9109-096-180-NA, Engineering Information.

**Interdigit Timer:** This defines the time gap inserted between outpulsed digits.

**Loop Start or Ground Start:** This defines trunk signaling type (T1 only).

**No Release Alarm:** If selected, a trunk failing to release is removed from service and maintenance is notified. The trunk can only be returned to service manually. If not selected, the trunk remains in service.

**No Seize Alarm:** If selected, a trunk failing to return a seize acknowledgement on three successive occasions is removed from service; maintenance is not notified. If not selected, the trunk remains in service. If the trunk originates, the no seize count is reset. As well, if the trunk had been removed from service due to a no seize count, the trunk is returned to service and the incoming call on the trunk is processed.

**Outgoing Start Type:** This field specifies the outgoing type of the trunk, which can be set to immediate outgoing, wink start outgoing, delay dial outgoing or delay dial with integrity.

**Outpulse Delay Timer:** This timer specifies the pause between seizing and the start of dialing, applicable to immediate outgoing trunks only. This value should be specified after determining the far end characteristics.

**Post Call Metering:** This defines how long the system will wait for and record meter pulses after the release signal is received.

**Release Acknowledge timer:** This specifies the time-out period to wait for a release acknowledge signal from the far end.

**Remote End is a Satellite:** Select if the trunk is to terminate at a satellite PABX. Refer to Practice 9109-096-180-NA, Engineering Information, for details of loss/gain.

**Remote End is a Satellite with OPS lines:** Select if the trunk is to terminate at a satellite PABX with OPS lines. Refer to Practice 9109-096-180-NA, Engineering Information, for details of loss/gain.

**Reverse to Idle:** In some central offices, upon seizure, the CO reverses the polarity on the trunk. When the call ends, the CO again reverses the polarity, returning the trunk to its normal idle state. When the Reverse to Idle option is enabled, the PABX treats the reversal to idle condition as a disconnect signal from the CO. The Far-End Gives Answer Supervision option has no effect.

**Ring Cycle Timer:** This defines a period during which a minimum ring burst (250 ms) must be present before the system will recognize it as an incoming call.

**Ringing Debounce Timer:** This defines the duration during which the system tries to detect the minimum ring burst, indicating the persistence of an incoming call.

**Ringing Expected:** If selected, incoming calls are not reported unless ringing is recognized. If other seize signals are received before ringing, the trunk is busied-out for outgoing calls, but the incoming call is not reported until ringing is received.

**Seize Timer:** This defines the time the system will wait for a seize acknowledge from a ground start trunk. Also see Option "No Seize Alarm" in this list.

**Toll Office:** Select if the CO trunk is to be connected to a Toll Office. This option is applicable to systems using the North American loss plan. It provides a 3 dB loss for trunk-to-OPS line connections, and a 6 dB loss for trunk-to-ONS line connections. If not selected, "normal" through switch loss is provided. Refer to Practice 9109-096-180-NA, Engineering Information.

**Wait For Delay Timer:** This timer specifies the period to wait for the delay signal from the far end. It is only applicable if the trunk is of type delay dial outgoing (without integrity).

**Wink Timer:** This timer specifies the duration of the wink signal sent to the far end if the trunk is programmed as a Wink Start Incoming or Delay Start incoming.

### Review List Subform for Form 13

- 4.19 This form appears when the **REVIEW** softkey is pressed in Form 13 – Trunk Circuit Descriptors. The form lists the trunks that use the selected trunk circuit descriptor. Refer to Figure 4–22 for the form layout. **Note:** The data in this form cannot be modified.

[ T1 E&M TRUNK: 1 ]		TRK NUM	BAY	SLT	CCT	COMMENTS
		48	1	6	1	
		48	1	6	1	
1-	2-	3-	4-	5-		
6-QUIT	7-DESC NUMBER	8-	9-	0-		

**Figure 4–22 Form 13 Review List Subform Layout**

#### Field Descriptions

The header line displays the descriptor number and the trunk type.

**TRK NUM:** This field lists the trunk numbers assigned to the selected trunk circuit descriptor number. Trunk numbers are arbitrarily assigned to the trunks in Form 14 (Non-Dial-In Trunks) and Form 15 (Dial-In Trunks).

**BAY, SLT and CCT:** These fields list the physical location of each trunk number according to their bay, slot and circuit numbers.

**COMMENTS:** This field displays any additional information about each trunk as it was entered on Form 14 (Non-Dial-In Trunks) and Form 15 (Dial-In Trunks). The COMMENTS field stores a maximum of 15 characters. The data in this field is stored by the system but not used.

#### Softkeys

**DESC NUMBER:** This softkey selects a trunk circuit descriptor number. Pressing the DESC NUMBER softkey displays the ENTER DESC. NUM: prompt. The selection is completed by entering a valid number (1 to 25).

The standard softkeys **CANCEL**, **ENTER**, and **QUIT** are also provided.

## Form 14 – Non-Dial-In Trunks

- 4.20 This form specifies the characteristics of the system's Non-Dial-In Trunks. These trunks cannot dial any digits into the PABX and are usually a CO Trunk. The Day, N1, N2 answer points are assigned in this form. Alternate recall points are assigned in Form 19 (Call Rerouting Table). Refer to Figure 4-23 for the form layout.

4:51 30-NOV-89		alarm status = MAJOR									
BAY	SLT	CCT	COS	TEN	DAY	N1	N2	CDN	TK NUM	TK NAME	COMMENTS
1	04	01	1	1	2311	2311		4	1	NE1	NY
1	04	02	1	1	2311			4	2	NE2	NY
1	04	03	1	1	2311			4	3	NE3	NY
1	04	04	1	1	2311			4	4	NE4	BOS
1	04	05	1	1	2311			4	5	NE5	BOS
1	04	06	1	1	2311			4	6	NE10	CLE
1	04	06	<input type="checkbox"/> 1	1	2311			4	6	NE10	CLE
1-			2-			3-TRUNK NUMBER			4-		5-
6-QUIT			7-BAY/SLT/CCT			8-DELETE			9-		0-

Figure 4-23 Form 14 Layout

## Field Descriptions

**BAY, SLT, and CCT:** These fields list the physical location of each Non-Dial-In Trunk. They are generated by the system based on what was entered in the PROGRAMMED field in Form 01, System Configuration. This field cannot be modified.

**COS:** This field specifies the Class of Service of each Non-Dial-In Trunk. The default COS is 1.

**TEN:** This field specifies the Tenant Group number of each Non-Dial-In Trunk. The default Tenant Group number is 1.

**DAY, N1 and N2:** These fields are reserved for the Day, Night1 and Night2 answer points. The answer points may be specified as an LDN on the Attendant Console, a console extension number, a station, a Hunt Group, a Night Bell, a logical line, a data station, or an ACD Path access code. **Note:** An LDN and Night Bell cannot be rung simultaneously.

**Notes:** 1. In Generic 1004 and Generic 1005, these fields may be left blank.

2. In all generics previous to Generic 1004, the DAY field must be programmed. If the N1 or N2 field is not specified, then the system defaults the night answer points to the day answer point. If only one of the night answer points is specified, then the other night answer point defaults to the specified night answer point.

**CDN:** The CDN (Circuit Descriptor Number) field links this form to Form 13, Trunk Circuit Descriptors, which defines the trunk hardware parameters. **Note:** This field must be filled in before any changes for the selected physical location are stored in the database.

**TKNUM:** This field lists the trunk identification numbers. **Note:** This field must be filled in before any changes for the selected physical location are stored in the database. In this field, trunks are listed according to their trunk number (1 to 200). This method of identifying trunks is used for the following:

- SMDR records of a trunk call (only three digits are allocated for trunk identification)
- Identification of a trunk in a call on the Attendant Console or on the *SUPERSET 4* telephone LCD,
- Attendant Direct Trunk Select (DTS) capability,
- Form 09 for *SUPERSET* telephone line appearance programming (DTS or Private Trunk)
- Form 16 for listing members of Trunk Groups.

**TK NAME:** This field lists the trunk names. Names can be up to 8 characters long.

**COMMENTS:** This field is reserved for additional data (a maximum of 15 characters). It is stored by the system but not used.

### Softkeys

**TRUNK NUMBER:** This softkey selects a trunk by its trunk number. Trunk numbers are assigned in Form 14 and Form 15. Pressing the TRUNK NUMBER softkey displays the ENTER TRUNK NUM: prompt on the command line. Entering a valid trunk number (1 to 200) selects that Non-Dial-In Trunk and displays it on the command line.

**DELETE FIELD:** This softkey appears when the cursor is on a programmed DAY, N1 or N2 field. It allows the field to be deleted, without affecting the other two fields. **Note:** This softkey appears in Generic 1004 and Generic 1005.

The standard softkeys **CANCEL**, **BAY/SLT/CCT**, **DELETE**, **ENTER**, and **QUIT** are also provided.

**Form 15 – Dial-In Trunks**

4.21 This form specifies the characteristics of the system's Dial-In Trunks. This form also designates where incoming calls on Dial-In Trunks are routed by modifying the incoming digits. See Figure 4-24 for the form layout.

4:42 30-NOV-89											alarm status = MAJOR	
BAY	SLT	CCT	COS	COR	TEN	N	M	X	CDN	TK NUM	TK NAME	COMMENTS
1	06	01	1	1	1	0	0		19	7		
1	06	02	1	1	1	0	0		19	8		
1	06	01	<input type="checkbox"/> 1	1	1	0	0		19	7		
1-				2-			3-TRUNK NUMBER		4-		5-	
6-QUIT				7-BAY/SLT/CCT			8-DELETE		9-		0-	

**Figure 4-24 Form 15 Layout**

**Field Descriptions**

**BAY, SLT and CCT:** These fields list the physical location identification of each Dial-In Trunk. They are generated by the system based on what was entered in the PROGRAMMED field of Form 01, System Configuration. This field cannot be modified.

**COS:** This field specifies the Class of Service for each entry. The COS defaults to 1.

**COR:** This field lists the Class of Restriction for each entry. The COR defaults to 1.

**TEN:** Tenant Group specifications are listed in this field. The Tenant Group number defaults to 1.

**N:** This field lists the number of expected digits. For Generic 1004 and below, the range is 1 to 9. For Generic 1005 only, the range is 0 to 10. If a value is specified in this field, then digit translation on incoming calls does not commence until the system receives the specified number of digits. **Note:** This field must be filled for a DID Trunk. Otherwise, this field defaults to 0, and the trunk is treated as a TIE trunk (regardless of the circuit descriptor).

**M:** This field specifies the number of digits (0 to 8) that must be absorbed after the incoming trunk is seized. The M field defaults to 0. This field is applicable for any type of Dial-In Trunk.

**X:** This field specifies a maximum of two digits that may be inserted before the digit string. This field is applicable for any type of Dial-In Trunk.

**CDN:** The CDN (Circuit Descriptor Number) field lists the circuit descriptor numbers for each Dial-In Trunk. This field links this form to Form 13 (Trunk Circuit Descriptors), which defines the trunk hardware parameters. Note that this field must be filled in before any changes for the selected physical location are stored in the database.

**TK NUM:** This field displays the Dial-In Trunks according to their trunk number. Note that this field must be filled in before any changes for the selected physical location are stored in the database. Trunk numbers range from 1 to 200 and are used for the following:

- SMDR records of a trunk call (only three digits are allocated for trunk identification),
- Identification of a trunk in a call on the Attendant Console or on the *SUPERSET 4* telephone LCD,
- Attendant Direct Trunk Select (DTS) capability,
- Form 09 for *SUPERSET* telephone line appearance programming (DTS or Private Trunk) and
- Form 16 for listing members of Trunk Groups.

**TK NAME:** This field lists the trunk names. Names can be up to 8 characters long.

**COMMENTS:** This field is reserved for additional data (a maximum of 15 characters). It is stored by the system but not used.

### Softkeys

**TRUNK NUMBER:** This softkey selects a trunk by its trunk number. Pressing the TRUNK NUMBER softkey displays the ENTER TRUNK NUM: prompt on the command line. Entering a valid trunk number (1 to 200) selects that Dial-In Trunk and displays it on the command line.

The standard softkeys **CANCEL**, **BAY/SLT/CCT**, **DELETE**, **ENTER**, and **QUIT** are also provided.

## Form 16 – Trunk Groups

- 4.22 This form specifies the members of each Trunk Group by trunk numbers. The trunk number is assigned in Form 14 (Non-Dial-In Trunks) and Form 15 (Dial-In Trunks). The system supports a maximum of 50 Trunk Groups and each group supports a maximum of 50 members. See Figure 4-25 for the form layout.

[GRP: 1-NOR-EAST] [SMDR ] [TERM]		TK NUM	BAY	SLT	CCT	COMMENTS
		1	01	04	01	NY
		2	01	04	02	NY
		3	01	04	03	NY
		4	01	04	04	BOS
		5	01	04	05	BOS
		6	01	04	06	CLE
		<input type="checkbox"/> 1	01	04	01	NY
1-NO SMDR	2-CIRCULAR	3-INSERT	4-TK GRP NAME		5-TRUNK GROUP	
6-QUIT	7-	8-DELETE	9-		0-	

Figure 4-25 Form 16 Layout

### Field Descriptions

The header line indicates the Trunk Group being programmed, via a number and a name (maximum of eight characters). This line also indicates the presence of the SMDR option and whether the Trunk Group is subjected to Terminal Hunting or Circular Hunting.

**TK NUM:** This field lists the members of each Trunk Group according to their trunk number. Members are added by entering a valid trunk number (1 to 200) when the cursor is at the TK NUM field on the command line. The Trunk Group is displayed on the header line.

**BAY, SLT, CCT and COMMENTS :** These fields are informational fields only. They cannot be modified in this form. When a trunk number is added to the Trunk Group, the physical identification (BAY, SLT and CCT) and the COMMENTS fields from Form 14 (Non-Dial-In Trunks) or Form 15 (Dial-In Trunks) are automatically displayed.

### Softkeys

**SMDR/NO SMDR:** This softkey enables and disables the outgoing Station Message Detail Recording (SMDR) feature for the Trunk Group. When the SMDR feature is enabled, the header line displays [SMDR ] and the softkey displays NO SMDR. Pressing the NO SMDR softkey disables the SMDR feature for that Trunk Group. The softkey now displays SMDR and the header line displays [NO SMDR].

**CIRCULAR/TERMINAL:** This softkey selects Circular or Terminal hunting. When the Trunk Group is defined as a Terminal type, the header line displays [TERM] and the softkey displays CIRCULAR. Pressing the CIRCULAR softkey programs the selected Trunk Group as a Circular type. The header line now displays [CIRC] and the softkey displays TERMINAL. Refer to Practice 9109-096-105-NA, Features Description, for details on Circular and Terminal Trunk Groups.

**INSERT:** This softkey adds new members to the Trunk Group. Pressing the INSERT softkey clears the command line and moves the cursor to the TK NUM field. The addition is completed by entering a valid trunk number. The system inserts the addition before the line previously displayed on the command line. Note that this softkey only appears if there is data present in this form.

**TK GRP NAME:** This softkey specifies a character name for the selected Trunk Group. Pressing the TK GRP NAME softkey displays the following prompt on the command line: ENTER TRUNK GROUP NAME:. The name specification is completed by entering a character name (a maximum of eight characters). The Trunk Group name is displayed on the header line beside the Trunk Group number.

**TRUNK GROUP:** This softkey selects a Trunk Group. Pressing the TRUNK GROUP softkey displays the ENTER TRUNK GROUP NUM: prompt on the command line. The selection is completed by entering a valid Trunk Group number (1 to 50).

The standard softkeys **CANCEL**, **DELETE**, **ENTER**, and **QUIT** are also provided.

### Form 17 – Hunt Groups

4.23 This form specifies the members of each Hunt Group by extension or DATASET numbers (see Figure 4–26). The system supports a maximum of 50 Hunt Groups (100 in Generic 1004 and Generic 1005). Each group supports a maximum of 50 members. Only DATASETs can be added to a data hunt group and data hunt groups can only contain DATASETs. Only modems can be added to a modem hunt group and modem hunt groups can only contain modems.

4:54 30-NOV-89		alarm status = MAJOR				
[GRP 1:_____][TERM][STN/SET ]		EXT NUM	BAY	SLT	CCT	COMMENTS
		1101	01	01	01	Manager
		1104	01	01	04	Accounts
		1105	01	01	05	Accounts
		1106	01	01	06	Secretary
		<input type="checkbox"/> 1106	01	01	06	Secretary
1-GROUP TYPE	2-CIRCULAR	3-INSERT		4-OPTIONS		5-HUNT GROUP
6-QUIT	7-ACCESS CODE	8-DELETE		9-EXT NUM		0-

Figure 4–26 Form 17 Layout

#### Field Descriptions

The header line indicates which Hunt Group is being programmed, its access code, the type of hunting used (Terminal or Circular) and the type of hunt group (Stn/set, Agent, Recording).

**EXT NUM:** This field lists the members of each Hunt Group according to their extension numbers. Valid numbers include extension numbers of Rotary Dial or DTMF sets and *SUPERSET* Prime Line and DATASET numbers.

**BAY, SLT, CCT and COMMENTS :** These fields are informational fields only. They cannot be modified in this form. When an extension or DATASET number is added to a Hunt Group, the corresponding physical location number (BAY, SLT and CCT) and the COMMENTS fields from Form 09 (Station/*SUPERSET* Telephones) and Form 12 (Data Assignment) are automatically displayed.

#### Softkeys

**GROUP TYPE:** Pressing this softkey displays softkeys which represent the alternative Hunt Group types. (Softkeys GROUP TYPE and CIRCULAR/TERMINAL do not appear until the hunt group exists. A hunt group is not created until the first member is defined). Note that the selected group type does not appear on the softkey display.

**STN/SET:** Pressing this softkey programs the selected Hunt Group as a Station/*SUPERSET* Telephone type. A bay/slot/circuit number of any type of line card can be used with this type of Hunt Group. The header line displays the [STN/SET] prompt to indicate this type of Hunt Group.

**DEFAULT:** This softkey appears when the first modem hunt group is established. (All the devices are modems; the header reads MODEM). Pressing the DEFAULT softkey makes the hunt group the default modem pool; the header reads MODEM/D. All members of the Default Modem Pool must be in BOTH mode. Not available in Generic 1001.

**DEFAULT OFF:** This softkey appears only if the hunt group is the default modem pool. Pressing it removes the hunt group's default status. Not available in Generic 1001.

**RECORDING:** Pressing this softkey programs the selected Hunt Group as a Recording type. Only those bay/slot/circuit numbers referring to the ONS Line Card can be used with this type of Hunt Group. The header line displays [RECORD]. This appears only if the hunt group contains industry standard telephones. The *SUPERSET 401* cannot be programmed as a member of this hunt group.

**AGENT:** Pressing this softkey programs the selected Hunt Group as a UCD Agent type. The header line displays [AGENT ].

**CIRCULAR/TERMINAL:** This softkey has two functions. It specifies the selected Hunt Group as a Circular or Terminal type. Refer to Practice 9109-095-105-NA, Features Description, for details on Circular and Terminal Hunt Groups. When the Hunt Group is defined as a Terminal type, the header line displays [TERM] and the softkey displays CIRCULAR. Pressing the CIRCULAR softkey programs the Hunt Group as a Circular type. The header line now displays [CIRC] and the softkey displays TERMINAL.

**AUTO ATT.:** Programs the selected hunt group as an Automatic Attendant hunt group. The header displays [AUTO ATT]. Only ONS line circuits may be entered in this type of hunt group (these would be connected to RADs – see Practice 9109-096-625-NA, Automated Attendant Application Package, for further information. This is available in Generic 1003, Generic 1004 and Generic 1005. The *SUPERSET 401* cannot be programmed as a member of this hunt group.

**INSERT:** This softkey adds new members to the selected Hunt Group. Pressing the INSERT softkey clears the command line and moves the cursor to the EXT NUM field. The addition is completed by entering a valid extension number. The system inserts the addition on the line preceding the current line. Note that this softkey only appears if there is data present in this form.

**OPTIONS:** This softkey allows access to the various Options Subforms, which allows selection of options for the different hunt group types. Value inputs are entered on the command line in the usual manner. Not available in Generic 1001.

**HUNT GROUP:** This softkey selects a Hunt Group. Pressing the HUNT GROUP softkey displays the ENTER HUNT GROUP NUM: prompt on the command line. The selection is completed by entering a valid Hunt Group number (1 to 50 in Generic 1001, Generic 1002 and Generic 1003); (1 to 99 in Generic 1004 and Generic 1005).

**ACCESS CODE:** This softkey assigns an access code for each Hunt Group. Pressing the ACCESS CODE softkey displays the ENTER NEW ACCESS CODE: prompt on the command line. The access code specification is completed by entering a valid number which must be unique in the database. The access code is displayed on the header line and can be a maximum of five digits.

**EXT NUM:** Pressing this softkey displays ENTER EXTENSION NUM on the command line. When a valid number is entered, followed by pressing the ENTER softkey, the screen displays the appropriate Hunt Group and the command line displays the number and its location BAY/SLT/CCT.

**DELETE FIELD:** Appears in any of the Options Subforms. Deletes programmed data on the command line. Will not appear if there is no data on the command line.

The standard softkeys **CANCEL**, **DELETE**, **ENTER**, and **QUIT** are also provided.

### Option Parameters

**Overflow:** Allows the programmer to assign a destination where calls can be answered when all members of the hunt group are busy.

**Name:** Allows the programmer to assign a name to the Hunt Group. The name can be up to 12 characters long. The first character must not be \*, # or a number; the name cannot contain blanks or dashes. Not available in Generic 1002.

**DTRX Enable/Disable:** Allows for immediate DTRX access. DTRX DISABLED also provides DTRX access, but only after the interdigit time-out has expired (about 15 seconds). This applies to modem type hunt groups only.

**Message Length:** Applies only to recording or auto attendant type hunt groups. The length is entered in minutes and seconds. The default value is 10 seconds; the maximum is 4 minutes. The timer should be set at least 3 seconds longer than the actual message length.

**Default Destination:** This is the destination for incoming calls – if the caller does not dial digits, the call connects to this destination. Not available in Generic 1002.

**Dialing Over Recording:** If enabled, allows for dialing digits while listening to a recording. Not available in Generic 1002.

**Prefix Digits:** These are added to the digit the caller dials in response to (or while listening to) a recorded announcement. Not available in Generic 1002.

**Wait For Resources:** This is the time that an incoming caller will wait for connection to a resource. When this times out the call is routed to the Default Destination. Not available in Generic 1002.

5:36 30-NOV-89		alarm status = MAJOR		
[GRP 2:____][TERM][RECORD. ]				OPTIONS
Name Message Length				0:10
Name				<input type="checkbox"/>
1-	2-	3-	4-	5-
6-QUIT	7-	8-	9-	0-

Figure 4-27 Recording Hunt Group Options Subform Layout

5:54 30-NOV-89		alarm status = MAJOR		
[GRP 5:____][CIRC][AUTO ATT]				OPTIONS
Name Message Length Default Destination Dialing over recording Prefix digits Wait for resources				0:10  ENABLED  1:00
Name				<input type="checkbox"/>
1-	2-	3-	4-	5-
6-QUIT	7-	8-	9-	0-

Figure 4-28 Auto Attendant Hunt Group Options Subform Layout

5:02 30-NOV-89		alarm status = MAJOR		
[GRP 1:700 ][TERM][STN/SET ]		OPTIONS		
Name Overflow		Publications 1511		
Overflow		<input type="checkbox"/> 1511		
1-	2-	3-	4-	5-
6-QUIT	7-	8-	9-DELETE FIELD	0-

**Figure 4-29 Station / Set Hunt Group Options Subform Layout**

## Form 18 – Miscellaneous System Ports

- 4.24 This form assigns a physical location to three types of devices and three alarms. The devices are a Music on Hold source, Paging equipment and Night Bells equipment. The alarms are Minor, Major and Critical. The system supports 25 night bells, nine paging zones and one Music on Hold source. Refer to Figure 4-30 for the form layout.

4:55 30-NOV-89		alarm status = MAJOR				
ENTRY NUMBER	DESCRIPTION	BAY	SLT	CCT	SCT	EXTENSION NUMBER
01	Music On Hold	01	05	04	01	
02	Pager 1	01	05	04	02	
03	Pager 2					
04	Pager 3					
05	Pager 4					
06	Pager 5					
07	Pager 6					
08	Pager 7					
09	Pager 8					
10	Pager 9					
11	Minor Alarm					
12	Major Alarm					
01	Music On Hold	<input type="checkbox"/> 01	05	04	01	
1-	2-	3-	4-TOP		5-BOTTOM	
6-QUIT	7-ENTRY NUM	8-DELETE		9-	0-	

Figure 4-30 Form 18 Layout

### Field Descriptions

**ENTRY NUMBER:** This field lists the entry numbers for the miscellaneous ports. There is a total of 38 entry numbers. The ENTRY NUMBER field cannot be modified.

**DESCRIPTION:** This field lists the titles assigned to the entry numbers. The DESCRIPTION field cannot be modified.

**BAY, SLT and CCT:** These fields list the bay, slot and circuit numbers of the device being programmed.

**SCT:** The SCT (subcircuit) field specifies the relay location on each module for each night bell and each alarm circuit. Refer to Figure 4-31, Universal Card Circuits and Subcircuits.

**EXTENSION NUMBER:** This field applies only to the night bell entries. The EXTENSION NUMBER field lists the extension numbers (a maximum of five digits) assigned to the night bells. This field links the night bell designations to Form 19 (Call Rerouting Table). This field also links the incoming trunks of Form 14 (Non-Dial-In Trunks) to the night bell designations.

### Softkeys

**ENTRY NUM:** This softkey selects an entry number. Pressing the ENTRY NUM softkey displays the ENTER ENTRY NUM: prompt on the command line. The selection is completed by entering a valid entry number (1 to 38). This entry number can now be specified by its bay, slot, circuit and, if applicable, subcircuit numbers.

The standard softkeys **CANCEL, DELETE, ENTER, TOP, BOTTOM** and **QUIT** are also provided.

**Table 4-7 Miscellaneous System Ports Entry Number Designations**

Entry Number	Title
01	Music on Hold
02	Pager 1
03	Pager 2
04	Pager 3
05	Pager 4
06	Pager 5
07	Pager 6
08	Pager 7
09	Pager 8
10	Pager 9
11	Minor Alarm
12	Major Alarm
13	Critical Alarm
14	Night Bell 1
15	Night Bell 2
16	Night Bell 3
17	Night Bell 4
18	Night Bell 5
19	Night Bell 6
20	Night Bell 7
21	Night Bell 8
22	Night Bell 9
23	Night Bell 10
24	Night Bell 11
25	Night Bell 12
26	Night Bell 13
27	Night Bell 14
28	Night Bell 15
29	Night Bell 16
30	Night Bell 17
31	Night Bell 18
32	Night Bell 19
33	Night Bell 20
34	Night Bell 21
35	Night Bell 22
36	Night Bell 23
37	Night Bell 24
38	Night Bell 25

**Note:** In 336-port systems only Bays 1 and 2 support Night Bells.

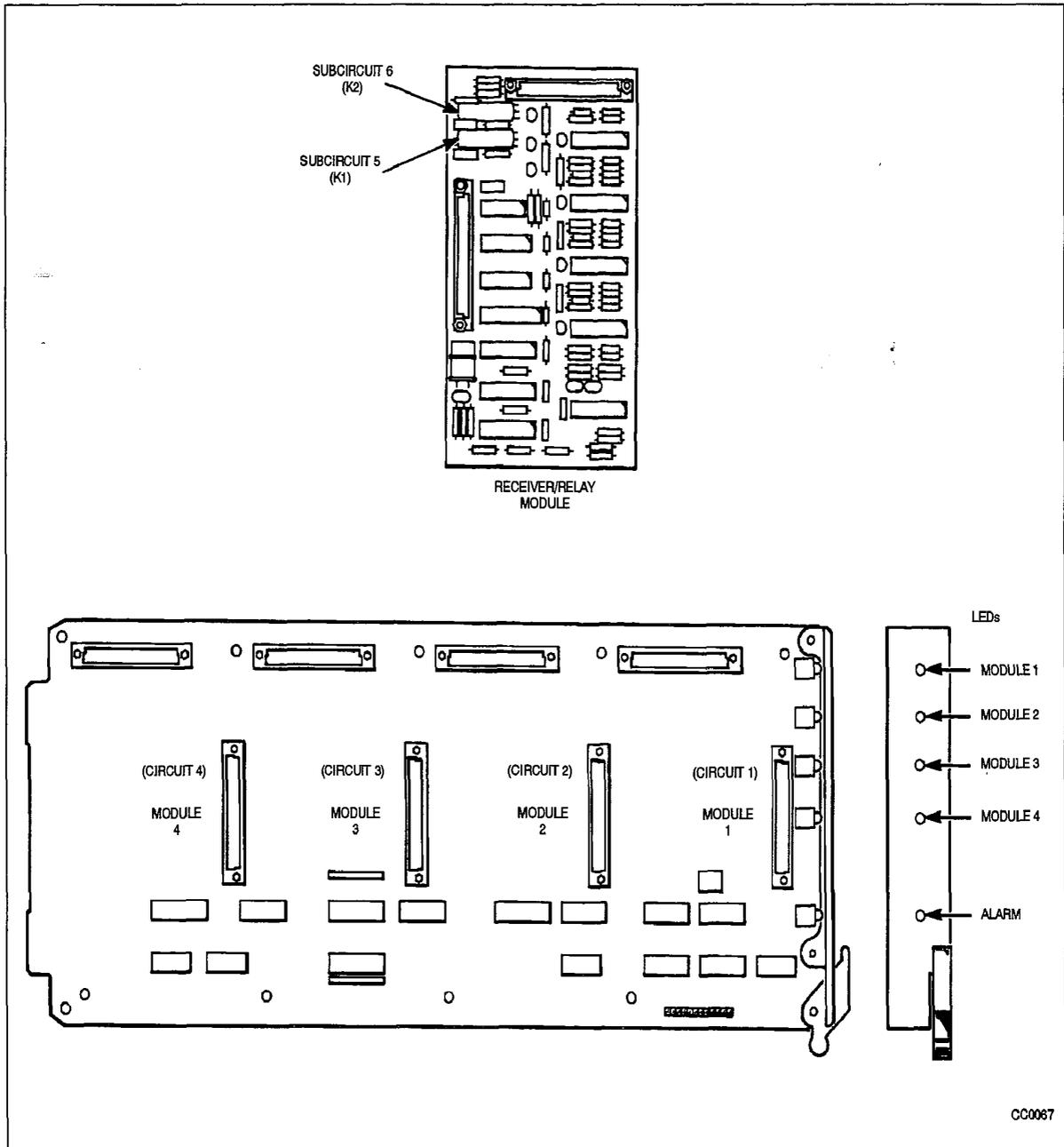


Figure 4-31 Universal Card Circuits and Subcircuits

### Form 19 – Call Rerouting Table

4.25 This form designates where intercepted and attendant-directed calls will route based on Day Service, Night1 Service and Night2 Service. Refer to Figure 4-32 for the form layout and to Table 4-8 for Call Rerouting Options. Each Tenant Group requires a Call Rerouting Table. "DIAL 0" calls can be directed to an LDN, Rotary Dial or DTMF set, *SUPERSET* telephone or Night Bell extension number, or to an individual console. For further information, refer to Practice 9109-096-105-NA, Feature Descriptions (under *Call Rerouting*).

6:08 30-NOV-89		alarm status = MAJOR			
[TENANT : 1 ]		TYPE OF CALL	DAY	N1	N2
Station Dial 0 Routing			1511	1511	
Priority Dial 0 Routing					
DID Recall Points On Busy					
DID Recall Points On No Answer					
DID Routing For Calls Into This Tenant					
DID Illegal # Intercept For This Tenant					
DID Vacant Number Routing For This Tenant					
DID Attendant Access Night Points			-----		
Non-Dial-In Trunks Alternate Recall Points					
Dial-In Tie Recall Points On Busy					
Dial-In Tie Recall Points On No Answer					
Dial-In Tie Routing For Calls Into This Tenant					
Station Dial 0 Routing			1511	1511	
1-	2-TENANT NAME	3-	4-TOP	5-BOTTOM	
6-QUIT	7-TENANT	8-DELETE	9-	0-	

Figure 4-32 Form 19 Layout

#### Field Descriptions

The header line displays the Tenant Group number being programmed.

**DAY:** This field designates a directory number for each type of call in Day Service Mode. The directory number is defined in one of the following forms:

- Form 07, Console Assignments
- Form 08, Attendant LDN Assignments
- Form 09, Station/*SUPERSET* Telephones
- Form 17, Hunt Groups
- Form 18, Miscellaneous System Ports
- Form 41, ACD Paths
- Form 45, Key System Telephones

If this field is blank, the call does not reroute (such as no answer or busy forwarding) or reorder tone is heard (such as vacant number intercept or Do Not Disturb intercept).

**N1:** This field specifies where calls route during Night1 Service Mode by the extension number. If this field is blank, the call reroutes to the number specified in the DAY field.

**N2:** This field specifies where calls route during Night2 Service Mode by the extension number. If this field is blank, the call does not reroute.

**Table 4-8 Call Rerouting Options**

Call Type
Station Dial 0 Routing
Priority Dial 0 Routing
DID Recall Points on Busy
DID Recall Points on No Answer
DID Routing for Calls into this Tenant
DID Illegal # Intercept for this Tenant <sup>1</sup>
DID Vacant Number Routing for this Tenant
DID Attendant Access Night Points
Non-Dial-In Trunks Alternate Recall Points
Dial-In Tie Recall Points on Busy
Dial-In Tie Recall Points on No Answer
Dial-In Tie Routing for Calls into this Tenant
Dial-In Tie Illegal # Intercept for this Tenant <sup>2</sup>
Dial-In Tie Vacant Number Routing for this Tenant
Dial-In Tie Attendant Access Night Points
DND Intercept Routing for this Tenant
Automatic Wake-up Routing for this Tenant
UCD/Attendant Recording for this Tenant <sup>3</sup>
UCD on Hold Time-out for this Tenant
DISA Day Service Routing for this Tenant
Station Vacant Number Routing for this Tenant
CO Line Routing Points on No Answer <sup>4</sup>
CSN/Autovon Precedence Recall Busy/No Answer <sup>5</sup>
Station Illegal Number Routing for this Tenant

<sup>1</sup> In Generic 1001, this is named "DID Intercept Routing for Calls into this Tenant"

<sup>2</sup> In Generic 1001, this is named "Dial-In Tie Intercept for Calls into this Tenant"

<sup>3</sup> In Generic 1001, this is named "UCD Recording Routing for this Tenant"

<sup>4</sup> This is available in Generic 1004 and Generic 1005.

<sup>5</sup> Available only with Autovon Feature Package -- refer to Practice 9109-096-630-NA, Autovon Feature Package Description.

**Softkeys**

**TENANT:** This softkey selects a Tenant Group. Pressing the TENANT softkey displays the ENTER TENANT GROUP NUM: prompt on the command line. The selection is completed by entering a valid number (1 to 25). The system displays the selected Tenant Group number on the header line.

**TENANT NAME:** Allows a name to be programmed for the selected tenant group. The name may have a maximum of 8 characters. Not available in Generic 1001.

The standard softkeys **CANCEL**, **DELETE**, **ENTER**, **TOP**, **BOTTOM**, and **QUIT** are also provided.

**Form 20 – ARS: Class of Restriction Groups**

4.26 Class of Restriction groups together users with the same outside call capabilities. A COR is assigned to each Attendant Console, station, *SUPERSET* telephone and Dial-In Trunk. This form specifies the Class-of-Restriction (COR) Group members. Refer to Figure 4-33 for the form layout. The system supports a maximum of 50 COR Groups with up to 25 CORs per group. Each COR Group specifies by COR number those extensions which are restricted from accessing the route.

12:44 PM 11-JUN-98		alarm status = MAJOR		
COR GROUP	COR GROUP MEMBERS (SEPARATE WITH SPACES)			COMMENTS
01	15 19-22			Long Distance DDD WATS band 2 access nnn
02	1-12			
03	5 7 14			
04				
05				
06				
07				
08				
09				
10				
11				
12				
03	5 7 14			nnn
1-	2-	3-	4-TOP	5-BOTTOM
6-QUIT	7-COR GROUP	8-DELETE	9-	0-

**Figure 4-33 Form 20 Layout**

**Field Descriptions**

**COR GROUP:** This field lists the COR Group numbers from 1 to 50. **Note:** The COR GROUP field cannot be modified.

**COR GROUP MEMBERS:** This field lists the separate members of each COR Group. **Note:** The COR Group members must be separated by a space (the → key, TAB key or space bar on the terminal or the → key on the console). Consecutive numbered

CORs can be separated by a dash (by pressing the “-” key on the terminal or the ninth softkey on the console).

**COMMENTS:** This field is reserved for additional data (a maximum of 20 characters). It is stored by the system but not used.

### Softkeys

**COR GROUP:** This softkey selects a Class-of-Restriction (COR) Group. Pressing the COR GROUP softkey displays the ENTER COR GROUP NUM: prompt on the command line. The selection is completed by entering a valid number (1 to 50). The selected COR Group number is displayed on the command line.

**‘-’:** This softkey is available only while a COR group is being edited. Pressing this softkey inserts a dash between a set of consecutive COR Group members. It is valid only when it is inserted between consecutive COR Group members. For example, 1 2 3 4 5 is equivalent to 1-5.

The standard softkeys **CANCEL**, **DELETE**, **ENTER**, **TOP**, **BOTTOM**, and **QUIT** are also provided.

### Form 21 – ARS: Day Zone Definition

4.27 This form defines the day zones for each day of the week. There are a maximum of three day zones. **Note:** All days of the week must have a zone specification before this form can be saved. Refer to Figure 4–34 for the form layout.

12:51 PM 11-JUN-90		alarm status = MAJOR					
DAY ZONE	MON.	TUE.	WED.	THU.	FRI.	SAT.	SUN.
01 02 03	*	*	*	*	*	*	*
01	*	*	*	*	*		<input type="checkbox"/>
1-ENABLE	2-		3-		4-		5-
6-QUIT	7-		8-		9-		0-

Figure 4–34 Form 21 Layout

#### Field Descriptions

**DAY ZONE:** This field lists the day zones for the system. Pressing the up and down arrow keys select different day zones. **Note:** This field cannot be modified.

**MON., TUE., WED., THU., FRI., SAT. and SUN. :** These fields list the zone specification. Pressing the right and left arrow keys (or the TAB key on the CRT terminal) select separate days. **Note:** Only one Day Zone number can be assigned to each day of the week. When a day is assigned to a day zone, the form displays an asterisk (\*) in that day field.

#### Softkeys

**ENABLE/DISABLE:** This softkey has two functions; it enables and disables the day zone specification for each day. Pressing the ENABLE softkey sets the selected day to the day zone that is displayed on the command line. The form displays an asterisk (\*) in the selected day field opposite the chosen day zone. When the cursor is at an asterisk, this softkey displays DISABLE. Pressing the DISABLE softkey removes that day specification from the selected day zone. The asterisk disappears and the softkey displays ENABLE again.

The standard softkeys **CANCEL**, **ENTER**, and **QUIT** are also provided.

## Form 22 – ARS: Modified Digit Table

- 4.28 This form specifies those digits that modify the user-dialed digits. The digit modification prepares the dialed digits for dialing out on certain trunks such as FX, TIE and WATS. Refer to Practice 9109-096-220-NA, Automatic Route Selection and Toll Control, for details. Refer to Figure 4-35 for the form layout.

1:18 PM 11-JUN-90		alarm status = MAJOR		
ENTRY	QTY TO DEL	DIGITS TO BE INSERTED		COMMENTS
01	1	*1416		Tie Line: Toronto
02	1	*1617		Tie Line: Boston
03	1	*1602		Tie Line: Phoenix
04				
05				
06				
07				
08				
09				
10				
11				
12				
03	1	*1602		Tie Line: Phoenix
1-	2-	3-	4-TOP	5-BOTTOM
6-QUIT	7-ENTRY NUM	8-DELETE	9-	0-

Figure 4-35 Form 22 Layout

### Field Descriptions

**ENTRY NUM:** This field lists the entry numbers. There are a maximum of 50 entry numbers for Generic 1001 and a maximum of 100 entry numbers for Generic 1002, Generic 1003, Generic 1004 and Generic 1005. The ENTRY NUM field links this form to Form 23, ARS: Route Definition. This field cannot be modified.

**QTY TO DELETE:** This field lists the quantity of digits that the system removes from the user-dialed digits before outpulsing on a trunk. A maximum of 25 digits can be deleted from each entry number. The digit "1" instructs the system to delete the first dialed digit.

**DIGITS TO BE INSERTED:** This field lists those digits that the system adds to the user-dialed digits for each entry number. A maximum of 38 digits can be inserted; including any pauses and wait for dial tone symbols. Special number sequences are:

- \*1 = Pause for 5 Seconds
- \*2 = Wait for Dial Tone
- \*3 = Switch to DTMF for Subsequent Digits
- \*4 = Do not Display Further Modified Digits on Sets or SMDR
- \*5 = Pause 10 Seconds
- \*6 = Insert caller's ID (for analog networking – not in Generic 1001 or Generic 1002)
- \*7 = Insert caller's dialed account code (for analog networking – not in Generic 1001 or Generic 1002)
- \*8 = Insert PBX node ID number (for analog networking – not in Generic 1001/Generic 1002)
- \*9 = Pause for 1 second. (Generics 1003, 1004 and 1005 only).

The asterisk (\*) character is generated on the Attendant Console and the terminal by pressing the \* key. If however, the asterisk character is required in a string of characters, the \* key must be pressed twice.

**COMMENTS:** This field is reserved for additional data (a maximum of 20 characters). It is stored by the system but not used.

**Softkeys**

**ENTRY NUM:** This softkey selects an entry number and displays it on the command line. Pressing the ENTRY NUM softkey displays the ENTER ENTRY NUM: prompt on the command line. The selection is completed by entering a valid number (1 to 100).

The standard softkeys **CANCEL, DELETE, ENTER, TOP, BOTTOM,** and **QUIT** are also provided.

**Form 23 – ARS: Route Definition**

4.29 This form defines each ARS Route by specifying the Trunk Group number, COR Group number and the Modified Digit Entry. Refer to Figure 4–36 for the form layout.

1:13 PM 11-JUN-98		alarm status = MAJOR		
ROUTE NUM	TRUNK GROUP	COR GROUP	MOD DIGIT ENTRY	COMMENTS
01	1	1	1	Local DDD
02	1	2	2	Long Distance DDD
03	2	1	3	Band 2 WATS
04				
05				
06				
07				
08				
09				
10				
11				
12				
03	2	1	3	Band 2 WATS
1-	2-	3-	4-TOP	5-BOTTOM
6-QUIT	7-ROUTE NUM	8-DELETE	9-	0-

**Figure 4–36 Form 23 Layout**

**Field Descriptions**

**ROUTE NUM:** This field lists the Route numbers. Note that the ROUTE NUM field cannot be modified. There is a maximum of 200 Route numbers.

**TRUNK GROUP:** This field displays the Trunk Group number specification (1 to 50) for each Route number.

**COR GROUP:** This field lists the COR Group number specification (1 to 50) for each Route number. This field links this form to Form 20 (refer to Form 20, ARS: COR Group Definition). Those users with CORs in the listed COR Group number are restricted from using this route. If no COR Group number is specified, then all users can use this route.

**MOD DIGIT ENTRY:** This field lists the entry number specification (1 to 50 for Generic 1001 and 1 to 100 for Generic 1002, Generic 1003, Generic 1004 and Generic 1005) for each Route number. This field links this form to Form 22 (refer to Form 22, ARS: Modified Digit Table).

**COMMENTS:** This field is reserved for additional data (a maximum of 20 characters). It is stored by the system but not used.

**Softkeys**

**ROUTE NUM:** This softkey selects a Route number and displays it on the command line. Pressing the ROUTE NUM softkey displays the ENTER ROUTE NUM: prompt on the command line. The selection is completed by entering a valid number (1 to 200).

The standard softkeys **CANCEL**, **DELETE**, **ENTER**, **TOP**, **BOTTOM**, and **QUIT** are also provided.

**Form 24 – ARS: Route Lists**

4.30 This form specifies the order that the Route numbers are selected. There are 100 Route List numbers; each Route List number accommodates a maximum of six Route numbers. Refer to Figure 4-37 for the form layout.

12:54 PM 11-JUN-90				alarm status = MAJOR							
LIST NUM	FIRST	SECOND	WT	THIRD	WT	FOURTH	WT	FIFTH	WT	SIXTH	WT
01	3	2	ON								
02	2	3									
03											
04											
05											
06											
07											
08											
09											
10											
11											
12											
02	<input type="checkbox"/> 2	3									
1-		2-		3-		4-TOP		5-BOTTOM			
6-QUIT		7-LIST NUM		8-DELETE		9-		0-			

**Figure 4-37 Form 24 Layout**

### Field Descriptions

**LIST NUM:** This field displays the Route List numbers. Note that the LIST NUM field cannot be modified. There is a maximum of 100 list numbers.

**FIRST, SECOND, THIRD, FOURTH, FIFTH and SIXTH :** These fields specify the Route numbers for each Route List number. Valid entries are 01 to 200. These fields link this form to Form 23 (ARS: Route Definition).

**WT:** There are five of these; one for each of the SECOND, THIRD, FOURTH, FIFTH and SIXTH fields. ON in this field indicates that the chosen Route number is an expensive route. The system indicates this by providing an audible warning tone when that route is selected.

### Softkeys

**LIST NUM:** This softkey selects a Route List number and displays it on the command line. Pressing the LIST NUM softkey displays the ENTER ROUTE LIST NUM: prompt on the command line. The selection is completed by entering a valid Route List number (01 to 100).

**DELETE/ADD:** This softkey appears when the pointer is pointing to data (i.e., data on the command line). This softkey has two functions; it deletes and adds data to the form. Pressing the DELETE softkey removes the data from the selected field. The deletion is completed by pressing the ENTER softkey. If the delete key is pressed while the cursor is in the [FIRST] field, data on that line is deleted. The field is ready for new data and the softkey blanks. When the cursor is at a blank WT field on the command line, this softkey displays ADD. Pressing the ADD softkey enables the warning tone. The WT field displays ON and the softkey now displays DELETE.

The standard softkeys **CANCEL, ENTER, TOP, BOTTOM,** and **QUIT** are also provided.

**Form 25 – ARS: Route Plans**

4.31 This form assigns the Route Lists to the time and day zones. There are 18 time zones (six for each day zone). Each time zone has a start time that can be set by the installer. The last specified start time creates a time period from its start time to the first specified start time of that day zone. If a time zone has no assigned Route List number, then all calls during that time period are restricted from this Route Plan. There are a maximum of 50 Route Plans. Refer to Figure 4-38 for the form layout.

12:48 PM 11-JUN-98				alarm status = MAJOR			
TIME ZONE	DAY ZONE 1		DAY ZONE 2		DAY ZONE 3		
	START HOUR	ROUTE LIST	START HOUR	ROUTE LIST	START HOUR	ROUTE LIST	
01	12	003	14	005	18	010	
02							
03							
04							
05							
06							
01	<input type="checkbox"/>	12	003	14	005	18	010
6-QUIT		7-ROUTE PLAN		8-DELETE		9-	

**Figure 4-38 Form 25 Layout**

**Field Descriptions**

**TIME ZONE:** This field lists the six time zones for each day zone. The TIME ZONE field cannot be modified.

**START HOUR:** There are three of these fields (one for each day zone). The START HOUR field specifies the starting time of each time zone. The time is represented by two digits in 24 hour format. For example, 18 represents 18:00.

**ROUTE LIST:** There are three of these fields (one for each day zone). The ROUTE LIST field displays the Route List numbers and links this form to Form 24 (ARS: Route Lists). Valid entries are 01 to 100.

**Softkeys**

**ROUTE PLAN:** This softkey has two functions. It displays the selected Route Plan number and enables the user to select an alternate Route Plan. Pressing the ROUTE PLAN softkey displays the following on the command line: CURRENT ROUTE PLAN: XX ENTER ROUTE PLAN NUM: ROUTE PLAN: where XX is Route Plan number 01 to 50. The Route Plan selection is completed by entering a new Route Plan number.

The standard softkeys **CANCEL**, **DELETE**, **ENTER**, and **QUIT** are also provided.

**Form 26 – ARS: Digit Strings**

4.32 This form (and its nested form) link the digits dialed by the user to the appropriate Route, Route List or Route Plan. It selects the relevant Route (if there is only one route), or Route List (if there is more than one route and the time of day is not important), or Route Plan (if the choice of routes vary with the time of day) by the user-dialed digits. Refer to Figure 4-39 for the form layout. Refer to Practice 9109-096-220-NA, Automatic Route Selection and Toll Control, for details.

4:23 PM 14-NOV-91		alarm status = MAJOR		
LEADING DIGITS		RETURN DIAL TONE		RESTRICTED COR GROUP
9 8		YES NO		Unrestricted Unrestricted
8		YES		Unrestricted
1-	2-	3-INSERT	4-	5-
6-QUIT	7-LEADING DIG	8-DELETE	9-SHOW STRINGS	0-

**Figure 4-39 Form 26 Layout**

**Field Descriptions**

**LEADING DIGITS:** This field displays the first digits of each digit string for digit analysis. The maximum number of digits in this field is five.

**RETURN DIAL TONE:** If this field displays YES, the system provides a dial tone after the leading digits have been dialed. Alternately, the system does not provide a temporary dial tone when NO is displayed in this field. Refer to Practice 9109-095-220-NA, Automatic Route Selection and Toll Control, for details.

**RESTRICTED COR GROUP:** This field lists the COR Group which cannot dial the specified leading digit(s). If this field is left blank, then every COR Group can access the specified leading digit(s).

**Softkeys**

**YES/NO:** This softkey has two functions; it enables or disables system dial tone for each entry. Pressing the YES softkey enables the system dial tone when that leading digit is accessed. The RETURN DIAL TONE field displays YES and the softkey now displays NO. Pressing the NO softkey disables the system dial tone when that leading digit is accessed. The RETURN DIAL TONE field displays NO and the softkey displays

YES again. Note that this softkey only appears when the cursor is in the "RETURN DIAL TONE" field.

**INSERT:** This softkey adds new entries to the form. Pressing the INSERT softkey clears the command line and moves the cursor to the LEADING DIGITS field. The addition is completed by entering the new data for each field and pressing the ENTER softkey. Note that the system inserts the addition after the line that was displayed on the command line.

**LEADING DIG:** This softkey selects an entry in the LEADING DIGITS field. Pressing the LEADING DIG softkey displays the ENTER LEADING DIGITS: prompt on the command line. The selection is completed by entering a valid number.

**SHOW STRINGS:** Pressing this softkey accesses the nested form for any defined Leading Digits entry. Refer to the ARS: Nested Digit Strings subform.

The standard softkeys **CANCEL**, **DELETE**, **ENTER**, **\*\*MORE\*\*** and **QUIT** are also provided.

### Digit Strings Subform For Form 26

- 4.33 This form is reserved for specifying subsequent digits for each entry in the LEADING DIGITS field of the previous form. It can only be accessed from the previous form. Refer to Figure 4-40 for the form layout. Refer to Practice 9109-096-220-NA, Automatic Route Selection and Toll Control, for details.

DIGITS TO BE ANALYZED		QTY TO FOLLOW	LONG DISTANCE	TERM TYPE AND NUM	
416		7	NO	ROUTE	1
604		7	YES	LIST	1
N0X		7	NO	PLAN	2
N1X		7	NO	ROUTE	3
N0X		7	NO	PLAN	2
1-10XXX0N0X	2-10XXX0N1X	3-INSERT	4-10XXX1N0X	5- ** MORE **	
6-QUIT	7-FIND STRING	8-DELETE	9-10XXX1N1X	0-	

Figure 4-40 Digit Strings Subform Layout

### Field Descriptions

**DIGITS TO BE ANALYZED:** This field displays those digits for digit analysis. Digit analysis is required so that the appropriate Route, Route List or Route Plan can be selected. The total number of digits in this field, the number of digits in the QTY TO FOLLOW field plus the digits in the LEADING DIGITS field in the previous form (refer to the top level Digit Strings form) cannot exceed 26.

**QTY TO FOLLOW:** This field lists the number of digits that the user dials AFTER the analyzed digits. The Unknown prompt in this field indicates that the number of subsequent digits is unknown to the system.

**LONG DISTANCE:** This field specifies which digit string entries require "long distance" management. Several features (account codes, Hotel/Motel, etc.) use this to control access to ARS. Default condition is NO.

**TERM TYPE AND NUM:** This field specifies where the digit string terminates. If there is only one route, then ROUTE is selected. If there is more than one route, but the time of day is not important, then LIST is selected. If the choice of routes vary with the time of day, then PLAN is selected.

### Softkeys

**YES/NO:** This softkey only appears when the cursor is at the LONG DISTANCE field. Pressing the YES softkey indicates to the system that this entry requires "long distance" management. The default condition is no "long distance" management required as indicated by NO in the LONG DISTANCE field.

**UNKNOWN:** This softkey appears only when the cursor is at the QTY TO FOLLOW field. Pressing the UNKNOWN softkey indicates to the system that the quantity of dialed digits AFTER the analyzed digits is unknown.

**INSERT:** This softkey adds new entries to the form. Pressing the INSERT softkey clears the command line and moves the cursor to the DIGITS TO BE ANALYZED field. The addition is completed by entering the new data for each field and pressing the ENTER softkey. Note that the system inserts the addition one line after the line that was displayed on the command line. The system automatically places all inserted or added strings in numerical ascending order with relation to existing strings.

**NOX:** This softkey functions as a wild card sequence, where N is any digit from 2 to 9. It represents half of the area codes in North America. Pressing this softkey displays NOX in the DIGITS TO BE ANALYZED field. Note that this softkey can only be pressed at the beginning of a digit string.

**ROUTE:** This softkey only appears when the cursor is at the TERM TYPE AND NUM field. Pressing the ROUTE softkey terminates that entry at a Route (the Route number must still be defined). ROUTE appears in the TERM TYPE AND NUM field.

**X:** This softkey functions as a wild card digit; it represents any digit from 0 to 9. Pressing this softkey displays X in the DIGITS TO BE ANALYZED field. Note that this softkey can only be pressed at the end of a digit string.

**PLAN:** This softkey only appears when the cursor is at the TERM TYPE AND NUM field. Pressing the PLAN softkey terminates that entry at a Route Plan (the number must still be defined). PLAN appears in the TERM TYPE AND NUM field.

**FIND STRING:** This softkey selects an entry in the DIGITS TO BE ANALYZED field. Pressing the FIND STRING softkey displays the ENTER DIGIT STRING: prompt on the command line. The selection is completed by entering a valid digit string. Note: The entered digit string does not have to be an exact match; the system accepts subsets of digit strings and moves the cursor to the closest entry.

**N1X:** This softkey functions as a wild card sequence, where N is any digit from 2 to 9. It represents half of the area codes in North America. Pressing this softkey displays N1X in the DIGITS TO BE ANALYZED field. Note that this softkey can only be pressed at the beginning of a digit string.

**LIST:** This softkey appears only when the cursor is at the TERM TYPE AND NUM field. Pressing the LIST softkey terminates that entry at a Route List (the number must still be defined). LIST appears in the TERM TYPE AND NUM field.

**1N1X, 1N0X, 0N1X, 0N0X:** For area codes not specifically identified, and where dialing is preceded by a 1 or 0 (long distance access code), these wildcard sequences followed by 7 digits would cover all unspecified area codes. This allows wild card restriction of 555 and 976 numbers. These softkeys can only be pressed at the beginning of a digit string and are available in Generic 1004 and Generic 1005. They are accessed by pressing the \*\* MORE \*\* softkey once.

**10XXX0N0X, 10XXX0N1X, 10XXX1N0X, 10XXX1N1X, 10XXX0, 10XXX1:** These wildcard sequences, designed for the call aggregator market (i.e. hotels, motels, hospitals, universities), prevent unauthorized calls from being billed to the originating line, while allowing consumers access to the long distance carriers of their choice. These softkeys can only be pressed at the beginning of a digit string and are available in Generic 1004 and Generic 1005. 10XXX0N0X, 10XXX0N1X, 10XXX0N1X and 10XXX1N0X are accessed by pressing the \*\* MORE \*\* softkey twice; 10XXX0 and 10XXX1 are accessed by pressing the \*\* MORE \*\* softkey three times.

The standard softkeys **CANCEL**, **DELETE**, **ENTER**, and **QUIT** are also provided.

## Form 27 – ARS: Maximum Dialed Digits

- 4.34 This form specifies the maximum number of dialed digits allowed for each Class of Restriction. The purpose of this form is to accommodate countries with open numbering plans, where it is generally not possible to determine from the leading digits the number of digits to follow. **Note:** For North America, the specified default value of Unlimited applies. Refer to Practice 9109-096-220-NA, Automatic Route Selection and Toll Control, for detailed information and additional CDE considerations if a value other than Unlimited is chosen. See Figure 4-41 for the form layout. **Note:** This form is not available in Generic 1001.

COR		MAXIMUM NUMBER OF DIALED DIGITS		
1		Unlimited		
2		Unlimited		
3		Unlimited		
4		Unlimited		
5		Unlimited		
6		Unlimited		
7		Unlimited		
8		Unlimited		
9		Unlimited		
10		Unlimited		
11		Unlimited		
12		Unlimited		
1		<input type="checkbox"/>	Unlimited	
1-	2-	3-	4-TOP	5-BOTTOM
6-QUIT	7-	8-COR	9-	0-

Figure 4-41 Form 27 Layout

### Field Descriptions

**COR:** This field lists the COR (1 => 25). **Note:** The COR field cannot be modified.

**Maximum Number of Dialed Digits:** This field lists the allowed number of dialed digits, 1 to 25, plus the default value of Unlimited. **Note:** 26 is equivalent to UNLIMITED, therefore, when 26 is entered the value UNLIMITED is displayed.

### Softkeys

**UNLIMITED:** Pressing the UNLIMITED softkey enters the default value of unlimited in the Maximum Number of Dialed Digits field. If the cursor is positioned at the default value, "Unlimited" is not displayed.

**COR:** When this softkey is pressed the user is prompted with ENTER COR NUMBER. After entering the COR number and pressing the ENTER softkey, the cursor is positioned to the COR specified. If the COR selected is out of range, the message "The value xx is outside valid range for COR (1 => 25)" is displayed.

The standard softkeys **CANCEL**, **ENTER**, **TOP**, **BOTTOM**, and **QUIT** are also provided.

## Form 28 – Form Access Restriction Def'n

- 4.35 This form specifies the level of access for the various CDE forms. There are five levels of access; the Installer level has the highest degree of access and the Attendant has the lowest. Each form is defined as Read Only, Read/Write or No Access. When the system is first initialized, the Installer and MAINT1 level have a Read/Write access for each form; the rest of the levels default to No Access. Note that at each level of access the user can only modify those forms plus the forms at the lower levels of access. For example, the user at the SUPERVISOR level can only modify those forms at SUPERVISOR and ATTENDANT levels. Refer to Figure 4-42 for the form layout. **Note:** In Generic 1001, this is Form 27.

1:24 PM 11-JUN-98		alarm status = MAJOR				
FORM NAME	INST	MAINT1	MAINT2	SUPER	ATT	
01 = SYSTEM CONFIGURATION	R/W	R/W	none	none	none	
02 = FEATURE ACCESS CODES	R/W	R/W	none	none	none	
03 = COS DEFINE	R/W	R/W	none	none	none	
04 = SYS OPTIONS/SYS TIMERS	R/W	R/W	none	none	none	
05 = TENANT INTERCONNECTION	R/W	R/W	none	none	none	
06 = TENANT NIGHT SWITCHING	R/W	R/W	none	none	none	
07 = CONSOLE ASSIGNMENTS	R/W	R/W	none	none	none	
08 = ATTENDANT LDN ASGN	R/W	R/W	R/W	R/W	R	
09 = STATIONS/SUPERSET TELEPHON	R/W	R/W	none	none	none	
10 = PICKUP GROUPS	R/W	R/W	R/W	R/W	R/W	
11 = DATA CIRCUIT DESCRIPTOR	R/W	R/W	none	none	none	
12 = DATA ASSIGNMENT	R/W	R/W	none	none	none	
05 = TENANT INTERCONNECTION	R/W	R/W	none	none	<input type="checkbox"/> none	
1-READ ONLY	2-READ/WRITE	3-	4-TOP	5-BOTTOM		
6-QUIT	7-SET PASSWORD	8-ALL FORMS	9-FORM NUM	0-		

Figure 4-42 Form 28 Layout

### Field Descriptions

**FORM NAME:** This field lists all the form numbers and names of the CDE package. The FORM NAME field cannot be modified.

**INST, MAINT1, MAINT2, SUPER and ATT:** These fields represent the five levels of access and list the access type (Read Only, Read/Write or No Access) for each form.

**Note:** The selected level of access is not displayed on the softkeys. The INST field cannot be modified.

### Softkeys

**READ ONLY:** Pressing the READ ONLY softkey restricts the user to viewing the selected form; no modifications can occur. The R prompt appears beside the selected form and under the selected access level.

**READ/WRITE:** Pressing the READ/WRITE softkey enables the user to view and modify the selected form. The form displays the R/W prompt to indicate this state.

**NO ACCESS:** Pressing the NO ACCESS softkey restricts form access. The form displays the none prompt to indicate this state.

**SET PASSWORD:** This softkey changes the password for Customer Data Entry. Pressing the SET PASSWORD softkey shows a new softkey display (ATTENDANT, SUPERVISOR, MAINT2, MAINT1, and INSTALLER) and the following prompt: SELECT LEVEL OF ACCESS:. The user cannot change the password for a level of access higher than the current one. For example, a user logged on as MAINT2 cannot change the password for MAINT1. After the user selects a level of access, the system prompts ENTER XXXXXXXX NEW PASSWORD:. When the new password is entered, the system prompts ENTER XXXXXXXX NEW PASSWORD TO VERIFY:. When changing the current level's password, the system first prompts ENTER XXXXXXXX OLD PASSWORD:, where XXXXXXXX is the selected level of access.

**ALL FORMS:** This softkey allows a user to change the level of access to all forms for a lower level user. For example, INSTALLER may use this to change the access for MAINT1, and MAINT2 may use this to change the access for SUPERVISOR. Not available in Generic 1001.

**FORM NUM:** This softkey selects a form by number. Pressing the FORM NUM softkey displays the ENTER FORM NUMBER: prompt on the command line. The selection is completed by entering a valid form number (1 to 35).

The standard softkeys **CANCEL**, **ENTER**, **TOP**, **BOTTOM**, and **QUIT** are also provided.

## Form 29 – DTE Profile

- 4.36 In order for the Data transceiver (DTRX) to communicate with the attached data terminal equipment (DTE), it is necessary to specify the programmable options which define the characteristics of the terminal. The Data transceiver circuit provides data devices with the ability to dial a destination via a keyboard. The DTE profile form provides 25 programmable profiles. **Note:** This form is not available in Generic 1001, Generic 1005 FPKG1 or Generic 1005 LIT96.

1:39 PM 11-JUN-90		alarm status = MAJOR		
PROFILE NUMBER	NUMBER OF DATA SETS ASSIGNED		COMMENTS	
01	3		Terminal Gp 1	
02	0			
03	0			
04	0			
05	0			
06	0			
07	0			
08	0			
09	0			
10	0			
11	0			
12	0			
02	0			
1-	2-	3-	4-TOP	5-BOTTOM
6-QUIT	7-PROFILE NUM	8-SEL. OPTION	9-	0-

Figure 4-43 Form 29 Layout

## Field Descriptions

**PROFILE NUMBER:** This field lists all the profile numbers 01 to 25. The PROFILE NUMBER field cannot be modified.

**NUMBER OF DATA SETS ASSIGNED:** This field lists the number of data sets assigned to each profile number.

**COMMENTS:** This field is reserved for additional data (a maximum of 20 characters). It is stored by the system but not used.

## Softkeys

**PROFILE NUM:** The PROFILE NUM softkey allows a user to select a device by number. Pressing this softkey displays the ENTER PROFILE NUM: prompt. When the number has been entered, the command line updates and the line pointer moves to profile number. The selection is completed by pressing the ENTER softkey.

**SEL. OPTION:** A new form is displayed when the SEL. OPTION softkey is pressed. Refer to the Options Subform for Form 29.

**REVIEW:** A new form is displayed when the REVIEW softkey is pressed. Refer to the Review Subform for Form 29. This softkey appears when the number of DATASETs is greater than 0.

The standard softkeys **CANCEL**, **ENTER**, **TOP**, **BOTTOM**, and **QUIT** are also provided.

### Options Subform For Form 29

4.37 The system displays this form when the programmer presses the SEL. OPTION softkey in Form 29, Data Terminal Equipment Profile. The options displayed are for the Profile Number that was on the command line of Form 29. **Note:** This form is not available in Generic 1001, Generic 1005 FPKG1 or Generic 1005 LIT96.

1:39 PM 11-JUN-90		alarm status = MAJOR		
[ PROFILE NUMBER : 1 ]		DTE OPTIONS		VALUE
Terminal type		VIDEO TERM		
Language		ENGLISH		
DTRX Echoplex		DISABLED		
Editing		DISABLED		
Editing character delete (0 - 127, Decimal value of ASCII code)		0		
Editing line display (0 - 127, Decimal value of ASCII code)		0		
Inject <LF> after <CR>		ALWAYS		
Number of pads after <CR> (0 - 7)		0		
Number of pads after <LF> (0 - 7)		0		
DTRX Inactivity Timer 1 - 60 seconds		10		
Terminal type		<input type="checkbox"/> VIDEO TERM		
1-TELEPRINTER	2-	3-	4-TOP	5-BOTTOM
6-QUIT	7-	8-	9-	0-

**Figure 4-44 Options Subform Layout**

#### Field Descriptions

The header displays the Profile Number.

**VALUE:** The VALUE field displays the current setting for each option.

#### Softkeys

Some of the softkeys displayed are the alternative settings for the option displayed on the command line. Refer to *Parameters*, below. The following softkeys are continuously present: **TOP**, **BOTTOM**, and **QUIT**.

#### Parameters

**Terminal Type:** This parameter is used to determine how the delete character is defined on a video or teleprinter terminal. A teleprinter terminal displays a "/" when the

delete character is used and the video terminal transmits a <backspace>, <space>, <backspace>.

**Language:** Commands and responses for the DTRX can be English or French.

**DTRX Echoplex:** This parameter determines whether the DTRX (Data Transceiver), will echo back transmitted characters to the originating station. The exception is programmed keys in the DTE and data circuit descriptor forms.

**Editing:** Enabled, this option provides the user with editing function DTRX delete character, and DTRX display line.

**Editing Character Delete:** An ASCII code in decimal form is used to define a character as a delete key. If echoplex and DTRX editing options are enabled, a "/" appears as the delete character on a teleprinter and a <backspace>, <space>, <backspace>, is transmitted back to a video terminal.

**Editing Line Display:** An ASCII code in decimal form is used to define a character as a display line key. When DTRX editing is enabled and the ASCII code for Display Line is transmitted, the current DTRX command line and the input digits are displayed on a new line.

**Inject <LF> After <CR>:** This field is used to accommodate terminal variations in the handling of carriage returns (<CR>). Some terminals automatically insert line feed (<LF>) after carriage return. While connected to the Data Transceiver the following options are available:

**NEVER:** No linefeed insertions after <CR> detected.

**FROM DTE:** Insert <LF> after <CR> from DTE if the echoplex feature is enabled. The <CR> and <LF> is returned to the Data Terminal Equipment by the Data Transceiver after a <CR> was received from the DTE. All messages originated by the DTRX (Data Transceiver) would only have a <CR>. The DTE would typically provide this.

**FROM SYSTEM (DTRX):** Insert <LF> after <CR> from DTRX. All messages originated by the DPABX that have a <CR> will have a <LF> injected. This does not include <CR> which are echoed back to the DTE. This option would be used if the DTE provided local echoing of characters transmitted.

**ALWAYS:** The <LF> will be injected if the <CR> is originated from the DTE or DTRX.

**Number of Pads after <CR>:** This field is used for terminals that require delays after a carriage return before receiving printable characters (printers with small or no buffers). Values entered range from 0 to 7. This option is valid only if echoplex is enabled.

**Number of Pads after <LF>:** This field is used for terminals that require delays after a line feed return before receiving printable characters (printers with small or no buffers). Values entered range from 0 to 7. This option is valid only if echoplex is enabled.

**DTRX Inactivity Timer:** This field specifies the length of time between the last character received or transmitted from a data device and the DTRX being dropped. Values range between 1 to 60 seconds; default is 10 seconds.

**Review List SUBFORM for Form 29**

4.38 This form appears when the REVIEW softkey is pressed in Form 29, DTE Profile. The form provides a list of users of a particular profile identified by their physical location. **Note:** This form is not available in Generic 1001, Generic 1005 FPKG1 or Generic 1005 LIT96.

1:48 PM 11-JUN-98			alarm status = MAJOR				
[ PROFILE NUMBER : 1 ]			BAY	SLT	CCT	SCT	COMMENTS
			1	8	1	2	1s term
			1	8	2	2	1s term
			1	8	5	2	hs term
			1	8	1	2	1s term
1-	2-	3-	4-		5-		
6-QUIT	7-PROFILE NUM	8-	9-		0-		

**Figure 4-45 Review List Subform Layout**

**Field Descriptions**

The header line displays the Profile number.

**BAY, SLT, CCT, SCT:** These fields list the bay, slot, circuit and subcircuit of the device programmed. These fields cannot be modified.

**COMMENTS:** This field displays the comments for each device from the Data Assignment form. It cannot be modified.

**Softkeys**

**PROFILE NUM:** When this softkey is pressed the command line displays "ENTER PROFILE NUM:". After entering a valid number and pressing the ENTER softkey, the screen will display the list of users of that DTE Profile, if any.

The standard softkeys **CANCEL, ENTER** and **QUIT** are also provided.

**Form 30 – Device Interconnection Table**

4.39 This form specifies which devices may be connected together. See Figure 4–46 for the form layout. The system allows for a maximum of 25 devices. **Note:** In Generic 1001, this is Form 29.

1:41 PM 11-JUN-90										alarm status = MAJOR																
	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	
>	01	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	02	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	03	*	*	.	.	.	.	.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	04	*	*	.	.	.	.	.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	05	*	*	.	.	.	.	.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	06	*	*	.	.	.	.	.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	07	*	*	.	.	.	.	.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	08	*	*	.	.	.	.	.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	09	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	10	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	11	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	12	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	01	<input checked="" type="checkbox"/>	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	1-	2-			3-			4-TOP			5-BOTTOM															
	6-QUIT	7-INTERCON NUM			8-DISALLOW			9-REVIEW			0-															

**Figure 4–46 Form 30 Layout**

**Field Descriptions**

Initially, the system interconnects all devices except trunks. The asterisk (\*) character indicates the device the row represents is allowed to connect to the device the column represents. When the system inhibits device interconnection, it is indicated by the period (.) character. The device numbers are listed in the header line and the first column. The devices these numbers represent are listed in the nested REVIEW form.

**Softkeys**

**INTERCON NUM:** The INTERCON NUM softkey allows a user to select a device by number. Pressing this softkey displays the ENTER INTERCONNECT NUM: prompt. Entering the interconnect number (1 to 25) displays that device with a series of "\*" characters (allow interconnection) and "." characters (disallow interconnection). Cursor movement on the command line is controlled by the right and left cursor control keys.

**DISALLOW/ALLOW:** This softkey has two functions; it enables and disables interconnection between devices. Pressing the DISALLOW softkey disables the interconnection between those two devices unidirectionally. For example, when modifying connections for device 5 (the command line displays line 5) and the DISALLOW softkey is pressed when the cursor is under the sixth column, then device 5 cannot communicate with device 6. However, device 6 can still communicate with device 5. Total interconnection is inhibited only when a "." (disallow) character is inserted at row 6 (device 6) under the fifth column (device 5). The softkey now displays the

ALLOW prompt. Pressing the ALLOW softkey enables the unidirectional interconnection between the selected devices; the '\*' character replaces the '.' character.

**REVIEW:** Pressing the REVIEW softkey displays a new form (refer to Review List Subform for Form 30). This form lists all the device types.

The standard softkeys **CANCEL**, **ENTER**, **TOP**, **BOTTOM**, and **QUIT** are also provided.

### Review List Subform for Form 30

4.40 This form appears when the REVIEW softkey is pressed in Device Interconnection Table Form. When entered from Form 30, this form displays a list of the device types. Refer to Figure 4-47 for the form layout. Note that the data in this form cannot be modified.

1:42 PM 11-JUN-90		alarm status = MAJOR		
ENTRY NUM	DEVICE TYPE DESCRIPTION		INTERCONNECT NUM	
01	Station/Set		1	
02	Console		2	
03	Loop Start Trunk		3	
04	Ground Start Trunk		4	
05	DID/Tie Trunk		5	
06	E&M Trunk ( 2-Wire or 4-Wire )		6	
07	RESERVED		7	
08	RESERVED		8	
09	RESERVED		9	
10	RESERVED		10	
11	RESERVED		11	
12	RESERVED		12	
<input type="checkbox"/> 01	Station/Set		1	
1-	2-ENTRY NUM	3-	4-TOP	5-BOTTOM
6-QUIT	7-INTERCON NUM	8-	9-	0-

**Figure 4-47 Review List Subform Layout**

#### Field Descriptions

**ENTRY NUM:** This field lists the entry numbers for the device types. There is a total of 25 entry numbers. The ENTRY NUM field cannot be modified.

**DEVICE TYPE DESCRIPTION:** This field lists the titles assigned to the entry numbers. The DEVICE TYPE DESCRIPTION field cannot be modified. The last 13 entries are reserved for future use.

**INTERCONNECT NUM:** This field lists all the interconnect numbers; it links this form to the previous form (refer to Form 30, Device Interconnection Table). The interconnect numbers range from 1 to 25. The INTERCONNECT NUM field cannot be modified.

### Softkeys

**ENTRY NUM:** This softkey selects an entry number. Pressing the ENTRY NUM softkey displays the ENTER ENTRY NUM: on the command line. The selection is completed by entering a valid entry number (1 to 25).

**INTERCON NUM:** This softkey selects a device type by its interconnect number. Pressing the INTERCON NUM softkey displays ENTER INTERCONNECT NUM: on the command line. The selection is completed by entering a valid interconnect number (1 to 25).

The standard softkeys **CANCEL**, **ENTER**, **TOP**, **BOTTOM**, and **QUIT** are also provided.

### Form 31 – System Abbreviated Dial Entry

- 4.41 This form specifies System Abbreviated Dial numbers. Refer to Practice 9109-096-105-NA, Feature Descriptions (under Abbreviated Dial), for details. See Figure 4-48 for the form layout. **Note:** In Generic 1001, this is Form 30.

1:46 PM 11-JUN-90		alarm status = MAJOR		
INDEX NUMBER	DIGIT STRING	PRIVATE		
22	5551209	PRIVATE		
77	5558812			
123	12285550090			
888	5551000	PRIVATE		
888	5551000	PRIVATE		
1-	2-FIND INDEX	3-	4-TOP	5-BOTTOM
6-QUIT	7-	8-DELETE	9-NON-PRIVATE	0-

**Figure 4-48 Form 31 Layout**

### Field Descriptions

**INDEX NUMBER:** This field lists the index numbers; one for each entry in the form. The System Abbreviated Dial Access Code followed by the Index number forms the Abbreviated Dial number. Each Index number can be a maximum of three digits.

**DIGIT STRING:** This field lists the digit strings; one for each Index number. The digit string can be a maximum of 26 digits for a non-private number, 25 digits for a private number. The following special characters may be entered:

- \*1 = Pause for 5 seconds (for ONS Voice Mail feature; Generic 1004/Generic 1005)
- \*3 = Wait for user to manually insert digits (2 digits expected)
- \*5 = Call to Call Announce Port. This code must be at the end of the number; it cannot have digits following it.
- \*6 = Insert caller's ID (for ONS Voice Mail feature; Generic 1004/Generic 1005)
- \*9 = Pause for 1 second (for ONS Voice Mail feature; Generic 1004/Generic 1005)
- \*\* = DTMF digit \* (Generic 1004/Generic 1005)
- # = DTMF digit #

**PRIVATE:** This field specifies which entries are Private (as indicated with the PRIVATE prompt) and which are non-Private (as indicated by a blank).

### Softkeys

**FIND INDEX:** This softkey selects an Index Number. Pressing the FIND INDEX softkey displays ENTER INDEX NUM: on the command line. The selection is completed by entering a valid Index Number (a maximum of three digits).

**INSERT:** This softkey adds new digit strings to this form. Pressing the INSERT softkey clears the command line and moves the cursor to the INDEX NUMBER field. The addition is completed by entering a valid index number and digit string. The system inserts the addition in numerical ascending order according to the INDEX NUMBER field. Note that if there is no data in this form or the line pointer is pointing to the last line of data, then this softkey does not appear.

**PRIVATE/NON-PRIVATE:** This softkey has two functions. Pressing the PRIVATE softkey sets the selected digit string entry to Private; the PRIVATE prompt appears in the PRIVATE field and the softkey now displays the NON-PRIVATE prompt. Pressing the NON-PRIVATE softkey sets the selected digit string to non-private; the PRIVATE field blanks and the softkey displays the PRIVATE prompt once again.

The standard softkeys **CANCEL**, **ENTER**, **DELETE**, **TOP**, **BOTTOM**, and **QUIT** are also provided.

## Form 32 – Customer Data Print

- 4.42 This form lists all the Customer Data options that can be sent to an output device, such as a printer or a terminal. The options are selected by Print Option Number. Note that this form cannot be modified. Refer to Table 3–1 for a complete list of the form numbers and to Figure 4–49 for the form layout. Print Options with “\*” are subforms of the preceding form. **Note:** In Generic 1001, this is Form 31.

1:48 PM 11-JUN-90		alarm status = MAJOR		
PRINT OPTION		CDE DATA PRINT		
01	System Configuration			
02	Feature Access Codes			
03	COS Definition			
04	System Options/System Timers			
05	Tenant Interconnection Table			
06	Tenant Night Switching			
07	Console Assignments			
08	Attendant LDN Assignments			
09	Station/SUPERSET Telephones			
09*	Line/SUPERSET Telephone Appearances			
10	Pickup Groups			
11	Data Circuit Descriptors			
<input type="checkbox"/>	01	System Configuration		
1-	2-PRINT ALL	3-	4-TOP	5-BOTTOM
6-QUIT	7-PRINT OPTION	8-	9-PRINT	0-

Figure 4–49 Form 32 Layout

### Field Descriptions

**PRINT OPTION:** This field lists the print option numbers for the CDE options that can be sent to an output device (a terminal or a printer). There is a maximum of 50 print option numbers. The PRINT OPTION field cannot be modified.

**CDE DATA PRINT:** This field lists the form names associated with the print option numbers. The CDE DATA PRINT field cannot be modified.

### Softkeys

**PRINT ALL:** This softkey transmits the contents of all the CDE Data Print option ranges to an output device (printer or terminal). Pressing the PRINT ALL softkey blanks the softkey display (with the exception of the QUIT softkey). This softkey is not available in Generic 1001.

Further CDE is prohibited while PRINT ALL is in effect. The command line sequentially prompts the user to enter the desired ranges for options. The softkey ENTER must be pressed after each entry. The following lists the Data Print options:

1. PRINT FROM COS START: TO COS END
2. PRINT FROM TRK CCT DESC START: TO TRK CCT DESC END
3. PRINT FROM DATA CCT DESC START: TO DATA CCT DESC END

4. PRINT FROM DTE PROFILE START: TO DTE PROFILE NUM. END
5. PRINT FROM T1 LINK DESC. START: TO T1 LINK DESC. END.

When printing starts, the command line displays: CDE DATA PRINT IN PROGRESS and the only softkey available is ABORT.

**Note:** The system does not generate an error message if the specified printer is not operational.

**ABORT:** This softkey appears whenever a print is in progress. Pressing this softkey cancels the current active printout.

**PRINT OPTION:** This softkey selects a print option number. Pressing the PRINT OPTION softkey displays ENTER PRINT OPTION: on the command line. The selection is completed by entering a valid print option number. The command line displays the selected option.

**PRINT:** This softkey transmits the contents of the selected print option to an output device (printer or terminal). Pressing the PRINT softkey blanks the softkey display (except for the ABORT softkey) for the duration of the print operation. When completed, the system displays CDE DATA PRINT OPTION XX HAS COMPLETED PRINTING where XX is the Print Option number. The softkey display returns to the original format.

The standard softkeys **CANCEL**, **ENTER**, **DELETE**, **TOP**, **BOTTOM**, and **QUIT** are also provided.

### Form 33 – Account Code Entry

- 4.43 This form specifies the Account Codes in the database. If the Account Codes are verified, they are stored in the Account Code database. Refer to Figure 4-50 for the form layout. Refer also to Practice 9109-096-221-NA, Station Message Detail Recording (SMDR). This form can only be accessed if System Option 05, Verified Account Codes is enabled. **Note:** In Generic 1001, this is Form 32.

1:52 PM 11-JUN-90		alarm status = MAJOR		
ACCOUNT CODE	COS	COR	ACTIVE	
100001	1	1	ACTIVE	
100002	1	1	ACTIVE	
100003	2	3	ACTIVE	
100004	2	1	INACTIVE	
100005	1	1	ACTIVE	
123456	1	2	ACTIVE	
□				
1-	2-	3-	4-TOP	5-BOTTOM
6-QUIT	7-DELETE RANGE	8-	9-FIND	0-

Figure 4-50 Form 33 Layout

#### Field Descriptions

**ACCOUNT CODE:** This field lists the stored Account Codes entries. The length of the Account Code is specified in Form 04, System Options/System Timers (System Option 55, Account Code Length). Depending on the status of System Option 55, Account Codes can be variable from 1 to 12 digits or fixed to a set value from 4 to 12 digits.

**COS:** This field specifies a COS number for each ACCOUNT CODE entry. This COS number replaces the caller's COS number for the duration of the call. When the call is finished, the system restores the caller's original COS number. If this field remains blank, then the caller's original COS number is used for the call.

**COR:** This field specifies a COR number for each Account Code entry. The system replaces the caller's COR number with this COR number for the tenure of the call. Upon call completion, the caller's original COR number is restored. If there is no specified COR number, then the caller's original COR number is used for the call.

**ACTIVE:** This field specifies which Account Codes can be accessed (as marked by the ACTIVE prompt) and which Account Codes are denied access (as marked by the INACTIVE prompt).

## Softkeys

**ACTIVE/INACTIVE:** This softkey has two functions. Pressing the ACTIVE softkey sets the selected Account Code entry to Active; that Account Code can now be accessed. The ACTIVE prompt appears in the ACTIVE field and the softkey now displays the INACTIVE prompt. Pressing the INACTIVE softkey sets the selected Account Code entry to Inactive; that Account Code can no longer be accessed. The ACTIVE field now displays the INACTIVE prompt and the softkey displays the ACTIVE prompt once again. Note that this softkey only appears when the cursor is in the ACTIVE field.

**NULL COS/NULL COR:** This softkey has two functions; it deletes selected COS and COR number entries. When the cursor is in a COS field which has a COS number, the NULL COS prompt appears on the softkey display. Pressing the NULL COS softkey erases the data in the COS field; the NULL COS prompt disappears only when the cursor moves to the next field. Similarly, when the cursor is in a COR field which has a COR number, the NULL COR prompt appears on the softkey display. Pressing the NULL COR softkey erases the data in the COR field; the NULL COR prompt disappears only when the cursor moves to the next field.

**INSERT:** The INSERT softkey adds a new account code to this form. Pressing this softkey opens a window with a clear command line and moves the cursor to the ACCOUNT CODE field. The new account code is programmed by entering an Account Code value, a COS number and a COR number (if required). The system inserts the new account in its appropriate sequential position. The line pointer now points to the new account code. Note that if there is no data in this form or if the line pointer is pointing to the last line of data, then this softkey does not appear.

**DELETE RANGE:** Pressing the DELETE RANGE softkey displays the FIRST ACCOUNT CODE TO DELETE: prompt on the command line. After an Account Code has been entered, the display returns the LAST ACCOUNT CODE TO DELETE: prompt. The deletion is completed by entering an Account Code. All Account Code entries between and including these specified Account Codes are removed from the form. If an invalid account code is entered the system will display 'Non-existent account code value has been entered'. Pressing CANCEL followed by QUIT returns the display without any modifications.

**FIND:** This softkey selects an Account Code and appears only when there is an account code in the form. Pressing the FIND softkey displays the ENTER ACCOUNT CODE: prompt on the command line. The selection is completed by entering a valid Account Code.

The standard softkeys **CANCEL**, **ENTER**, **DELETE**, **TOP**, **BOTTOM**, and **QUIT** are also provided.

## Form 34 – Directed IO

- 4.44 This form allows the user to specify the printers available in the system. Printouts and printout types will also be defined for each printer, as well as designating whether the printout is guaranteed or not (will or will not print.) Data outputs such as Traffic Measurement, SMDR, Hotel/Motel can be routed to any data port with an asynchronous DATASET. If no new point is specified, printouts continue to default to the system printer RS-232 port. If the printer specified is currently active, then any request to print is queued. The system can support 7 different printers. When the form is entered for the first time the default routing is displayed for all valid printouts. See Figure 4-51 for the form layout. **Note:** This form is not available in Generic 1001, Generic 1005 FPKG1 or Generic 1005 LIT96.

1:59 PM 11-JUN-90		alarm status = MAJOR		
EXT NUM	PRINTOUT	PRINTOUT TYPE	GUARANTEED	
> Printer Port	Maintenance Logs	Autoprint	NO	
Printer Port	Maintenance Logs	Directed	NO	
Printer Port	Maintenance Logs	Monitor	NO	
Printer Port	Traffic Measurement	Autoprint	NO	
Printer Port	Traffic Measurement	Directed	NO	
Printer Port	SMDR	Autoprint	YES	
Printer Port	DATA SMDR	Autoprint	YES	
Printer Port	CDE Data Print	Directed	NO	
Printer Port	Hotel/Motel Wakeup	Autoprint	NO	
Printer Port	Hotel/Motel Audit	Directed	NO	
<input type="checkbox"/> Printer Port	Maintenance Logs	Autoprint	NO	
1-	2-	3-ADD	4-TOP	5-BOTTOM
6-QUIT	7-	8-DELETE	9-	0-

Figure 4-51 Form 34 Layout

### Field Descriptions

**EXT NUM:** This field lists printer ports and extension numbers of programmed DATASETS. This form is linked to Form 12, Data Assignment.

**PRINTOUT:** This field lists the specified data outputs from each programmed printer such as Traffic Measurement, SMDR, Hotel/Motel, DATA SMDR, etc. Values in this field are entered through softkey commands. See *Softkeys*. Note that the PMS (Property Management System) softkey is displayed only if the PMS system option is enabled.

**PRINTOUT TYPE:** This field lists the type of printout provided for each data output such as Autoprint, Directed and Monitor. Values in this field are entered through softkeys. The softkeys displayed will depend upon the data output programmed in the PRINTOUT field. Table 4-9 lists available softkeys as determined by the PRINTOUT field.

Table 4-9 Available Softkeys

Application	Printout Type Options
Maintenance Logs	AUTOPRINT, DIRECTED, MONITOR
Traffic Measurement	AUTOPRINT, DIRECTED
SMDR	AUTOPRINT
CDE Data Print	DIRECTED
Hotel/Motel Wakeup	AUTOPRINT
Hotel/Motel Audit	DIRECTED
PMS	AUTOPRINT
ACD Agent Summary	AUTOPRINT
ACD Monitor Print	DIRECTED
ACD Group Summary	MONITOR
MAI*	AUTOPRINT

\* Available in Generic 1004 and Generic 1005.

**GUARANTEED:** This field is only modifiable for SMDR and Data SMDR printouts. The field defaults to NO in all other cases. If yes, SMDR records are guaranteed to print without losing records.

### Softkeys

**ADD:** This softkey appears upon entry to the form and is used to insert additional printer locations and/or extension numbers of DATASET's. When the ADD softkey is pressed, the form is in the ADD mode. See Commands: Add Mode below.

**DELETE:** Pressing the DELETE softkey deletes from the form the printout listed at the cursor position. The ENTER softkey must then be pressed to change the database. The user is alerted if the printout is currently active (printing or queued to print) before the delete is performed. If the printout is active, the user can cause the immediate deletion of the printout by pressing the CONTINUE softkey or cancel the delete operation by pressing the CANCEL softkey. When the deletion is completed the message 'DELETION COMPLETED' is returned. The printer is deleted when the last printout directed to it is deleted.

**PRINTER PORT:** This softkey appears when the cursor is positioned on the EXT NUM field. The programmer can enter a valid DATASET number or press the PRINTER PORT softkey to enter Printer Port in the EXT NUM field.

**SMDR:** This softkey defines the printout as an SMDR printout.

**CDE DATA:** This softkey appears after the MORE softkey has been pressed. It defines the selected printout as a CDE DATA record, allowing the user to print the CDE programmable data to a specified printer.

**DATA SMDR:** This softkey defines the printout as a DATA SMDR. DATA SMDR is a record of internal data calls.

**ACD AGT SUM:** This softkey appears after the MORE softkey has been pressed. Available only if system software contains ACD Option. Refer to Practice 9109-096-620-NA, *ACD TELEMARKETER* Application Package, for further information.

**ACD MONITORS:** This softkey appears after the MORE softkey has been pressed. Available only if system software contains ACD Option. Refer to Practice 9109-096-620-NA, *ACD TELEMARKETER* Application Package, for further information.

**ACD GRP SUMMARY:** This softkey appears after the MORE softkey has been pressed. Available only if system software contains ACD Option. Refer to Practice 9109-096-620-NA, *ACD TELEMARKETER* Application Package, for further information.

**TRAFFIC:** This softkey defines the printout as a Traffic Measurement report.

**MAINT LOGS:** This softkey defines the printout as a Maintenance Log printout.

**HM WAKEUP:** This softkey defines the printout as a report of Wakeup calls.

**HM AUDIT:** This softkey defines the printout as an Audit report.

**PMS:** This softkey appears only if Property Management System is enabled in the CDE System Options/System Timers form. When the programmer presses the PMS softkey, "PMS Port" appears in the PRINTOUT field the AUTOPRINT softkey appears. Pressing the AUTOPRINT softkey completes programming of the PMS port.

**MAI:** This softkey appears only if Mitel Application Interface is enabled in the CDE System Options/System Timers form. When the programmer presses the MAI softkey, "MAI" appears in the PRINTOUT field the AUTOPRINT softkey appears. Pressing the AUTOPRINT softkey completes programming of the MAI port (available in Generic 1004 and Generic 1005).

**AUTOPRINT:** The printout occurs automatically when a certain condition in the system is met.

**DIRECTED:** The printout occurs at the user's request.

**MONITOR:** This softkey is available only if the PRINTOUT field is set to Maintenance Logs. The logs are printed as they occur.

**YES:** Pressing YES guarantees the printing of the record. By default, the GUARANTEED field is set to NO.

**NO:** This softkey appears if the GUARANTEED field has been set to YES. Pressing this softkey restores it to NO.

The standard softkeys **CANCEL**, **ENTER**, **DELETE**, **TOP**, **BOTTOM**, **\*\*MORE\*\***, and **QUIT** are also provided.

**Form 35 – Global Find Access Code**

4.45 This form lists the access codes in the CDE database, including ARS Leading Digits. Callback Busy and Executive Busy Override are excluded, as they can only be dialed when receiving busy tone. This form exists to provide access code information conveniently to the user. Codes can be assigned, modified or deleted only in the appropriate forms. **Note:** This form is not available in Generic 1001.

ACCESS CODE		DEFINED	BAY	SLT	CCT	SCT	MULTIPLE APP.
1812		Data Station	1	08	01	2	N/A
1813		Data Station	1	08	02	2	N/A
1852		Data Station	1	08	05	2	N/A
2101		PBX Station	2	01	01		N/A
2311		Console	2	03	01	1	N/A
7		ARS Leading Digit					N/A
8		ARS Leading Digit					N/A
9		ARS Leading Digit					N/A
000		ARS Leading Digit					N/A
<input type="checkbox"/> 1812		Data Station	1	08	01	2	N/A
1-	2-	3-	4-TOP		5-BOTTOM		
6-QUIT	7-ACCESS CODE	8-	9-		0-		

**Figure 4-52 Form 35 Layout**

**Field Descriptions**

**ACCESS CODE:** This field lists all programmed access codes as assigned in numerical order by the first digits, for example 10, 111, 1210, 132, 20.

**DEFINED:** This field lists the areas where access codes have been assigned.

**BAY, SLOT, CCT and SCT:** These fields list the physical location of devices, and LDNs.

**MULTIPLE APP.:** This indicates if there are multiple appearances of number (LDNs or extension numbers) – this will be one of YES, NO or N/A.

**Softkeys**

**ACCESS CODE:** Pressing the ACCESS CODE softkey displays ENTER ACCESS CODE prompt on the command line. Upon entering the access code and pressing the ENTER softkey, the code is then verified by the system. If the number entered is not presently used as an access code, the following message is displayed: The access code xxx does not exist.

**NEXT:** This softkey is displayed when an unassigned number is entered at the ENTER ACCESS CODE prompt, and is cancelled. Pressing this softkey displays the next access code that exists numerically after the one requested.

The standard softkeys **CANCEL**, **ENTER**, **TOP**, **BOTTOM**, and **QUIT** are also provided.

## Form 36 – Modem Assignment

- 4.46 This form assigns Pooled Modems to the system database. A Pooled Modem consists of a modem connected to an ONS or OPS circuit and a DATASET connected to a Digital Line Circuit. Each line of the form establishes the software association between the ONS or OPS circuit and the Digital Line Circuit for one Pooled Modem. **Note:** This form is not available in Generic 1001, Generic 1002, Generic 1005 FPKG1 or Generic 1005 LIT96.

2:26 PM 11-JUN-90		alarm status = MAJOR													
BAY	SLT	CCT	CDN	BAY	SLT	CCT	EXTN	TEN	DTE	COS	COR	MODE	DIAL	COMMENTS	
2	01	02	1	2	04	01	2401	1	2	1	1	ORIG	AUTO	modem gp 1	
2	01	03	1	2	04	02	2402	1	2	1	1	ORIG	AUTO	modem gp 1	
2	01	04	1	2	04	03	2403	1	2	1	1	ORIG	NON	modem gp 1	
2	01	05	1	2	04	04	2404	1	1	2	2	ANS	NON	ic-1	
2	01	06													
2	01	07													
2	01	08													
2	01	09													
2	01	10													
2	01	11													
2	01	12													
2	01	06	<input type="checkbox"/>												
1-MOVE			2-FIND EXT				3-			4-			5-		
6-QUIT			7-BAY/SLT/CCT				8-			9-			0-		

Figure 4-53 Form 36 Layout

### Field Descriptions

**BAY/SLT/CCT:** The three left-most columns contain the BAY/SLT/CCT numbers of all unassigned ONS and OPS circuits. The system provides this information.

**CDN:** A Circuit Descriptor Number (CDN) must be assigned to each DNIC device. The default CDN is 1. Circuit Descriptors are programmed in the CDE Data Circuit Descriptor Form.

**BAY/SLT/CCT:** The second set of BAY/SLT/CCT columns lists the DNIC circuits associated with each ONS (or OPS) circuit. BAY/SLT/CCT numbers assigned here do not appear in the Data Assignment form or the Stations/*SUPERSET* Telephones form.

**EXTN:** This column lists the extension numbers assigned to the pooled modems.

**TEN:** This column lists the tenant numbers to which the pooled modems are assigned. The default tenant number is 1.

**DTE:** This column lists the optional DTE Descriptor that applies to each pooled modem. The DTE Descriptor is needed for incoming or internal modem pooling calls that require a DTRX. DTE Descriptors are programmed in the CDE DTE Descriptor Form.

**COS:** This column lists the Class of Service (COS) of each pooled modem. The default COS is 1.

**COR:** This column lists the Class of Restriction (COR) of each pooled modem. The default COR is 1. This is required because outgoing calls connect to trunks and are routed via ARS.

**MODE:** This column lists the mode of operation for each modem. The options are ANSWER, ORIGINATE, or BOTH. The default is BOTH.

**DIAL:** This column lists the auto-dial capability of each modem. The options are AUTODIAL or NON AUTODIAL. The default is NON AUTODIAL.

**COMMENTS:** There is a COMMENTS field of 15 characters for each modem listed.

### Softkeys

**MOVE:** This softkey relocates a device via its bay slot, and circuit numbers. When the MOVE softkey is pressed, the command line requests the FROM location (BAY: SLOT: CCT: ). When the location is specified and the ENTER softkey is pressed, the command line requests the TO location. The new location is designated and the ENTER softkey is pressed. **Note:** Entering invalid numbers inhibits cursor movement.

**FIND EXT:** This softkey locates a pooled modem by its extension number.

**ANSWER:** This softkey appears when the cursor is on the MODE field. Pressing it enables the modem to operate in Answer mode only.

**NON AUTODIAL:** This softkey appears when the cursor is on the DIAL column. Pressing it tells the system that the modem does not dial automatically.

**AUTODIAL:** This softkey appears when the cursor is on the DIAL column. Pressing it tells the system that the modem can dial automatically.

**ORIGINATE:** This softkey appears when the cursor is on the MODE field. Pressing it enables the modem to operate in Originate mode only.

**BOTH:** This softkey appears when the cursor is on the MODE field and the ANSWER or ORIGINATE softkey has been pressed. Pressing the BOTH softkey enables the modem to operate in both Answer and Originate modes.

**DELETE FIELD:** This softkey appears when the cursor is on the DTE field and a DTE Descriptor number has been entered. Pressing the DELETE FIELD softkey restores the field to its default, blank.

The standard softkeys **CANCEL**, **BAY/SLT/CCT**, **ENTER**, **DELETE**, **TOP**, **BOTTOM**, and **QUIT** are also provided.

### Form 37 – Guest RM SUPERSET Keys Template

- 4.47 Form 37 (see Figure 4-54) provides 3 preprogrammed sets (templates) of Speed Dial and Feature Keys for Hotel/Motel guest room phones. In each COS, the programmer can enable one template which will apply to all *SUPERSET 3DN*, *SUPERSET 4DN*, *SUPERSET 410*, *SUPERSET 420* and *SUPERSET 430* telephones in that COS that have Room Status Applies enabled. **Note:** This form is not available in Generic 1001 or Generic 1002.

2:28 PM 11-JUN-98		alarm status = MAJOR		
TEMPLATE 1	KEY	TYPE	SPEED DIAL NUMBER	PRIVATE
	02	Speed Dial	95551221	PRIVATE
	03	Speed Dial	95555552	PRIVATE
	04	Do Not Dist		
	05	Override		
	06	Speed Dial		
	07	Speed Dial		
	08	Speed Dial		
	09	Speed Dial		
	10	Speed Dial		
	11	Speed Dial		
	12	Speed Dial		
	05	<input type="checkbox"/> Override		
1-	2-	3-FEATURE	4-TEMPLATE NO	5-
6-QUIT	7-KEY	8-DELETE	9-	0-

Figure 4-54 Form 37 Layout

#### Field Descriptions

**KEY:** The *SUPERSET 3DN*, *SUPERSET 4DN*, *SUPERSET 410*, *SUPERSET 420*, and *SUPERSET 430* Telephone column of line appearance keys are numbered from the bottom. Key 01 is the Prime Line key and cannot be re-programmed. This field cannot be changed. The form provides a line for each key.

**TYPE:** This field lists the function of each key, either Speed Dial (the default) or a feature (e.g. Do Not Disturb).

**SPEED DIAL NUMBER:** If the key is a Speed Dial key, the programmer enters the number here.

**PRIVATE:** If the key is a Speed Dial key, the programmer can prevent the user from displaying the number by selecting the PRIVATE feature for this field.

### Softkeys

**FEATURE:** Pressing this softkey makes the set key a Feature Access key. The following softkeys appear:

**AUTO ANSWER  
DO NOT DIST  
PRIVACY REL  
OVERRIDE  
PA PAGING \*  
CAMPON  
MUSIC**

**CALL FORWARD  
CALL PICKUP  
NIGHT ANSWER  
CALLBACK  
SWAP  
CALL/ATTN  
DATA DISC**

\* Prior to Generic 1004, this is called **PAGING**.

These softkeys are the same ones that appear in the nested Expand Set form of the Stations/*SUPERSET* Telephones form. Refer to Form 09 for more information.

**TEMPLATE NO:** Pressing the **TEMPLATE NO** softkey prompts the user to "ENTER TEMPLATE NUMBER:". Valid template numbers are 1, 2 and 3. When a valid template number is entered, the new template form is displayed.

**KEY:** Pressing this key prompts the user to "ENTER KEY NUM:". The valid range for the key number is 2 – 12.

**PRIVATE:** This softkey appears when a speed dial number has been entered and the cursor is on the **PRIVATE** field. Pressing this key makes a non-private speed dial number private. When a speed dial number is entered under the **SPEED DIAL NUMBER** column, just tab over to the **PRIVATE** column and press the **PRIVATE** softkey to make the number private. The word **PRIVATE** will appear under the **PRIVATE** column.

**NON PRIVATE:** This softkey appears when the cursor is on the **PRIVATE** field of a line containing a private speed dial number. Pressing this key makes a private speed dial number non-private.

The standard softkeys **CANCEL**, **DELETE**, **ENTER** and **QUIT** are also provided.

## Form 38 – ACD Keys Template

- 4.48 The ACD KEYS TEMPLATE FORM provides up to 3 different function key configurations for each ACD position: Agent, Supervisor and Senior Supervisor. In each COS, however, only one template for one position type can be enabled. Line appearance keys assigned in the Stations/*SUPERSET* Telephones form have priority over ACD Feature keys. **Note:** This form is not available in Generic 1001, Generic 1002, Generic 1005 FPKG1 or Generic 1005 LIT96.

AGENT [1]		KEY	TYPE	SPEED DIAL NUMBER	PRIVATE
	02	Speed Dial	95552212		
	03	Speed Dial	8888		
	04	Speed Dial	95554411		
	05	Speed Dial			
	06	Speed Dial			
	07	Speed Dial			
	08	Speed Dial			
	09	Speed Dial			
	10	Speed Dial			
	11	Make Busy			
	12	Queue Status			
	13	Speed Dial			
	04	<input type="checkbox"/> Speed Dial	95554411		
1-AGENT	2-SUPERVISOR	3-SENIOR	4-	5-	
6-QUIT	7-KEY	8-DELETE	9-	0-	

Figure 4-55 Form 38 Layout

### Field Descriptions

The Header lists the ACD position to which the template applies and the template number (1, 2 or 3).

**Key:** This field lists the Line Select keys. The keys are numbered on the set from bottom to top. Key 01, the Prime Line key, is not shown because it cannot be reprogrammed.

**Type:** This field lists the function of each key. The default is Speed Dial.

**Speed Dial Number:** This field lists the Speed Dial number for each Speed Dial key.

**Private:** The word Private in this field indicates the Speed Dial number is private and cannot be displayed at the set.

### Softkeys

**AGENT:** Pressing the AGENT softkey prompts the user to enter an agent template number "ENTER AGENT TEMPLATE NUMBER: ". When a valid template number (1-3) is entered, the selected agent keys template is displayed. The title line is updated with the agent template number.

**SUPERVISOR:** Pressing the SUPERVISOR softkey prompts the user to enter a supervisor template number "ENTER SUPERVISOR TEMPLATE NUMBER:". When a valid template number (1–3) is entered, the selected supervisor keys template is displayed. The title line is updated with the supervisor template number.

**SENIOR:** Pressing the SENIOR softkey prompts the user to enter a senior supervisor template number "ENTER SENIOR SUPERVISOR TEMPLATE NUMBER: ". When a valid template number (1–3) is entered, the selected senior supervisor keys template is displayed. The title line is updated with the senior supervisor template number.

**ACD KEYS:** Pressing the ACD KEYS softkey provides a set of softkeys used to assign ACD feature keys to the set's Line Select keys. The feature keys presented depend on the type of keys template being programmed. All templates have a QUEUE STATUS key available. In addition, an Agent template can have a MAKE BUSY key and a Supervisor template can have an AGENT STATUS key. Both the SUPERVISOR and SENIOR SUPERVISOR can be provided with a SHIFT key.

**KEY:** Pressing the KEY softkey prompts the user to enter a key number (2–15). When a valid line key number is entered, the cursor points to that line. The command line displays the line, ready for editing.

**PRIVATE:** Pressing the PRIVATE softkey makes the programmed Speed Dial number private.

**NON PRIVATE:** Pressing the NON PRIVATE softkey makes a private Speed Dial number non-private.

The standard softkeys **QUIT** and **DELETE** are also provided.

## Form 39 – ACD Agent Groups

- 4.49 The ACD AGENT GROUPS CDE form lists the agents in each ACD group. It cannot be accessed unless the "ACD Enable" system option is enabled. The title line contains the agent group number and name. Entries in this form are sorted by ID. See Figure 4-56. **Note:** This form is not available in Generic 1001, Generic 1002, Generic 1005 FPKG1 or Generic 1005 LIT96.

[ ACD GRP: 1 ]		AGENT ID	AGENT NAME	COS
		111	MARY RUBY	10
		112	CATHY BREN	10
		113	SUE BALDIN	10
		114	MARY ATT.	20
		<input type="checkbox"/> 114	MARY ATT.	20
1-ACD GRP NAME	2-FIND ID	3-ADD	4-TOP	5-BOTTOM
6-QUIT	7-AGENT GROUP	8-DELETE	9-OPTIONS	0-

Figure 4-56 Form 39 Layout

### Field Descriptions

The header shows the ACD Group Number, and ACD Group Name.

**AGENT ID:** This field lists the Agent ID. This is an access code that identifies the agent to the system. The form lists the Agents in numerical order by Agent ID.

**AGENT NAME:** This field lists the Agent Name. Use of this field is optional, but recommended.

**COS:** This field lists the Agent's Class of Service.

### Softkeys

**ACD GRP NAME:** Pressing the ACD GRP NAME key displays ENTER ACD GROUP NAME : on the command line. This softkey appears only if there is at least one agent in the group, because a group cannot exist without members. The name can be up to 8 characters long.

**FIND ID:** Pressing the FIND ID key displays ENTER AGENT ID : on the command line. The system searches the data base for the requested agent. If found, the group containing this agent is displayed with the cursor pointing at the agent.

**ADD:** Pressing the ADD key permits the programmer to enter the information needed to add an agent to the displayed group. When the Agent ID has been entered, the ENTER softkey appears. Optionally, the programmer can fill in the Agent Name and COS fields prior to pressing the ENTER softkey. If nothing is entered, the name defaults to blanks and the COS to 1. The added agent will appear in the correct position in the sorted list. If the agent is already assigned to another agent group, the system warns the programmer on the command line and asks the programmer to CONFIRM or CANCEL the entry via softkeys. If the programmer confirms it, any previous group assignment for that agent is deleted. Agents can be reassigned in this way at any time, even while the agent is active. When reassigning an agent, only the ID field should be filled-in. The NAME and COS fields will be filled automatically when the ENTER key is pressed.

**AGENT GROUP:** Pressing the AGENT GROUP softkey displays ENTER ACD GROUP NUM: on the command line. When the ACD Group number is entered, the requested group is displayed.

**OPTIONS:** Pressing the OPTIONS key displays the Options sub-form. This softkey is not provided if the group is empty.

The standard softkeys **DELETE, TOP, BOTTOM** and **QUIT** are also provided.

### Options Subform for Form 39

4.50 For each Agent Group a set of options can be set to control the ACD Group environment (see Figure 4-57). **Note:** This form is not available in Generic 1001, Generic 1002, Generic 1005 FPKG1 or Generic 1005 LIT96.

2:37 PM 11-JUN-98		alarm status = MAJOR		
[ ACD GRP: 1 ]		OPTIONS		STATUS
Afterwork Timer (MM:SS)		0:00		
Overflow Timer (MM:SS)		9:00		
First Status Threshold (MM:SS)		3:00		
Second Status Threshold (MM:SS)		6:00		
Afterwork Timer (MM:SS)		0:00		
1-	2-	3-	4-	5-
6-QUIT	7-	8-	9-	0-

Figure 4-57 Option Subform Layout

### Field Descriptions

**OPTIONS:** This field displays the Option name. For options that have a numerical value, the format and units of measure are given in brackets (e.g. MM:SS for minutes:seconds).

**STATUS:** This field displays the current setting of the option.

### Softkeys

The standard softkey **QUIT** is provided.

### Parameters

**Afterwork Timer:** After an ACD call has ended, this timer provides a time period for the Agent to complete paperwork. The Agent will receive no ACD calls during this period. The timer has a range of 00:00 to 15:00. The default is 00:00.

**Overflow Timer:** This timer specifies the maximum time a call can wait for answer in this ACD Group. When the time period has elapsed, the call is sent to the Overflow destination. The timer has a range of 00:00 to 54:00 (Minutes:Seconds). The default is 00:00.

**First Status Threshold:** This threshold time provides a visual indication to the Supervisor that the system has reached a defined level of activity. When any call has waited for the defined time period, the supervisor's Queue Status LCD shows a light circle in a dark square. The threshold has a range of 00:00 to 54:00 (Minutes:Seconds). The default is 03:00. The First Threshold time must be less than the Second Threshold time.

**Second Status Threshold:** This threshold time provides a visual indication to the Supervisor that the system has reached a defined level of activity. This is a higher level of activity than the First Status Threshold represents. When any call has waited for the defined time period, the supervisor's Queue Status LCD shows a dark square. The threshold has a range of 00:00 to 54:00 (Minutes:Seconds). The time must exceed that defined for the First Status Threshold.

**Form 40 – ACD Supervisors**

4.51 The ACD SUPERVISORS form shows the ID numbers and names of ACD senior supervisors. A subform lists the supervisors. These forms cannot be accessed unless the "ACD Enable" system option is enabled. Refer to Figure 4-58. **Note:** This form is not available in Generic 1001, Generic 1002, Generic 1005 FPKG1 or Generic 1005 LIT96.

2:48 PM 11-JUN-98		alarm status = MAJOR		
ACD SENIOR SUPERVISOR ID CODES		NAME	COS	
301		J. NANTILL	21	
302		E. LEGAULT	21	
303		D. FELSBG	21	
<input type="checkbox"/> 303		D. FELSBG	21	
1-FIND GROUP	2-FIND SUPER	3-ADD	4-TOP	5-BOTTOM
6-QUIT	7-	8-DELETE	9-EXPAND	0-

**Figure 4-58 Form 40 Layout**

**Field Descriptions**

**SENIOR SUPERVISOR IDS:** This field lists the Senior Supervisor ID codes. The form is sorted by ID code.

**NAME:** Senior supervisor and supervisor names are carried to the set where they log on. Their ID's are used for logging on.

**COS:** This field specifies the Class of Service of each Senior Supervisor. The range is 1 to 50.

**Softkeys**

**FIND GROUP:** The FIND GROUP softkey displays ENTER ACD GROUP NUM: on the command line. When the group number is entered, the requested group is displayed. If the requested group is assigned to a senior supervisor, that senior supervisor's sub-form is shown, with the cursor pointing at the requested group.

**FIND SUPER:** The FIND SUPER softkey displays ENTER SUPERVISOR OR SENIOR SUPERVISOR ID : on the command line. The data base is searched for this senior supervisor or supervisor ID. If the requested senior supervisor exists, the top level form is shown, with the cursor pointing at the requested ID. If the requested supervisor exists, the sub-form is shown, with the cursor pointing at the requested ID.

**ADD:** This softkey appears upon entry to the form and is used to add additional senior supervisors to the form. When assigning an agent as a Senior Supervisor, only the ID field needs to be filled in. The NAME field will be filled automatically when the ENTER key is pressed. When the ADD softkey is pressed, the form is in the ADD mode. To leave ADD mode, use the QUIT softkey.

**EXPAND:** The EXPAND softkey displays the Expand sub-form, which lists all the groups of the supervisors under the current senior supervisor. The sub-form is sorted by supervisor ID code. All groups reporting directly to the Senior Supervisor are listed at the end of the form in order of group number.

The standard softkeys **DELETE**, **TOP**, **BOTTOM** and **QUIT** are also provided.

### Expand Sub-form for Form 40

- 4.52 For each senior supervisor, this form, shown in Figure 4-59, lists the assigned ACD Groups and their supervisors. The programmer positions the line pointer at the desired Senior Supervisor in the ACD Senior Supervisors form and presses the EXPAND softkey.

GRPS OF E. LEGAULT 302		SUPER ID	SUPER NAME	COS
12		107	H. FERGSON	21
10		108	C. BRAZEAU	20
2		109	C.J.CHAT	20
1		NO SUPER		
12		107	H. FERGSON	21
1-FIND GROUP	2-FIND SUPER	3-ADD	4-TOP	5-BOTTOM
6-QUIT	7-	8-DELETE	9-NO SUPER	0-

**Figure 4-59 Expand Subform Layout**

#### Field Descriptions

The subform header shows the senior supervisor's name and ID. If the senior supervisor has no name programmed, the header will show the senior supervisor's number.

**GRPS OF:** This field lists the Agent Groups reporting to the Senior Supervisor. All groups reporting directly to the Senior Supervisor (with no Supervisor) are listed at the bottom of the form, sorted by Agent Group number. Groups that have Supervisors are

sorted by Supervisor ID. Groups with the same Supervisor are sorted by Agent Group number.

**SUPER ID:** This field lists the Supervisor ID number for each Supervisor under the Senior Supervisor. If a group has no supervisor, the field displays NO SUPER.

**SUPER NAME:** The Supervisor's name can be programmed in this column. It can be up to 10 characters long; it must not begin with the character "\*".

**COS:** This field lists the Class of Service of each Supervisor.

### Softkeys

**FIND GROUP:** The FIND GROUP softkey displays ENTER ACD GROUP NUM: on the command line. When the group number is entered, the requested group is displayed. If the requested group is assigned to a senior supervisor, that senior supervisor's sub-form is shown, with the cursor pointing at the requested group.

**FIND SUPER:** The FIND SUPER softkey displays ENTER SUPERVISOR OR SENIOR SUPERVISOR ID : on the command line. If the requested senior supervisor exists, the top level form is shown, with the cursor pointing at the requested ID. If the requested supervisor exists, the sub-form is shown, with the cursor pointing at the requested ID.

**ADD:** Pressing the ADD key assigns a group and its supervisor to the displayed senior supervisor. Any previous assignment for that group is deleted. Groups can be reassigned at any time, even while active.

**NO SUPER:** The NO SUPER key assigns the Agent Group directly to the Senior Supervisor; the group has no Supervisor.

The standard softkeys **DELETE**, **TOP**, **BOTTOM** and **QUIT** are also provided.

## Form 41 – ACD Path

- 4.53 This CDE form defines routing for ACD calls. It cannot be accessed unless the “ACD Enable” System option is enabled. Each path has its own form. **Note:** This form is not available in Generic 1001, Generic 1002, Generic 1005 FPKG1 or Generic 1005 LIT96.

[ ACD PATH: 1 ]		OPTIONS			STATUS
Access Code For This ACD Path Primary ACD Agent Group Delay For Ringback (MM:SS) Recording 1 : Start Time (MM:SS) Access Code Music Source Following Recording 2 : Start Time (MM:SS) Access Code Music Source Following Recording 3 : Start Time (MM:SS) Access Code Music Source Following					
Access Code For This ACD Path					<input type="text"/>
1-	2-	3-	4-	5-	
6-QUIT	7-ACD PATH	8-	9-	0-	

Figure 4-60 Form 41 Layout

### Field Descriptions

The header displays the ACD Path number and name.

**OPTIONS:** The Options field lists the programmable timers and options for the ACD Path.

**STATUS:** The status field is the only field that can be edited; however, no fields on an ACD path can be edited without first assigning the “Access Code For This ACD Path”, and the “Primary ACD Agent Group” (the first two lines on the form).

### Softkeys

**PATH NAME:** The PATH NAME softkey displays ENTER PATH NAME: on the command line. When the name (up to 8 characters) is entered, it appears on the form top line, beside the path number. This softkey appears only after the first two lines of the form are both filled.

**ACD PATH:** Pressing the ACD PATH softkey displays ENTER ACD PATH NUMBER: on the command line. This softkey appears whenever the first two lines of the form are either both filled or both empty.

**DELETE PATH:** Pressing the DELETE PATH softkey displays the CANCEL and CONFIRM softkeys. Pressing CONFIRM deletes the ACD path. Pressing CANCEL restores the softkeys without deleting the ACD Path.

**DELETE FIELD:** Blanks the current status field.

**DROP CALL:** Appears only when the cursor is in the "Interflow Point Access Code" line – the STATUS will be set to "DROP CALL".

**YES/NO:** Enables / disables the "Allow Overflow to Interflow Point Before Timeout" or "Interflow Enabled" parameters.

**Parameters**

ACD PATH PARAMETERS	
Access Code For This ACD Path	
Primary ACD Agent Group	
Delay For Ringback (MM:SS)	
Recording 1 :	Start Time (MM:SS)
	Access Code
	Music Source Following
Recording 2 :	Start Time (MM:SS)
	Access Code
	Music Source Following
Recording 3 :	Start Time (MM:SS)
	Access Code
	Music Source Following
Recording 4 :	Start Time (MM:SS)
	Access Code
	Music Source Following
Overflow 1 Agent Group	
Overflow 2 Agent Group	
Overflow 3 Agent Group	
Interflow Enabled	
Interflow Timeout (MM:SS)	
Interflow Point Access Code (Default = DROP CALL)	
Allow Overflow to Interflow Point Before Timeout	
Priority	
Service Time	

**Access Code For This ACD Path** and **Primary ACD Agent Group** must be defined to establish an ACD Path. Until this is done, no other options can be edited.

**Delay For Ringback (MM:SS):** Allows the caller to hear ringback before being connected to an agent.

**Recording n: Start Time (MM:SS)** is counted from when a caller has finished the Delay For Ringback period. The range of this timer is 00:00 to 54:00. Recording 1 must be defined before Recording 2, Recording 2 before Recording 3, Recording 3 before Recording 4. For example, the programmer cannot edit "Recording 3: Start Time", unless "Recording 2" and "Recording 1" are both defined. If <cursor down> is pressed from a blank "Recording n: Start Time" field, the cursor moves to "Overflow 1 Agent Group". Each recording's start time must be later than the preceding recording's start time.

**Recording n: Access Code** must be an access code for a Recording Hunt Group. The programmer cannot make an entry for this option until a Start Time is defined for the recording. Once a recording start time is entered, the programmer can only move back and forth between the Start Time and Access Code fields for that recording, until both fields are filled or deleted (by the DELETE FIELD key). PATH NAME, ACD PATH, and DELETE PATH keys are removed during this time too.

**Music Source Following** defines, for each recording, an ONS port to which the caller will be connected when the recording ends. The ONS port is permanently off-hook with a music source connected. The caller stays connected until the call is answered or another scheduled recording plays. If no music source is defined, the Music on Hold source is used. If this is not provided, the caller receives silence.

**Overflow 1 Agent Group** must be defined before **Overflow 2 Agent Group**, **Overflow 2 Agent Group** before **Overflow 3 Agent Group**. If <cursor down> is pressed from a blank "Overflow X Agent Group", the user is positioned at the "Interflow Timeout" field.

**Interflow Enabled**, when set to YES, allows the waiting ACD call to exit ACD and be answered at a defined Interflow Point. Default is NO.

**Interflow Timeout (MM:SS)** specifies when a waiting ACD call should be directed to the Interflow Point. The timer has a range of 00:01 to 54:00. The default is 54 minutes.

**Interflow Point Access Code** can be an extension number, another ACD Path, a Hunt Group (including a UCD Agent Hunt Group), a System Abbreviated Dial number, Night Bells or DROP CALL.

**Priority** for the ACD Path has a range of 1 (highest priority) to 99. Calls are answered in order of priority. Default priority is 99.

**Service Time:** Defines a standard time to answer, used in the measurement of ACD path performance. Statistics can be seen from the ACD Path Monitors and Path Summary Reports (see Practice 9109-096-620-NA, *ACD TELEMARKETER* Application Package). Can be set from 1 second to 54 minutes.

### Form 42 – T1 Link Descriptors

4.54 The T1 Link Descriptors define the parameters that control the behavior of each T1 link. The form provides 10 programmable descriptors. The main form displays the number of users of each descriptor. A 20-character comment field is provided for each descriptor. **Note:** This form is unavailable in Generic 1001 and Generic 1002.

3:03 PM 11-JUN-98		alarm status = MAJOR		
DESCRIPTOR	LINK TYPE	NUMBER OF LINKS ASSIGNED		COMMENTS
01	T1 DS1	0		
02	T1 DS1	0		
03	T1 DS1	0		
04	T1 DS1	0		
05	T1 DS1	0		
06	T1 DS1	0		
07	T1 DS1	0		
08	T1 DS1	0		
09	T1 DS1	0		
10	T1 DS1	0		
01	<input type="checkbox"/> T1 DS1	0		
1-	2-	3-	4-	5-
6-QUIT	7-	8-SEL. OPTION	9-	0-

**Figure 4-61 Form 42 Layout**

#### Field Descriptions

**DESCRIPTOR:** This field lists the Descriptor numbers. It cannot be edited.

**LINK TYPE:** This field lists the type of link for each descriptor. Only T1 DS1 is available. This field cannot be changed.

**NUMBER OF LINKS ASSIGNED:** This field lists the number of links assigned this descriptor in the T1 Link Assignment form.

**COMMENTS:** This 20-character field is provided for the programmer's notes. The system does not use this information.

#### Softkeys

**SEL. OPTION:** Pressing the SELECT OPTION softkey displays the Link Descriptor Options subform for the descriptor on the command line.

**REVIEW:** Pressing the REVIEW softkey displays the Review List subform for the descriptor on the command line. This appears only if the number of links is greater than 0.

The standard softkey **QUIT** is also provided.

## Link Descriptor Options Subform for Form 42

**Note:** Altering this form may have side effects on T1 links in operation.

[ LINK DESCRIPTOR NUMBER : 1 ]		IN/OUT GOING	VALUE	
Alarm debounce timer		( 300 - 3200 ms )	2500	
B8ZS zero code suppression			NO	
Slip rate - maintenance limit		( 0 - 9000 ) /24 hrs	255	
Slip rate - service limit		( 0 - 9000 ) /24 hrs	7000	
Slip rate - network sync limit		( 0 - 9000 ) /24 hrs	7	
BER - maintenance limit ( 10**-n , n = ( 3,4,5,6 ) ) / hour			4	
BER - service limit ( 10**-n , n = ( 3,4,5,6 ) ) / hour			3	
Framing losses - maintenance limit		( 0 - 9000 ) /24 hrs	255	
Framing losses - service limit		( 0 - 9000 ) /24 hrs	9000	
RTS timer - service limit exceeded		( 1 - 255 min )	30	
RTS timer - net slip limit exceeded		( 1 - 255 min )	30	
RTS timer - after alarm		( 0 - 300 sec )	10	
Alarm debounce timer		( 300 - 3200 ms )	<input type="checkbox"/> 2500	
1-	2-	3-	4-	5-
6-QUIT	7-	8-	9-	0-

**Figure 4-62 Link Descriptor Options Subform Layout**

### Field Descriptions

The Header line displays the Link Descriptor number and the direction of the link.

**Value:** This field lists the selected value for each parameter.

### Softkeys

**YES/NO:** This softkey appears only when the command line displays the B8ZS Zero Code Suppression parameter. (All other parameters require numeric entries and have no softkeys). Pressing the softkey changes the state of the parameter. If the parameter is set to YES, the softkey is NO, if the parameter is set to NO, the softkey is YES.

**CONFIRM:** This softkey appears when an option value has been changed. Press the CONFIRM softkey to enter the change in the database.

The standard softkeys **CANCEL**, **ENTER** and **QUIT** are also provided.

### Parameters

**Alarm Debounce Timer:** The Alarm Debounce Timer defines the length of time a fault condition must be present before it is reported to the main controller, and the link is removed from service. The range of the timer is 300 to 3200 ms. The reportable fault conditions are:

- Failure of power supply
- Loss of incoming signals at 1544 Kbps

- Loss of frame alignment (synchronization)
- Alarm indication received from the remote end

**B8ZS Zero Code Suppression:** Special encoding is used when a data byte for a channel contains consecutive bits of the same level. There are two of these line code options available: Alternate Mark Inversion (AMI) and Bipolar 8 Zero Substitution (B8ZS). In AMI, a 1 is transmitted as a pulse and a 0 is transmitted as no pulse. Consecutive 1's are sent as pulses of opposite polarity. If a channel data byte contains all 0's, bit 2 is forced to a 1. In B8ZS encoding, consecutive 1's are sent as pulses of opposite polarity, as in AMI. A block of eight 0's is replaced by a special eight bit sequence.

**Slip Rate Limits:** Slip is the deletion or repetition of a single frame of information in a digital bit stream. There are 3 slip rate limits: maintenance, service and network. The slip rate limit is between 0 and 9000 slips over a 24 hour period.

**BER Limits:** BER is the Bit Error Rate over the last hour. There are 2 BER rate limits: maintenance and service. The bit error rate limit is between  $10^{-3}$  (1 error per 1000 bits) and  $10^{-6}$  (1 error per 1,000,000 bits) over a 24 hour period.

**Framing Loss Limits:** Framing loss occurs when the digital trunk cannot find the proper framing bit sequence in the incoming bit stream. It is thus unable to ensure correct decoding of the channels. There are 2 framing loss limits maintenance and service. The framing loss error rate is between 0 and 9000 losses over a 24 hour period.

### Limit Definitions

**Maintenance:** When a maintenance limit is exceeded, the system generates a maintenance log.

**Service:** When a service limit is exceeded, the system generates a maintenance log and removes the link from service.

**Slip Rate – Network Sync Limit:** When this limit is exceeded, the system generates a maintenance log and selects a new sync source.

**RTS Timer – Service Limit Exceeded:** This timer specifies the minimum time for which the link is removed from service after a service limit has been exceeded. When the timer expires, the link is returned to service only if the error rate on the link is less than 1/24th the maintenance limit. The range of the timer is 1 to 255 minutes.

**RTS Timer – Net Slip Limit Exceeded:** This timer specifies the minimum time for which the link is removed as the sync source after the net slip limit has been exceeded. When the timer expires, the link is again available to the system as a sync source only if the number of slips on the link is less than the net slip limit. The range of the timer is 1 to 255 minutes.

**RTS Timer – After Alarm:** This timer specifies how long the link will remain unavailable after an alarm condition has cleared.

## Review List Subform for Form 42

- 4.55 The review form provides a list of users for each descriptor, identified by their physical location . There are no fields that the programmer can edit. See Figure 4-63 for the form layout.

LINK DESC NO: 1		BAY	SLOT	COMMENTS
		01	06	
1-	2-	3-	4-	5-
6-QUIT	7-	8-	9-	0-

12:59 PM 12-JUL-90 alarm status = MAJOR

**Figure 4-63 Review List Subform Layout**

### Field Descriptions

The header line identifies the link descriptor being reviewed.

**BAY, SLOT:** These fields list the bay and slot location of the T1 trunk cards using this link descriptor.

**Comments:** The text in this field comes from the Comments field of Form 43, T1 Link Assignment.

### Form 43 – T1 Link Assignment

4.56 Form 43 (see Figure 4–64) assigns one of the ten link descriptors to each link.  
**Note:** This form is unavailable in Generic 1001 and Generic 1002. Altering this form may have side effects on T1 links in operation.

3:33 PM 11-JUN-98			alarm status = MAJOR	
TRUNK TYPE	BAY	SLOT	LINK DESC NUM	COMMENTS
	01	06	03	T1 CO
	01	06	<input type="checkbox"/> 03	T1 CO
1-	2-	3-	4-	5-
6-QUIT	7-	8-DELETE	9-	0-

**Figure 4–64 Form 43 Layout**

#### Field Descriptions

**TRUNK TYPE:** This field cannot be edited.

**BAY, SLOT:** This field lists the Bay and Slot location of the T1 trunk cards in the system.

**LINK DESC NUM:** This field lists the Link Descriptor that applies to each T1 trunk card.

**COMMENTS:** The comments field can store 15 characters.

#### Softkeys

**CONFIRM:** This softkey appears when an option value has been changed. Press the CONFIRM softkey to enter the change in the database.

The standard softkeys **ENTER** and **QUIT** are also provided.

## Form 44 – T1 Network Sync

- 4.57 This form, shown in Figure 4–65, determines the order in which the links will be used as the network synchronization clock source. When the error threshold of the first clock source is crossed, the second clock is used as the sync source, etc. **Note:** This form is unavailable in Generic 1001 and Generic 1002. Altering this form may have side effects on T1 links in operation.

3:38 PM 11-JUN-90		alarm status = MAJOR		
DESCRIPTION	BAY	SLOT	COMMENTS	
> First clock source Second clock source Third clock source Fourth clock source Fifth clock source Sixth clock source Seventh clock source Eighth clock source	1	06	Main Link To. <	
First clock source	<input type="checkbox"/> 1	06	Main Link To.	
1-	2-	3-	4-	5-
6-QUIT	7-	8-DELETE	9-	0-

Figure 4–65 Form 44 Layout

### Field Descriptions

**DESCRIPTION:** This field lists the clock sources, first through eighth, for system synchronization to the T1 network. This field cannot be edited.

**BAY, SLOT:** This field lists the Bay/Slot location of the T1 trunk cards in the system.

**LINK DESC NUM:** This field lists the Link Descriptor that applies to each T1 trunk card.

**COMMENTS:** The comments field can store 16 characters.

### Softkeys

**CONFIRM:** This softkey appears when an option value has been changed, followed by the QUIT softkey. Press the CONFIRM softkey to enter the change in the database and exit the form.

The standard softkeys **ENTER**, **DELETE** and **QUIT** are also provided.

### Form 45 – Key System Telephones

4.58 This form assigns keys system telephones to the system. See Figure 4–66 for the form layout. **Note:** This form is available in Generic 1004 and Generic 1005 only.

3:46 PM 11-JUN-98		alarm status = MAJOR										
BAY	SLT	CCT	TEN	EXTN	COS	COR	TYPE	PAGE	NAME	ASSOC	COMMENTS	
1	08	03	1	2407	2	3	420	01	TINA S.		R. Coach	
1	08	04	1	1804	2	3	410	01	SONJA S.		R. Coach	
1	08	06	1	1806	2	3	DN	01	CARALEE B.		R. Coach	
1	08	07	1	1807	2	3	DN	01	CHANTAL		R. Coach	
1	08	08	1	1808	2	3	410	01	HEATHER C.		Corp.	
1	08	09	1	1809	2	3	420	01	CONNIE L.		Ext.	
1	08	10					DN					
1	08	11					420					
1	08	12					410					
2	04	05					DN					
2	04	06					DN					
2	04	07					DN					
1	08	09	1	1809	2	3	420	01	CONNIE L.		Ext.	
1-MOVE			2-FIND EXT			3-EXPAND SET			4-DEVICE TYPE		5-RANGE	
6-QUIT			7-BAY/SLT/CCT			8-DELETE			9-REVIEW		0-	

Figure 4–66 Form 45 Layout

#### Field Descriptions

**BAY, SLT and CCT:** These fields list the physical location number of each *SUPERSET* telephone. They are generated by the system based on what was entered in the PROGRAMMED field of Form 01, System Configuration. This field cannot be modified.

**TEN:** This field lists the Tenant Group number for each *SUPERSET* telephone. Default tenant number is one.

**EXTN:** This field lists the Intercom Line extension number of each *SUPERSET* telephone.

**COS:** This field lists the Class-of-Service number for each *SUPERSET* telephone. Default COS number is 1.

**COR:** This field lists the Class-of-Restriction number for each *SUPERSET* telephone. Default COR number is 1.

**TYPE:** When a *SUPERSET* telephone is being programmed, the TYPE field displays SET. For a *SUPERSET* 4DN programmed as an enhanced sub-attendant, SUB is displayed. For a *SUPERSET* DSS module, BLF is displayed.

**Note:** For Generic 1005, the following differences apply to the TYPE field:

When a *SUPERSET* 3DN or a *SUPERSET* 4DN telephone is being programmed, the TYPE field displays DN. For a *SUPERSET* 4DN or a *SUPERSET* 430 programmed as an enhanced sub-attendant, SUB is displayed. When a *SUPERSET* 401 is being

programmed, **401** is displayed. For a *SUPERSET 410*, **410** is displayed. For a *SUPERSET 420*, **420** is displayed. When a *SUPERSET 430* is being programmed, **430** is displayed.

**PAGE:** Shows the paging group that the telephone is in (the default is a blank field – no paging group). Valid entry is a number between 1 and 50.

**NAME:** This field is reserved for a set name up to 10 characters long. The name's first letter must NOT be \*.

**ASSOC:** Associates the device in the TYPE field with another device. A *SUPERSET* telephone can be associated with a modem (enter the ONS port extension number), and a *SUPERSET DSS* module can be associated with an attendant console, subattendant or a *SUPERSET* telephone (enter the extension number). A modem may be associated with more than one *SUPERSET* telephone, but a *SUPERSET* telephone may be associated with only one modem. Two *SUPERSET DSS* modules can be associated to the same device, but a *SUPERSET DSS* module can be associated with only one device. For further information, refer to Practice 9109-095-105-NA, Features Description, under Associated Modem Line, Busy Lamp Field, or Line Types and Appearances. The device in the TYP field device may be disassociated with the device in the

ASSOC field simply by entering another device extension number, or erasing the existing extension number (enter a space). **Note:** This field is updated automatically if the extension number of the associated device is changed.

**COMMENTS:** This field is reserved for additional data (a maximum of 15 characters). It is stored by the system but not used.

### Softkeys

**MOVE:** This softkey relocates a device via its bay slot, and circuit numbers. When the MOVE softkey is pressed, the command line requests the FROM location (BAY: SLOT: CCT: ). When the location is specified and the ENTER softkey is pressed, the command line requests the TO location. The new location is designated and the ENTER softkey is pressed. Note entering invalid numbers inhibits cursor movement.

**FIND EXT:** This softkey selects a device by its extension number. Pressing the FIND EXT softkey displays the ENTER EXTENSION NUM: prompt on the command line. The selection is completed by entering an extension number of the Intercom Line number of a *SUPERSET* telephone. The selected device information appears on the command line.

**EXPAND SET:** Pressing this softkey displays the Expand Set subform. Refer to *Expand Set Subform*.

**RANGE:** This softkey facilitates block programming for key system telephones. Pressing this softkey displays the prompt: FROM BAY: SLOT: CIRCUIT:. Enter valid Bay, Slot and Circuit numbers for the first device and press the ENTER softkey. The system then prompts TO BAY: SLOT: CIRCUIT:. Enter valid Bay, Slot and Circuit numbers for the last device and press the ENTER softkey. Enter Tenant Group, Extension Number, COS and COR for the first device, if this has not been done already. Press the ENTER softkey. The system automatically assigns incremented extension

numbers, the same COS, COR and Tenant Group numbers to the rest of the devices in the block. **Note:** A range program cannot be done over a *SUPERSET DSS* module circuit.

**REVIEW:** Presents 2 more softkeys:

**SET APP:** Displays a new form – refer to *Review (Set App) Subform*. This form lists all programmed appearances of the selected extension number on other *SUPERSET* telephones. This key appears only when a device has been defined.

**PAGING GROUP:** Displays a new form – refer to *Review (Paging Group) Subform*. This form lists all of the sets in the paging group.

**DEVICE TYPE:** Allows the line circuit to be programmed as a specific device type. This softkey appears only when a DNIC circuit is not programmed (only the BAY, SLT, CCT and TYP fields have entries). Programming any other fields “freezes” the device type at its current value. After this, only the fields valid for that device type are available. The following softkeys are presented after pressing the **DEVICE TYPE** softkey:

**BLF:** Sets the TYPE field to **BLF** and designates the device type as a *SUPERSET DSS* module.

**SUB ATT:** Sets the TYPE field to **SUB** and designates the device type as an Enhanced Subattendant. For further information, see Subattendant – Enhanced Functions, in Practice 9109–096–105–NA, Features Description.

**SET:** Sets the TYPE field to **SET** and designates the device type as a normal *SUPERSET 3DN* or *SUPERSET 4DN* key system telephone.

**Note:** For Generic 1005 only, the **DEVICE TYPE** softkey allows the line circuit to be programmed as one of: SUB ATT, BLF, 3/4DN, SS401, SS410, SS420 or SS430.

**3/4DN:** Sets the TYPE field to **DN** and designates the device type as a *SUPERSET 3DN* or a *SUPERSET 4DN*.

**SS401:** Sets the TYPE field to **401** and designates the device type as a *SUPERSET 401*.

**SS410:** Sets the TYPE field to **410** and designates the device type as a *SUPERSET 410*.

**SS420:** Sets the TYPE field to **420** and designates the device type as a *SUPERSET 420*.

**SS430:** Sets the TYPE field to **430** and designates the device type as a *SUPERSET 430*.

The device type can be changed by deleting all of the programmed entries – the **DEVICE TYPE** softkey will then reappear.

The standard softkeys **BAY/SLT/CCT**, **CANCEL**, **DELETE**, **ENTER**, **\*\*MORE\*\*** and **QUIT** are also provided.

## Expand Set Subform for Form 45

- 4.59 This form appears when the EXPAND SET softkey is pressed in the Key System Telephones form. It is used to program *SUPERSET* telephones line appearances and feature keys. Refer to Figure 4-67 for the form layout. **Note:** This form is not available to *SUPERSET 401*.

3:53 PM 11-JUN-98		alarm status = MAJOR						
KEY	TYPE	DIR	RING	SEC	DSS	EXT NUM	TRK ACC	LABEL
*01	Intercom	In/Out	Immed	No		2407		
02	CO Line	In/Out	Immed	No			10	
03	CO Line Grp	O/G	None	No			9	
04	Busy Lamp			No	No	2101		
05	Do Not Dist			No				
06	Key	I/C	None	No		2101		
07	Speed Dial							
08	Speed Dial							
09	Speed Dial							
10	Speed Dial							
11	Speed Dial							
12	Speed Dial							
06	Key	<input type="checkbox"/> I/C	None	No		2101		
1-BOTH WAY		2-IN ONLY		3-OUT ONLY		4-LINE PREF		5-
6-QUIT		7-KEY		8-DELETE		9-REVIEW		0-

Figure 4-67 Expand Set Subform Layout

### Field Descriptions

The asterisk (\*) indicates the line preference for the set – see LINE PREF softkey below.

**KEY:** This field lists the *SUPERSET* Telephone Line Select key numbers and cannot be modified. If the expanded set is one of 2 *SUPERSET DSS* modules associated with another device, the key numbers are preceded by a 1 or a 2, indicating that the module is the first or second module associated with that device.

**Note:** The *SUPERSET 410* has 6 programmable keys; *SUPERSET 420* and *SUPERSET 430* each have 12 programmable keys. The error message "Invalid key for set in use" will appear if the user attempts to program keys 7 to 12 of a *SUPERSET 410* which has been installed on a circuit which has been programmed for a *SUPERSET 420* or a *SUPERSET 430*.

**TYPE:** This field lists the key function. If it is a Speed Dial key, the default assignment, the words "Speed Dial" are shown. If it is a line appearance, the line type is shown. If it is a feature key, the feature name is shown. If the line is a BLF Appearance or a DSS Key, the key type is "Busy Lamp". To change the type of an assigned key, the existing assignment must be deleted. Key 1 defaults to the Intercom line and cannot be deleted or modified. Refer to Practice 9109-096-105-NA, Features Description, for details on line types.

**DIR:** If the key is a line appearance, the directional variant of the line (In/Out, O/G or I/C) is shown.

**RING:** If the key is a line appearance, the ringing variant of the line (Immed, Delay, or None) is shown.

**SEC:** If the key is a line appearance, this field indicates (Yes or No) whether the secretarial variant is enabled. For a Busy Lamp key, setting this field to YES causes an immediate release when the DSS key is pressed.

**DSS:** A YES in this field indicates that the key is a DSS key.

**EXT NUM:** This field contains the extension number of the line. This applies to the Intercom Line, Key lines, Multiple Call lines, Personal Outgoing lines or BLF/DSS lines. When this field is filled for a specific key, no entry is allowed in the corresponding TRK ACC field. The EXT NUM field is blank if the key directly selects a trunk.

**TRK ACC:** This is either a trunk number (CO Line) or an ARS Leading Digit String. These come from Form 14, Non-Dial-In Trunks, or Form 26, ARS: Digit Strings. Only non-dial-in trunks may be entered here. Note that when this field is filled for a specific key, no entry is allowed in the corresponding EXT NUM field.

**LABEL:** Only used if the key type is defined as LDN, and the device type is a subattendant. The only exception is, if the key type is Recall, the LABEL field is automatically RECALL. For all other LDN keys, any character string may be entered up to 12 characters in length. Note: These are keys on the set, defined in the TYPE field.

### Softkeys

**KEY LINE:** Pressing this softkey assigns the selected *SUPERSET* key as a Key Line appearance. "Key" appears in the TYPE field. Then use the TAB or => key to move the cursor to the DIRECTION field.

**PERSONAL O/G:** This softkey appears after the \*\* MORE \*\* softkey is pressed. Pressing the PERSONAL O/G softkey designates the selected *SUPERSET* key as a personal outgoing line. No other fields can be edited. Press the ENTER softkey. "Personal" appears in the TYPE field. "O/G" appears in the DIR field. "None" appears in the RING field, and "No" appears in the SEC field.

**MULTI-CALL:** Pressing this softkey assigns the selected *SUPERSET* key as a Multiple Call Line appearance. "Multiple" appears in the TYPE field. Then use the TAB or => key to move the cursor to the DIRECTION field.

**FEATURE:** Pressing this softkey assigns the selected *SUPERSET* line appearance key as a feature access key. This applies to a *SUPERSET 3DN*, *SUPERSET 4DN*, *SUPERSET 410*, *SUPERSET 420* or a *SUPERSET 430*. The following softkeys appear when the cursor is at the TYPE field and the FEATURE softkey is pressed:

- AUTO ANSWER
- DO NOT DIST (Do Not Disturb)
- PRIVACY REL (Privacy Release)

- OVERRIDE
- PA PAGING
- CAMPON
- MUSIC
- CALL FORWARD
- CALL PICKUP
- NIGHT ANSWER
- CALLBACK
- SWAP (Trade Calls)
- CALL/ATTN (Data Call Connect)
- DATA DISC (Data Call Disconnect)
- DIRECT PAGE
- ACCOUNT CODE
- FORWARD CALL

**Note:** Refer to Practice 9109-096-105-NA, Features Description for a description of the feature keys available for digital *SUPERSET* telephones.

**BLF/DSS:** Programs the selected key as a busy lamp field appearance (for the associated extension number).

**KEY:** This softkey selects a *SUPERSET* key by number. Pressing the KEY softkey displays the ENTER KEY NUM: prompt on the command line.

**LDN:** This applies only to Enhanced Subattendant positions. Programs the selected key as an enhanced sub-attendant LDN key. LDN is displayed in the TYPE field. At this point, a ring type can be selected, an extension number entered, and a label entered. The label is displayed on the *SUPERSET 4DN* and the *SUPERSET 430* display. An enhanced sub-attendant may have up to 3 LDN positions.

**HOLD POS:** This applies only to Enhanced Subattendant positions. Programs the selected key as an enhanced sub-attendant hold slot. Hold Pos is displayed in the TYPE field. No other fields may be programmed. An enhanced sub-attendant may have up to 3 hold slots.

**RECALL:** This applies only to Enhanced Subattendant positions. Programs the selected key as an enhanced sub-attendant Recall key. Recall is displayed in the TYPE field. The only other field that may be programmed is the RING field. An enhanced sub-attendant may have only one Recall Key.

**REVIEW:** Presents the set application review subform (refer to *Review Subform – Set App*).

**BOTH WAY:** Pressing this softkey enables the selected *SUPERSET* key (line appearance) to originate and receive calls. The DIR field displays the In/Out indication.

**IN ONLY:** Pressing this softkey restricts the selected *SUPERSET* key (line appearance) to receiving incoming calls only. No call originations are permitted. The DIR field displays "I/C".

**IMMED RING:** Pressing this softkey programs the selected *SUPERSET* key (line appearance) to ring the *SUPERSET* telephone immediately for incoming calls. The form displays "Immed" in the RING field to indicate this condition.

**DELAY RING:** Pressing this softkey causes incoming calls to flash the selected key (line appearance) for a programmable period of time and then ring the *SUPERSET* telephone for incoming calls. The "Delay" indication appears in the RING field.

**NO RING:** Pressing this softkey prevents incoming calls from ringing the *SUPERSET* telephone ringer. Only the line appearance flashes. The "None" indication appears in the RING field.

**DSS:** Appears only in the DSS field. Enables the DSS key associated with a BLF appearance. The YES indication appears in the DSS field.

**NON DSS:** Appears only in the DSS field. Disables the DSS key associated with a BLF appearance. The NO indication appears in the DSS field.

**NON SECR:** Pressing this softkey disables the secretarial function for the selected *SUPERSET* key (line appearance). The NO indication appears in the SECRETARIAL field. For a DSS key, this disables the secretarial option.

**SECRETARIAL:** Pressing this softkey enables the secretarial function for the selected *SUPERSET* key (line appearance). The YES indication appears in the SECRETARIAL field. When a Line Select key is set as a secretarial key, then the user can override the DO NOT DISTURB feature on the *SUPERSET* telephone corresponding to that line appearance. For a DSS key, this enables the secretarial option.

**LINE PREF:** Allows selection of the preferred line. This can be one of: INTERCOM key, CO LINE key, CO LINE GRP key, PERSONAL O/G key or MANUAL (must press a line key) – no other line types are permitted to be the preferred origination line. The line programmed as the preferred line will have an asterisk (\*) beside its number in the KEY field.

**CO LINE:** Assigns the selected *SUPERSET* key as a CO Line appearance. This gives the telephone direct access to a trunk. Only Non-Dial In trunks can be specified. Up to 16 telephones can have an appearance of the same trunk. The SEC, DSS, EXT NUM and LABEL fields are not accessible.

**CO LINE GRP:** Assigns the selected key as a CO Line Group key. This gives the telephone direct access to a group of trunks through ARS. **Note:** It is the responsibility of the installer to program access limitations via CORs (Form 20 and Form 26). The TRK ACC field must match an ARS leading digit string from Form 26.

The standard softkeys **CANCEL**, **DELETE**, **ENTER**, **\*\* MORE \*\*** and **QUIT** are also provided.

## Review Subform (SET APP) for Form 45

- 4.60 This form appears when the REVIEW and SET APP softkeys are pressed in the Key System Telephones form, or when the REVIEW softkey is pressed in the Expand Set Subform for Form 45. This form lists all programmed appearances of the selected extension number on other *SUPERSET* telephones. When entered from the Station/*SUPERSET* Form, this form displays a list of all programmed appearances of the selected extension number. When entered from the Expand Set Subform, the form displays all appearances of the selected key's extension number, trunk number, or Sub Attendant LDN number. Refer to Figure 4-68 for the form layout.

CO LINE : 10		BAY	SLOT	CCT	EXT NUM	SET TYPE	KEY
		1	08	03	2407	Key SET	2
		1	08	03	□ 2407	Key SET	2
1-	2-CO LINE GRP	3-TRUNK NUMBER		4-LDN NUM		5-	
6-QUIT	7-	8-		9-EXT NUM		0-	

Figure 4-68 Review (Set App) Subform Layout

### Field Descriptions

The header line displays the selected line appearance access number. For telephones, the type (set, station, subattendant) and application (PBX or KEY system) is shown, along with the extension number. For trunks, the type (trunk number, CO Line CO Line group) is shown along with the trunk number, or leading ARS digits. Extension numbers are also shown for LDNs and logical lines.

**BAY, SLT and CCT:** These fields list the bay, slot and circuit numbers of each extension or *SUPERSET* telephone that has an appearance of the selected line. These fields cannot be modified. The system generates them based on the PROGRAMMED field of Form 01, System Configuration.

**SET TYPE:** This field displays the listed device type; PBX STATION indicates an industry standard telephone, PBX SET indicates a *SUPERSET* telephone, KEY SET indicates a key system telephone, Key SUB-ATT indicates a Sub Attendant for a Key System Tenant group, PBX SUB-ATT indicates a Sub Attendant for a PBX tenant group, and CONSOLE indicates an attendant console.

**KEY:** For listed *SUPERSET* telephones, the KEY field displays the key number where the line appears.

**EXT NUM:** This field displays the extension number assigned to a particular Bay/Slot/Circuit.

**Softkeys**

**TRUNK NUMBER:** This softkey selects a trunk, and shows all sets which have appearances of it. Pressing this softkey displays ENTER TRUNK NUM: prompt on the command line. The trunk selection is completed by entering a valid trunk number (1 – 200), and pressing the ENTER softkey.

**EXT NUM:** This softkey selects an extension number, and shows all sets which have appearances of it. Pressing this softkey displays the ENTER EXTENSION NUM: prompt. The selection is completed by entering a valid Station Number or SUPERSET telephone Number and then pressing the ENTER softkey.

**LDN NUM:** Selects an LDN number, and shows all sets which have appearances of it. Pressing this softkey displays the ENTER LDN NUM: prompt. The selection is completed by entering a valid LDN number and then pressing the ENTER softkey.

**CO LINE GRP:** Applies only to key system telephones. Selects a CO Line Group access code, and shows all sets which have appearances of it. Pressing this softkey displays the ENTER ARS LEADING DIGIT STRING: prompt. The selection is completed by entering a valid access code and then pressing the ENTER softkey.

The standard softkeys **CANCEL**, **ENTER**, and **QUIT** are also provided.

**Review Subform (PAGING GROUP) for Form 45**

4.61 This form appears when the REVIEW and PAGING GROUP softkeys are pressed in the Key System Telephones form. This form lists all of the sets in the paging group. See Figure 4-69 for the form layout.

3:56 PM 11-JUN-98		alarm status = MAJOR				
[PAGING GROUP : 1] [R.C. GP ]		EXTN	BAY	SLT	CCT	COMMENTS
		2407	01	00	03	R. Coach
		1804	01	00	04	R. Coach
		1806	01	00	05	R. Coach
		1807	01	00	07	R. Coach
		1808	01	00	08	Corp.
		1809	01	00	09	Ext.
		<input type="checkbox"/> 2407	01	00	03	R. Coach
1-	2-NAME	3-PAGING GROUP		4-	5-	
6-QUIT	7-	8-	9-EXT NUM		0-	

**Figure 4-69 Review (Paging Group) Subform Layout**

### Field Descriptions

The header line displays the page group, and the page group name (if programmed).

**EXTN:** This field displays the extension number of the page group members.

**BAY, SLT and CCT:** These fields list the bay, slot and circuit numbers of the page group members.

**COMMENTS:** This field displays the COMMENTS field from the corresponding lines in Form 45, Key System Telephones.

### Softkeys

**NAME:** Specifies a character name for the selected paging group. The "ENTER PAGING GROUP NAME:" prompt is displayed. Selection is completed by entering a character string (maximum 8 characters), followed by the ENTER softkey. The page group name is then displayed in the header line.

**PAGING GROUP:** Selects a paging group. The "ENTER PAGING GROUP:" prompt is displayed. Selection is completed by entering a valid page group number (1 – 50), followed by the ENTER softkey.

**EXT NUM:** This softkey selects a device by its extension number. Pressing this softkey displays the "ENTER EXTENSION NUM:" prompt. The selection is completed by entering a valid Key System *SUPERSET* telephone number and then pressing the ENTER softkey.

The standard softkeys **CANCEL**, **ENTER**, and **QUIT** are also provided.

**Form 46 – Key System Toll Control**

4.62 This form serves to verify dialed digits for the CO Line Key feature. This is similar to, but independent from Form 26 (ARS: Digit Strings). See Figure 4-70 for the form layout.

4:00 PM 11-JUN-90		alarm status = MAJOR			
DIGITS TO BE ANALYZED		QTY TO FOLLOW	LONG DST	TERM TYPE AND NUM	COR GROUP
416		7	NO	TRUNK 12	1
555		7	NO	TRUNK 10	1
N0X		Unknown	YES	TRUNK 11	2
N0X		Unknown	YES	TRUNK 11	2
1-	2- X	3-	4-N0X	5- **MORE**	
6-QUIT	7-FIND STRING	8-DELETE	9-N1X	0-	

**Figure 4-70 Form 46 Layout**

**Field Descriptions**

**DIGITS TO BE ANALYZED:** This field displays those digits for digit analysis. Digit analysis is required so that they can be verified. The total number of digits in this field, plus the number of digits in the QTY TO FOLLOW field cannot exceed 25.

**QTY TO FOLLOW:** This field lists the number of digits that the user dials AFTER the analyzed digits. The Unknown prompt in this field indicates that the number of subsequent digits is unknown to the system.

**LONG DISTANCE:** This field specifies which digit string entries require “long distance” management. When this field displays YES, the system expects an account code for that digit string entry from users with COS Option 201 (Account Code, Forced Entry – Long Distance Calls) enabled. Default condition is NO.

**TERM TYPE AND NUM:** Allows for selection of a termination type (TRUNK or trunk GROUP) and a number (valid trunk number: 1-200; valid trunk group number: 1-50). If TRUNK is chosen as the termination type, only non-dial-in trunks may be entered.

**COR GROUP:** Specifies a COR group which is restricted from accessing the digit string. If the field is left blank, all COR groups can access the digit string. This links the form to Form 20 (ARS: COR Group Definition). Valid COR group numbers: 1-50.

### Softkeys

**YES/NO:** This softkey only appears when the cursor is at the LONG DISTANCE field. Pressing the YES softkey indicates to the system that this entry requires "long distance" management. While NO indicates no "long distance" YES appears in the LONG DISTANCE field. The default condition is no "long distance" management required as indicated by the NO prompt.

**UNKNOWN:** This softkey appears only when the cursor is at the QTY TO FOLLOW field. Pressing the UNKNOWN softkey indicates to the system that the quantity of dialed digits AFTER the analyzed digits is unknown.

**INSERT:** This softkey adds new entries to the form. Pressing the INSERT softkey clears the command line and moves the cursor to the DIGITS TO BE ANALYZED field. The addition is completed by entering the new data for each field and pressing the ENTER softkey. Note that the system inserts the addition one line after the line that was displayed on the command line. The system automatically places all inserted or added strings in numerical ascending order with relation to existing strings.

**TRUNK:** Appears when the cursor is in the TERM TYPE AND NUM field. Sets the termination point device as a trunk. A trunk number is then entered (1 – 200) – this must be a valid non-dial-in trunk number.

**GROUP:** Appears when the cursor is in the TERM TYPE AND NUM field. Sets the termination point device as a trunk group. A trunk group number is then entered (1 – 50) – this must be a valid trunk group number.

**N0X:** This softkey functions as a wild card sequence, where N is any digit from 2 to 9. It represents half of the area codes in North America. Pressing this softkey displays N0X in the DIGITS TO BE ANALYZED field. Note that this softkey can only be pressed at the beginning of a digit string.

**X:** This softkey functions as a wild card digit; it represents any digit from 0 to 9. Pressing this softkey displays X in the DIGITS TO BE ANALYZED field. Note that this softkey can only be pressed at the end of a digit string.

**FIND STRING:** This softkey selects an entry in the DIGITS TO BE ANALYZED field. Pressing the FIND STRING softkey displays the ENTER DIGIT STRING: prompt on the command line. The selection is completed by entering a valid digit string. Note: The entered digit string does not have to be an exact match; the system accepts subsets of digit strings and moves the cursor to the closest entry.

**N1X:** This softkey functions as a wild card sequence, where N is any digit from 2 to 9. It represents half of the area codes in North America. Pressing this softkey displays N1X in the DIGITS TO BE ANALYZED field. Note that this softkey can only be pressed at the beginning of a digit string.

**1N1X, 1N0X, 0N1X, 0N0X:** For area codes not specifically identified, and where dialing is preceded by a 1 or 0 (long distance access code), these wildcard sequences followed by 7 digits would cover all unspecified area codes. This allows wild card restriction of 555 and 976 numbers. These softkeys can only be pressed at the beginning of a digit

string and are available in Generic 1004 and Generic 1005. They are accessed by pressing the **\*\* MORE \*\*** softkey once.

**10XXX0N0X, 10XXX0N1X, 10XXX1N0X, 10XXX1N1X, 10XXX0, 10XXX1:** These wildcard sequences, designed for the call aggregator market (i.e. hotels, motels, hospitals, universities), prevent unauthorized calls from being billed to the originating line, while allowing consumers access to the long distance carrier of their choice. These softkeys can only be pressed at the beginning of a digit string and are available in Generic 1004 and Generic 1005. 10XXX0N0X, 10XXX0N1X, 10XXX1N0X and 10XXX1N1X are accessed by pressing the **\*\* MORE \*\*** softkey twice; 10XXX0 and 10XXX1 are accessed by pressing the **\*\* MORE \*\*** softkey three times.

The standard softkeys **CANCEL, DELETE, ENTER, \*\*MORE\*\*** and **QUIT** are also provided.

# Appendix A.

## PROGRAMMING ERROR MESSAGES

<b>Table A-1 Programming Error Messages</b>	
<b>Error Message</b>	<b>Meaning</b>
XXXXXX is an ACD agent ID	A Supervisor with ACD ID XXXXXX, cannot be displayed, as requested via the FIND SUPER key, because this ID belongs to an agent, not a supervisor.
XXXXXX is an ACD supervisor	The ID entered for the FIND ID key belongs to a senior supervisor or supervisor.
XXXXXX already has day zone X specified	The selected day already has a day zone specification. Only one day zone can be specified per day. Refer to Form 25, ARS: Route Plans.
XXXXXX has no zone specified	All days of the week must have a day zone specification.
*3 must be followed by 01 to 14	In Form 31, System Abbreviated Dial Entry, the "*3" indicates that the subsequent digits will be manually dialed. The number of digits that will be manually dialed follows the "*3" indicator, and can be from 01 to 14.
*5 cannot be followed by further digits	In Form 31, System Abbreviated Dial Entry, the "*5" indicates that the previous number is an Intercom Number. Therefore, no digits can follow the "*5" terminator.
* must be followed by *, 3, 5, 6 or 9	In Form 31, System Abbreviated Dial Entry, only the numbers "3", "5", "6", "9" or "*" are valid entries after an "*" entry.
The access code XXXXXX is already assigned	The access code is used elsewhere in the database. Select another access code. Refer to Form 35, Global Find Access Code, for a list of assigned codes.
Access Code XXXXXX conflicts with the Access Code for HUNT GROUP NUM XX	The code entered has already been defined as a Hunt Group Access Code in Form 17, Hunt Groups. Select a new code or change the Hunt Group Access Code.
Access Code XXXXXX conflicts with an ARS Leading Digits Entry	The system does not allow a partial match between an ARS Leading Digit and an access code. Leading Digit strings must be unique. Refer to Form 26, ARS: Digit Strings and select a new code or change the ARS Leading Digit entry.
Access Code XXXXXX conflicts with an Attendant LDN Access Code	The code entered has already been defined as an LDN Access Code in Form 08, Attendant LDN Assignments. Select a new code or change the LDN assignment.

**Table A-1 Programming Error Messages  
(continued)**

Error Message	Meaning
Access Code XXXXX conflicts with a Console Access Code	The code entered has already been defined as an extension number for a console in Form 07, Console Assignments. Select a new code or change the console extension number.
Access Code XXXXX conflicts with the Feature Access Code for FEATURE NUMBER XX	The code entered has already been defined as a Feature Access Code. Select a new code or change the code in Form 02, Feature Access Codes.
Access Code XXXXX conflicts with a Night Bell Access Code	The code entered has already been defined as an extension number for a night bell in Form 18, Miscellaneous System Ports. Select a new code or change the night bell extension number.
Access Code XXXXX conflicts with a station number or SUPERSET Prime Line number	The code entered has already been defined as a station number or the prime line number of a SUPERSET telephone. Select a new code or change the station number (or Prime Line number) in Form 09, Station/SUPERSET Telephones.
Access Code XXXXX conflicts with SUPERSET line number	The code entered has already been defined as a SUPERSET line extension number in Form 09, SUPERSET Telephone Lines. Select a new code or change the SUPERSET line extension number.
Access code XXXXX does not correspond to a Stn, Set or logical line	Only those access codes (extension numbers) which correspond to a station, SUPERSET key or logical line can be used.
The access code XXXXX does not exist	The selected access code has not been assigned.
Access Code XXXXX does not match with ARS Leading Digits Entry	The access code entered does not match the Direct to ARS access code assigned in Form 02, Feature Access Codes.  The access code must be a defined ARS leading digit string.
Access code entered is not for a station, SUPERSET or logical line	An invalid access code has been entered and the ENTER key is pressed.
The access code for field XXX is invalid	The extension number, Hunt Group Access Code, Night Bell extension number or Attendant Console directory number assigned to one of the DAY, N1 or N2 fields in Form 19, Call Rerouting Table is invalid. Assign a new code in that field.
The access codes for fields XXX & XXX are invalid	The extension numbers, Hunt Group Access Codes, Night Bell extension numbers, or Attendant Console directory numbers assigned to two of the DAY, N1 or N2 fields in Form 19, Call Rerouting Table are invalid. Assign new codes in the fields.

<b>Table A-1 Programming Error Messages (continued)</b>	
<b>Error Message</b>	<b>Meaning</b>
The access codes for fields XXX, XXX & XXX are invalid	The extension numbers, Hunt Group Access Codes, Night Bell extension numbers or Attendant Console directory numbers assigned to the DAY, N1 and N2 fields in Form 19, Call Rerouting Table are invalid. Assign new codes in the fields.
Access code XXXXX is not a valid answer point	The following are valid answer points for the DAY, N1 and N2 fields in Form 14, Non-Dial-In Trunks: <ul style="list-style-type: none"> <li>– an LDN on the Attendant Console,</li> <li>– a Rotary Dial or DTMF set extension number,</li> <li>– a SUPERSET telephone directory number,</li> <li>– a Hunt Group Access Code or,</li> <li>– a Night Bell extension number.</li> </ul>
Account codes of unspecified lengths exist; delete these first	Ensure that all of the account codes in Form 33, Account Code Entry are equal to the specified account code length in Form 04, System Options/System Timers.
Account code value exists in the database	In Form 33, Account Code Entry, the entered Account Code already exists. Select a new Account Code.
ACD agent group XX has no members	The agent group added to the form is empty. It must have members before it can be put in this form.
ACD agent group XX already assigned to a supervisor	The ACD Agent Group which has been edited or inserted into the sub-form, is already programmed under some other supervisor.
ACD Agent Group XX not assigned to a supervisor	ACD group XX, requested by the FIND GROUP key, cannot be displayed, because it has not been assigned to a supervisor yet.
ACD groups under XXXXX must first be deleted	This senior supervisor cannot be deleted from the first-level form by the DELETE key, because there are ACD groups defined under this senior supervisor.
Agent XXXXX does not exist	The ID entered for the FIND ID key does not exist in the database.
Agent XXXXX is on line and cannot be deleted	The DELETE key cannot be used on an agent who is on line.
The agent group XX does not exist	The selected overflow agent group does not exist.
Agent Group XX has no members	The selected Primary ACD Agent Group or Overflow Agent Group is empty. It must have members before it can be put in this form.
AGENT STATUS not allowed when multiple QUEUE STATUS keys are programmed	No agent status keys are allowed on an ACD supervisor key template when multiple queue status keys are programmed.

**Table A-1 Programming Error Messages  
(continued)**

Error Message	Meaning
All members must be idle before changing Hunt Group type	The user attempted to change the hunt group type. The user needs to wait for all of the devices to be free or take them out of service before changing the group type.
Alternate music sources cannot have keyline or multi-call line appearances	Music sources cannot be line appearances.
The ARS Leading Digits XXXX have not been assigned	The access code is valid, but it has not been assigned to any sets.
Associated device already has two <i>SUPERSET DSS</i> Modules attached	An attempt was made to associate more than two <i>SUPERSET DSS</i> modules with a device.
Associated device has a key template established in its COS	An attempt was made to associate a <i>SUPERSET DSS</i> module with a set that has a key template enabled in its COS.
Association of <i>SUPERSET DSS</i> Module to <i>SUPERSET</i> must be removed	An attempt was made to delete a <i>SUPERSET</i> that has one or more <i>SUPERSET DSS</i> modules associated with it.
Attempting to add invalid access code	<p>A PBX <i>SUPERSET DSS</i> Module may only be associated with a PBX set.</p> <p>A Key System <i>SUPERSET DSS</i> Module may only be associated with a Key System set.</p> <p>A <i>SUPERSET DSS</i> Module must be associated with a <i>SUPERSET</i> telephone; not with a standard telephone set.</p>
Attempting to add more than XXX members to this group	<p>There are a maximum of 50 members for each Pickup Group, Trunk Group and Hunt Groups. Note: 100 max. for hunt groups in Generic 1004 and Generic 1005.</p> <p>Maximum 16 members in a Paging Group.</p>
Attempting to define multiple appearances of LDN XXX on this set	An LDN may appear only once on a given set.
Attempting to define multiple KEY LINE appearances of XXXXX on this SET	An access code for a Key Line appearance cannot be duplicated on another Key Line appearance on that <i>SUPERSET</i> telephone. Refer to Form 09, (Expand Set Subform) <i>SUPERSET</i> Telephone Lines.
Attempting to define multiple key types for Access Code XXX	In Form 09, Stations/ <i>SUPERSET</i> Telephones, only one key type can be assigned to each station number.
Attempting to define multiple key types for Trunk Number XX	In Form 09, Stations/ <i>SUPERSET</i> Telephones or Form 45, Key System Telephones, only one key type can be assigned to each Trunk Number.
Attempting to delete an ACD path that is currently in use	This ACD path cannot be deleted because there are ACD calls currently being handled via this path.

<b>Table A-1 Programming Error Messages (continued)</b>	
<b>Error Message</b>	<b>Meaning</b>
Attempting to delete a device for which a disk operation is pending – retry	Attempting to delete data not fully written to disk yet. Try again later.
Attempting to enter invalid access code	An invalid access code was entered. Note: a blank access code is not allowed.
Attempting to program more than 16 appearances for <i>SUPERSET</i> line	A single <i>SUPERSET</i> line may have a maximum of 16 appearances on other sets.
Attempting to program more than XX appearances for sub-attendant LDN	There is a limited number of appearances for any line appearance on sets in the system and the user attempted to exceed this limit.
Attempting to remove an Agent Group that has calls waiting	This message will be displayed if the Primary Agent group or the Overflow agent groups have calls waiting and the user is attempting to change or delete the agent group or delete the path.
Attempting to remove a Music Source that is currently in use	Someone is listening to the Music source so it cannot be removed. This message can occur when attempting to change or delete a music source, deleting the recording that the music source is in, or deleting the path.
Attempting to remove a Recording that is currently in use	Someone is using the Recording hunt group so it cannot be removed. This message can occur when attempting to change or delete the recording or when deleting the path.
Attempting update/delete of a device that is currently in use	The selected device is being used; modify this device at a later time.
Automated Attendant hunt group may not contain <i>SUPERSETS</i>	An auto attendant hunt group can only contain Industry Standard Telephones.
Bay/Slot/Circuit XX/XX/XX is already assigned	The specified bay/slot/circuit is assigned elsewhere. Select a new bay/slot/circuit number or change the assignment of that bay/slot/circuit number. Refer to Form 01, System Configuration and Form 09, Stations/ <i>SUPERSET</i> Telephones.
Bay/Slot/Circuit XX/XX/XX is already programmed elsewhere	The specified bay/slot/circuit is assigned elsewhere. Select a new bay/slot/circuit number or change the assignment of that bay/slot/circuit number. Refer to Form 07, Console Assignment, Form 09, Stations/ <i>SUPERSET</i> Telephones and Form 12, Data Assignment.
The Bay/Slot/Circuit – XX/XX/XX cannot be programmed	Devices are assigned to the selected bay/slot/circuit. These devices must be deleted before a new card type can be programmed for the bay/slot/circuit.
Bay/Slot/Circuit XX/XX/XX has device programmed Cannot change system	Attempting to change system type (336-Port/456-Port) while devices are programmed for bays, 3, 4, and/or 5. Delete devices in these bays. Refer to Form 01, System Configuration.

**Table A-1 Programming Error Messages  
(continued)**

Error Message	Meaning
The Bay/Slot/Circuit – XX/XX/XX is not present	The specified circuit number is not applicable for these bay and slot numbers. Re-enter the bay and slot numbers without the circuit number or enter 0 for the circuit number.
The Bay/Slot/Circuit – XX/XX/XX is not programmed as a console	The selected bay/slot/circuit is not a console. Refer to Form 01, System Configuration and reprogram this bay/slot/circuit as a console.
The Bay/Slot/Circuit – XX/XX/XX is not programmed as a DIAL-IN trunk	The selected bay/slot/circuit is programmed as a Non-Dial-In Trunk. Refer to Form 14, Dial-In Trunks.
The Bay/Slot/Circuit – XX/XX/XX is not programmed as a DNIC	The selected bay/slot/circuit is not a DNIC circuit.
The Bay/Slot/Circuit – XX/XX/XX is not programmed as a MUSIC/PAGER MODULE	The selected bay/slot/circuit is not a music/pager assignment. Refer to Form 01, System Configuration and reprogram this bay/slot/circuit as a Music/Pager Module.
The Bay/Slot/Circuit – XX/XX/XX is not programmed as a NON-DIAL-IN trunk	The selected bay/slot/circuit is programmed as a Dial-In Trunk. Refer to Form 15, Dial-In Trunks.
The Bay/Slot/Circuit – XX/XX/XX is not programmed as a RECEIVER MODULE	Relays (Subcircuits 5 and 6) are located on the Receiver/Relay Module only. Ensure that there is a Receiver/Relay Module on a Universal Card at that location in Form 01, System Configuration.
The Bay/Slot/Circuit – XX/XX/XX has incompatible device type programmed.	The user attempted to range program over different card types, a circuit that has a BLF programmed or a circuit that has a SUB (enhanced subattendant) programmed.
The Bay/Slot/Circuit – XX/XX/XX is not programmed as a trunk	The selected trunk number corresponds to a bay/slot/circuit that is not programmed as a trunk.
The Bay/Slot/Circuit – XX/XX/XX is not programmed as a UNIVERSAL CARD	The selected bay/slot/circuit is not a Universal Card assignment. Refer to Form 01, System Configuration and reprogram this bay/slot/circuit as a Universal Card.
Cannot change tenant grp, if a member of Modem Pool Hunt Group	The user attempted to change the tenant of a modem which was a member of a modem pool hunt group.
Cannot delete last agent while callers are waiting on ACD Group XX	The user attempted to delete the last agent from ACD group XX, which would delete group XX itself. However, there are ACD calls waiting for this group, so the deletion cannot be permitted at this time.
Cannot disable option when Automated Attendant programming is present	The user attempted to disable System Option 16 – Automated Attendant when there are Auto Attendant groups programmed in the system.
Cannot enable DTRX due to invalid mode or DTE not assigned	The user attempted to enable the DTRX option in the hunt group options form for a modem hunt group for which DTRX does not apply. The group has to be in ANSWER or BOTH mode.

<b>Table A-1 Programming Error Messages (continued)</b>	
<b>Error Message</b>	<b>Meaning</b>
Cannot modify LEADING DIGITS until digit strings deleted	In Form 26, ARS: Digit Strings, the digit entries in the DIGITS TO BE ANALYZED field must be deleted before the digit entries in the LEADING DIGITS field can be modified.
Cannot update music/pager assignment – must delete and re-enter	To modify the selected music/pager assignment, it must first be deleted and then re-entered.
Can only use “X” wildcard at end of strings	The X softkey can only be pressed at the end of a digit string entry. Refer to Form 26, ARS: Digit Strings.
Circuit descriptor type must match programmed trunk hardware type	The selected trunk circuit descriptor type in Form 13, Trunk Circuit Descriptors must match the specified Trunk Card type in Form 01, System Configuration.
Configuration cannot be changed for the Bay/Slot/Circuit – XX/XX/XX	In Form 01, System Configuration, the data in the PROGRAMMED field cannot be matched to the data in the INSTALLED field as devices are already assigned to that physical location. Cannot change the configuration until the devices are de-assigned.
This console has LDN assigned – cannot delete	An Attendant Console can only be deleted from the system if all of its LDN assignments are removed first. Refer to Form 08, Console LDN Assignments.
Consoles that share an LDN access code must be in the same TENANT GROUP	Attendant Consoles that share the same LDN Access Code must also share the same Tenant Group. Refer to Form 07, Console Assignments.
COR group out of range. Valid range is (1 – 50)	There are a maximum of 50 COR Groups.
COR value is out of range	In Form 32, Customer Data Print, the COR value specified must be valid (1 => 25 for each COR Group). There are a maximum of 50 COR Groups. Refer to Form 20, ARS: Class of Restriction Groups.
COS number must be 1 to 50	Valid range for COS numbers is 1 to 50.
COS value is out of range	In Form 32, Customer Data Print, the COS value specified must be valid (1 => 50).
The current associated set is using a key on the SUPERSET DSS Module	An attempt was made to change the association of a module while the associated set is using a line on the set.
Data port of the DNIC console must be deleted first	The user is attempting to delete the DNIC console in Form 07 without first deleting its data port in Form 12.
Database is out of sync	The database copy in RAM does not match the database copy on the diskette. Delete the selected device and re-enter the device in the appropriate form.

**Table A-1 Programming Error Messages  
(continued)**

Error Message	Meaning
Delete ACD Group XX from ACD PATH YY before deleting last agent	The user attempted to delete the last agent from group XX, which would have the effect of deleting group XX itself. However, group XX is referenced in the ACD PATH form, for path number YY, so it must be deleted from that form first. Then the user will be allowed to delete the last agent, and thus delete the group.
Delete ACD Group XX from ACD SUPERVISORS form before deleting last agent	The user attempted to delete the last agent from group XX, which would delete group XX itself. However, group XX is referenced in the ACD SUPERVISORS form, so it must be deleted from that form first.
Delete in Hunt Group Form first	The user attempted to delete the last member of a hunt group programmed as an overflow point, which would delete the hunt group itself. The member must be deleted from Form 17 first.
DISA trunks cannot have prefix or absorb digits programmed	The user was trying to program these fields for a DISA trunk.
Disk I/O failure – database may be corrupted	Due to the disk I/O failure, the database may be corrupted. Exit CDE Mode, reset the system and then re-enter CDE Mode.
Disk is not ready – data was not written to disk	The disk was not ready. Initiate the write process at a later time.
Disk is write-protected – data was not written to disk	Remove the write-protect tag from the disk. Re-insert the disk in the disk drive and activate the write process again.
DNIC console cannot originate a DTRX call	The data port for a DNIC console cannot have the DTE field in Form 12 filled out since it cannot originate a DTRX.
DTE field is not programmed for this device	First member of a modem hunt group has the DTE field programmed. User attempted to add a member without the DTE field programmed – must be consistent within the hunt group.
DTE field is programmed for this device	First member of a modem hunt group does not have the DTE field programmed. User attempted to add a member with the DTE field programmed – must be consistent within the hunt group.
Entered string is not in the system	In Form 26, ARS Nested Digit Strings, the selected digit string is not defined.

**Table A-1 Programming Error Messages  
(continued)**

Error Message	Meaning
Error in "*" sequences. * (1,2,3,4,5,6,7,8,9,*) are the only valid sequences	The asterisk sequence in the DIGITS TO BE INSERTED field in Form 22, ARS: Modified Digit Table is restricted to the following: *1 = Pause for 5 seconds, *2 = Wait for Dial Tone, *3 = Switch to DTMF for subsequent digits, *4 = Do not display further modified digits on sets or SMDR, *5 = Pause 10 seconds, *6 = Insert caller's ID, *7 = Insert caller's dialed account code, *8 = Insert PBX node ID number, *9 = Pause for 1 second, ** = asterisk character.
Error in COR members. Use spaces between CORs. eg. 1 3 5-14 25	The members for each COR Group must be separated by a space. For consecutive CORs, a dash is inserted.
Error in QTY TO DELETE field Can only delete up to 25	Only 25 digits can be deleted. Refer to the QTY TO DELETE field in Form 22, ARS: Modified Digit Table.
Extn. xxxx can't have a key template and a BLF module at the same time	A telephone may not be programmed with both a key template and an associated <i>SUPERSET DSS</i> Module at the same time.
The extension number XXXXX does not exist	The selected extension number is undefined. The extension number must first be defined in Form 09, Stations/ <i>SUPERSET</i> Telephones.
Extension number XXXXX has not been assigned a paging group	That extension number is not in a paging group.
EXTENSION NUMBER XXXXX is a member of HUNT GROUP XX	The selected extension number is a member of the Hunt Group shown. An extension number can be a member of only one Hunt Group at a time.
EXTENSION NUMBER XXXXX is a member of PICKUP GROUP XX	The selected extension number is a member of the Pickup Group shown. An extension number can be a member of only one Pickup Group at a time.
A FATAL disk error has been detected, check with your supervisor	The diskette could be damaged. Read and write operations cannot occur. See your supervisor.
FEATURE NUMBER XX conflicts with option YY	The given feature conflicts with the specified system option in Form 4. The option and the feature access code cannot be programmed at the same time.
Feature Number out of range Valid range is (1 - 45)	Feature numbers range from 1 to 45. Refer to Form 02, Feature Access Codes.
First account code position value greater than last	When Print Option Number 14 in Form 32, Customer Data Print is selected, the first specified Account Code must be less than the last specified Account Code.
First digit in Access Code must be '**	The Key System – Retrieve Personal Speed Call feature access code must begin with an asterisk (*).

**Table A-1 Programming Error Messages  
(continued)**

Error Message	Meaning
First digit in digit string cannot be a '**'	This will conflict with the Key System – Retrieve Personal Speed Call. If asterisks (*) are required, program them into the Modified Digit Table.
Form access disallowed; enable verified account codes system option	To access Form 33, Account Code Entry, System Option 05, Verified Account Code must first be enabled. Refer to Form 04, System Options/System Timers.
Form number XX cannot be accessed	The selected form number is reserved for future use or the selected form number has restricted user access. Refer to Form 28, Form Access Restriction Definition for the level of access for each form.
Form number out of range	The selected Form number is invalid. Refer to Table 3-1.
High power card cannot be programmed at this location	The Universal Card can only be assigned to those card slots rated for high power consumption. These are the upper slots of any digital bay.
The hour value XX is out of range	The hour value can range from 01 to 24. Refer to Form 04, System Options/System Timers.
Hunt group must have an access code assigned before name can be programmed	The user attempted to program a name for the hunt group before an access code was programmed. The access code has to be done first.
Incorrect specification of Bay/Slot/Circuit for range programming	The specified start bay/slot/circuit numbers must be less than the end bay/slot/circuit numbers.
Inserted too many digits Up to 38 allowed, with '**n' counted as 1	The specified entry exceeds the maximum. A maximum of 38 entries are allowed in the DIGITS TO BE INSERTED field in Form 22, ARS: Modified Digit Table.
Invalid default destination	The user attempted to program an invalid default destination for an auto attendant group. See Practice 9109-096-625-NA, Automated Attendant Application Package, for a list of valid destinations.
Invalid digit to insert Use 0-9 or “*(1,2,3,4,5,*)” only	<p>The specified entry is invalid. The entries in the DIGITS TO BE INSERTED field are restricted to the following:</p> <ul style="list-style-type: none"> <li>- 0 to 9 and</li> <li>- the valid asterisk sequences.</li> </ul>
Invalid key for set in use	The user attempted to program invalid keys (7 to 12) for a SUPERSET 410 on expanded set forms for Form 09 and Form 45.
Key number XX cannot be programmed as the Origination Line Preference key	This can only be one of: INTERCOM Key, CO Line Key, CO Line Group Key, MANUAL, or PERSONAL O/G Key.

<b>Table A-1 Programming Error Messages (continued)</b>	
<b>Error Message</b>	<b>Meaning</b>
The maximum ACD positions allowed are already assigned	The user attempted to insert a 1000th ACD position into the system. Only 999 are allowed. ACD positions include agents, supervisors and senior supervisors.
Maximum Afterwork Timer is 15:00	The user entered a timer out of range.
Maximum Waiting Too Long Timer is 54:00	The user entered a timer out of range.
The minute value XX is out of range	The minute value can range from 01 to XX, where XX is option specific. Refer to Form 04, System Options/System Timers.
MODIFIED DIGIT ENTRY out of range Valid range is (1 – 50)	The selected Entry Number is invalid. The range is 1 to 50. Refer to Form 22, ARS: Modified Digit Table.
Modified digit table entries are from 1 to 50	The selected Entry number is invalid. The range is 01 to 50. Select a new Entry number. Refer to Form 22, ARS: Modified Digit Table.
Module must have only BLF/DSS keys before moving to non- <i>SUPERSET</i>	An attempt was made to delete or move a <i>SUPERSET DSS</i> module to stand alone mode and there are still keys programmed on it – a stand alone module may have only BLF appearances programmed on it.
Multiple QUEUE STATUS keys not allowed with AGENT STATUS keys	Multiple queue status keys are not allowed on an ACD supervisor key template when agent status keys are programmed.
Must delete all appearances of XXX from CALL REROUTING TABLE	This ACD path cannot be deleted, because its access code appears in the CALL REROUTING table (Form 19).
Must delete all appearances of XXXXX from CALL REROUTING TABLE	The selected device must have its access code or extension number deleted from the Call Rerouting Table before it can be removed from the system. Refer to Form 19, Call Rerouting Table.
Must delete all appearances of XXXXX from Key System Telephones Form	This digit string is used in Form 45 as CO Line Group Keys – must delete this first. Use the REVIEW form in the Key Sets form to review the list of <i>SUPERSETS</i> using this leading digit.
Must delete all appearances of XXX in NON-DIAL-IN trunks	This ACD path cannot be deleted because its access code appears in the NON-DIAL-IN TRUNKS form (Form 14).
Must delete all appearances of XXX on all sets before deleting trunk	This trunk is programmed on a set as a CO Line key in Form 45 – must delete there first.
Must delete all appearances of XXXXX in Hunt Group Options form	The user attempted to delete a device which is programmed in the Hunt Group Options form as a default destination for auto attendant or an overflow point.

**Table A-1 Programming Error Messages  
(continued)**

Error Message	Meaning
Must delete all Digit Strings that begin with a *.*	Before programming this access code, go to the SHOW STRINGS subform of Form 26 – ARS: Digit Strings, and delete all digit strings beginning with an asterisk (*).
Must delete all key definitions before deleting set	The selected <i>SUPERSET</i> telephone must have all its key definitions deleted before it can be removed from the system. Refer to Form 09, (Expand Set Subform) <i>SUPERSET</i> Telephone Lines.
Must delete appearances of XXXXX from answer points in NON-DIAL-IN TRUNKS	The selected device must have its access code or extension number deleted from the answer points in Form 14, Non-Dial-In Trunks before it can be removed from the system.
Must delete BLF appearances starting on device XXXX before deleting	The user attempted to delete a device which has BLF appearances on the specified device. The appearances must be deleted first.
Must delete the appearances of XXXXX on all sets before deleting set	All appearances of the station number (or Prime Line number) must be deleted before that set can be removed from the system.
Must enter first choice for route list to be defined (leave no gaps)	In Form 24, ARS: Route Lists, the FIRST field must be specified with a valid Route List number before the SECOND field is specified.
Must enter LEADING DIGITS	To complete the entry in Form 26, ARS: Digit Strings, must enter digits in the LEADING DIGITS field.
Must first disable Option 217 in COS ( 1 – 50 )	Cos Option 217 Direct To ARS must be disabled before the Direct To ARS feature access code can be deleted.
Must program Direct To ARS access code first	The user attempted to enable COS Option 217, Direct To ARS when there is no feature access code programmed in Form 02 for this feature. Form 02 must be programmed first.
Neither Option #248 Nor #249 are enabled yet	One of these COS Options must be enabled for correct system operation.
Night Bell cannot be programmed on bay XX	Night Bells can only be programmed in bays 1 or 2 for systems which are not configured as a 672 port system.
No CONSOLE MODULES are programmed	The Console Module must be assigned to a bay/slot/circuit/subcircuit in Form 01, System Configuration.
No DIAL-IN trunk cards are programmed	A card that supports Dial-In Trunks must be defined in Form 01, System Configuration.
No DNIC cards are programmed	To access Form 45, there must be DNIC cards programmed into Form 01.
No more space available for comments	Subsequent comments that are entered in the CDE Forms are not saved.

**Table A-1 Programming Error Messages  
(continued)**

Error Message	Meaning
Non-existent account code value has been entered	During a search in Form 32, Customer Data Print, the entered Account Code does not exist. Select another Account Code.
No NON-DIAL-IN trunk cards are programmed	A card that supports Non-Dial-In Trunks must be defined in Form 01, System Configuration.
No STATION or SUPERSET cards are programmed	A card that supports Rotary Dial or DTMF sets or a card that supports SUPERSET telephones must be defined in Form 01, System Configuration.
No trunks are assigned to circuit descriptor number X	The trunk circuit descriptor number entered has not been specified in Form 13, Trunk Circuit Descriptors.
NUMBER OF DIGITS TO ABSORB must be in the range (0 – 8)	In the M field of Form 15, Dial-In Trunks, the maximum quantity of digits allowed is 8.
ONS Port access code XXXXX does not exist	The access code entered for the Music Source Following a Recording is non-existent or illegal.
Option 600 conflicts with this option	COS option 600 cannot be enabled at the same time as COS option 682.
Option 682 conflicts with this option	COS option 682 cannot be enabled at the same time as COS option 600.
Option XX conflicts with FEATURE NUMBER YY	The given system option conflicts with the specified feature number in Form 02. The option and the feature access code cannot be programmed at the same time.
Option XX conflicts with this option	The selected option is mutually exclusive with the option number shown.
Option number XXX is out of range; must be between XXX and XXX	The selected option number is out of range. For COS Options, the valid range is 100 to 908. For System Options, the valid range is 1 to 52.
Overflow Agent Groups must be unique	The selected overflow agent group is a duplicate of an overflow already specified for this path, or it is the primary agent group for this ACD path.
The paging group XX has not been assigned	No members in specified group – group undefined.
Recording access code XXXXX does not exist	The access code entered for a recording is non-existent or illegal. The code must be for a recording hunt group.
The power rating of the UNIVERSAL CARD is exceeded	The power rating of the Universal Card is 10. Therefore, the number of modules that can be installed on the Universal Card depends on the individual power rating of the modules. The Console Module has a power rating of 5, the Receiver/Relay Module has a power rating of 2, the Music on Hold/Pager Module has a power rating of 1 and the E&M Trunk Module has a power rating of 3.

**Table A-1 Programming Error Messages  
(continued)**

Error Message	Meaning
Previous transaction encountered a permanent I/O failure; data was not written to disk	Due to the I/O failure, the last write process did not occur. Exit CDE Mode, reset the system and re-enter CDE Mode.
Print Option out of range Valid range is (1 - 50)	In Form 32, Customer Data Print, there are only 50 Print Option numbers. Select a new Print Option number.
This printer specification has already been programmed	System already contains printer parameters.
Recording 1 Start Time must be > = Delay For Ringback	The values for these two items must be adjusted as indicated.
ROUTE LIST out of range Valid range is (1 - 100)	The selected Route List number is invalid. The range is 1 to 100. Refer to Form 24, ARS: Route Lists.
ROUTE out of range Valid range is (1 - 200)	The selected Route number is invalid. The range is 1 to 200. Refer to Form 23, ARS: Route Definition.
ROUTE PLAN out of range Valid range is (1 - 50)	The selected Route Plan number is invalid. The range is 1 to 50. Refer to Form 25, ARS: Route Plans.
RTE PLN= X, DZ= X, TZ= X, Field= ROUTE LIST: Error= entry must be blank	The entered Route List number does not have a corresponding entry in the START HOUR field. Therefore, the ROUTE LIST field must be cleared or a starting time must be specified in the START HOUR field. Refer to Form 25, ARS: Route Plans.
RTE PLN= X, DZ= X, TZ= X, Field= START HOUR, Error = Entry <= previous entry	The START HOUR field entry is less than or equal to the previous START HOUR field entry. The entries in the START HOUR field must be listed in ascending order. Refer to Form 25, ARS: Route Plans.
RTE PLN= X, DZ= X, TZ= X, Field= START HOUR, Error= Entry cannot be deleted	A blank entry in the START HOUR field represents 24 hours. Therefore, the subsequent entry in the START HOUR field is less than or equal to the blank entry. Starting times must be listed in ascending order. Refer to Form 25, ARS: Route Plans.
Start time of a recording must be < Interflow timeout	Adjust the start time as indicated.
Start time of a recording must be < start time of the next recording	The recording start times should be adjusted as indicated.
A sub-attendant prime cannot have keyline or multi-call line appearances	The line must be a single appearance (the prime) in the system.
The SUPERSET has a BLF module and cannot have a COS with a key template	The extension has a SUPERSET DSS Module associated with it and therefore, cannot have a key template programmed in its COS.
The SUPERSET specified and the SUPERSET DSS Module have the same feature key	The module and the set have been programmed with the same feature key.

<b>Table A-1 Programming Error Messages (continued)</b>	
<b>Error Message</b>	<b>Meaning</b>
The <i>SUPERSET</i> specified and the <i>SUPERSET DSS</i> Module have the same key line key	An attempt was made to move a <i>SUPERSET DSS</i> Module to a set that already has an appearance of a DTS, PRIVATE or KEY line that is already on the module.
Supervisor XXXXX does not exist	A Supervisor with ID XXXXX cannot be displayed as requested via the FIND SUPER key because this access code has not been assigned to a supervisor.
System Option 16 must be enabled	This option must be enabled before auto attendant groups can be programmed.
System Option 59 must be programmed before creating an Auto-Attendant group	This option must have a value programmed before an auto attendant group can be programmed.
TENANT NUMBER is out of range Valid is 1 to 25	There are a maximum of 25 Tenant Groups.
TRUNK NUMBER XX does not correspond to a CO trunk	Trunk number entered was either a dial-in trunk or a non-existent trunk. Only non-dial-in trunks may be entered here.
The TRUNK NUMBER XXX is already assigned	Trunk numbers can be assigned to only one trunk. Trunk numbers are assigned in Form 14, Non-Dial-In Trunks and Form 15, Dial-In Trunks.
The TRUNK NUMBER XXX has not been assigned	Entered trunk number does not correspond to a trunk. It must be defined in Form 14, Non-Dial-In Trunks or Form 15, Dial-In Trunks.
TOTAL DIGITS EXPECTED must be in the range (1-9)	In Form 15, Dial-In Trunks, the N field (total digits expected) is restricted to digits 1 to 9. (Generic 1004 and below).
TOTAL DIGITS EXPECTED must be in the range (0 - 10)	In Form 15, Dial-In Trunks, the N field (total digits expected) is restricted to digits 0 to 10. (Generic 1005 only).
Total number of <i>SUPERSET</i> telephones programmed in Bay 3 cannot exceed 64	The power supply restricts the total number of <i>SUPERSET</i> telephones for the Control Cabinet to 64.
Total number of <i>SUPERSET</i> telephones programmed in Bays 4 and 5 cannot exceed 64	The power supply restricts the total number of <i>SUPERSET</i> telephones for the Peripheral Cabinet to 64.
Total string is too long Limit is 26 digits	The total number of digits in the DIGITS TO BE ANALYZED field plus the digits in the LEADING DIGITS field cannot exceed 26. Refer to Form 26, ARS: Digit Strings.
TRUNK GROUP must be entered for a route to be defined	To complete the Route definition, the Trunk Group number must be specified. Refer to Form 23, ARS: Route Definition.
TRUNK NUMBER XX does not correspond to a CO trunk	Only CO trunks can be assigned as DTS in Form 09, (Expand Set Subform) <i>SUPERSET</i> Telephone Lines.

**Table A-1 Programming Error Messages  
(continued)**

Error Message	Meaning
TRUNK NUMBER XXX is a member of TRUNK GROUP XX	The selected trunk number is a member of the Trunk Group shown. A trunk number can be a member of only one Trunk Group at a time.
Unable to delete – A device is programmed for the Bay/Slot/Circuit – XX/XX/XX	Circuits are assigned to the selected card in that bay and slot. Cannot delete the card in that slot until the devices are de-assigned from the forms.
Unable to locate extension XXXXX	The selected extension number is not assigned to any station or set. Refer to Form 09 or Form 45.
Unable to locate extension XXXXX assigned to a PICKUP GROUP	The selected extension number is not assigned to any station or set. Refer to Form 09 or Form 45.
Unable to stop CDE print Try again later	The Customer Data print process cannot be halted. Try again later.
Undefined access number or digit string	In Form 31, System Abbreviated Dial Entry, either the Index Number or the Digit String is blank. Specify the required Index Number or Digit String.
Unmatched Account code length; system option account code length enabled	The length of the entered Account Code does not match the Account Code Length specified in System Option 49. (See Form 04, System Options/System Timers). Enter a new Account Code or change the Account Code Length option.
Update of database failed	The changes to the database were not stored properly on the diskette(s). Ensure proper positioning of the diskette(s) in the drive(s).
User currently programming feature keys Try again later	Cannot EXPAND SET while set user is accessing Program Feature Key feature.
Valid COS range must be entered before COS print is initiated	Before a print operation can occur, a valid COS range must be entered (1 to 50). Refer to Form 03, COS Define.
Valid TRK CCT DESC range must be entered before print is initiated	This error occurs in Form 32, Customer Data Print. The valid Trunk Circuit Descriptor range is 1 to 25.
The value XX is outside valid range for ACD Agent Group (1-50)	The ACD Group number entered is out of range.
The value X is outside valid range for BAY (1-5)	The selected bay number is invalid. The range is 1 to 5.
The value XX is outside valid range for CIRCUIT (1-XX)	The selected circuit number is invalid.
The value XX is outside valid range for CIRCUIT DESCRIPTORS (1-25)	There are a maximum of 25 trunk circuit descriptors.
The value XX is outside valid range for COR (1-25)	The selected COR Group number is out of range. The range is 1 to 25.
The value XX is outside valid range for COS (1-50)	The selected COS number is out of range; the range is 1 to 50.

<b>Table A-1 Programming Error Messages (continued)</b>	
<b>Error Message</b>	<b>Meaning</b>
The value XX is outside valid range for ENTRY NUMBER (1 – XX)	In Form 18, Miscellaneous System Ports, there are only 38 Entry Numbers.
The value X is outside valid range for HUNT GROUP (1 – 50)	The selected Hunt Group number is invalid. The range is 1 to 50.
The value XX is outside valid range for INTERCONNECT NUMBER (1 – XX)	In Form 30, Device Interconnection Table, there are only 25 Interconnect Numbers.
The value XX is outside the valid range for KEY NUMBERS (2 – 15)	The selected <i>SUPERSET</i> key number is invalid. Key numbers range from 2 to 15. <i>SUPERSET</i> key 1 is reserved for the Prime Line and cannot be programmed in Form 09, (Expand Set Subform). Note: Key 1 MAY be programmed for a <i>SUPERSET DSS</i> Module.
The value XX is outside the valid range for KEY NUMBERS	The selected <i>SUPERSET</i> key number is invalid. Key numbers range from 2 to 15 for <i>SUPERSET</i> telephones, and 1 to 32 for <i>SUPERSET DSS</i> Modules.
The value XX is outside the valid range for PAGING GROUP (1 – 50)	The selected Paging Group number is invalid. The range is 1 to 50.
The value XX is outside valid range for PICKUP GROUP (1 – 50)	The selected Pickup Group number is invalid; the range is 1 to 50.
The value XX is outside the valid range for the selected timer option	The selected timer value is invalid. Refer to /r13/, Trunk Hardware Options for a list of valid timer values.
The value XX is outside valid range for SLOT (1 – XX)	The selected slot number is invalid.
The value XX is outside valid range for START HOUR (0 – 23)	In Form 25, ARS: Route Plans, the START HOUR specifies the starting time for each time zone. The time is represented by two digits in 24 hour format.
The value XX is outside valid range for SUBCIRCUIT (X – X)	Subcircuits 1 to 4 refer to the DTMF Receivers; they cannot be accessed. The only subcircuits that can be accessed are the relays on the Receiver/Relay Module. These are Subcircuits 5 and 6.
The value XX is outside valid range for TENANT (1 – 25)	The selected Tenant Group number is invalid; the range is 1 to 25. Tenant Group numbers are used in the following forms: Form 05, Tenant Interconnection Table, Form 06, Tenant Night Switching Control, Form 07, Console Assignments, Form 09, Stations/ <i>SUPERSET</i> Telephones, Form 12, Data Assignment, Form 14, Non-Dial-In Trunks, Form 15, Dial-In Trunks and Form 19, Call Rerouting Table.
The value X is outside valid range for TRUNK GROUP (1 – 50)	The selected Trunk Group number is invalid. The range is 1 to 50.
The value XXX is outside valid range for TRUNK NUMBERS (1 – 200)	Trunk numbers range from 1 to 200.
The value 0 is outside valid range (1–99)	The selected ACD Path or Priority is invalid.

**Table A-1 Programming Error Messages  
(continued)**

<b>Error Message</b>	<b>Meaning</b>
Verified account codes system option must be enabled first	In Form 33, Account Code Entry, the Account Code can only be modified if System Option 05, Verified Account Codes is enabled. Refer to Form 04, System Options/System Timers.
Voice port of the DNIC console must be programmed first	The DNIC console must be programmed first in Form 07 before its data port can be programmed in Form 12.
Warning: This path will be deleted unless 1st two status lines are assigned	The user attempted to QUIT this form with "Access Code for This ACD Path" or "Primary ACD Agent Group" field blank. A path is meaningless without these two pieces of information. The user is now provided with two keys: QUIT, which quits the form and deletes this path, and BACK TO FORM (softkey 0), which returns the user to the form.
Warning: Reassigning agent from group XX CONFIRM or CANCEL	The inserted ID is one that is already programmed in group XX. This agent will be reassigned now to the current ACD Group. Press either the CONFIRM or CANCEL softkey.
Warning: Rec X info will be deleted unless Start Time & Access Code assigned	The user attempted to QUIT the form while only one of the indicated status fields for Recording X was assigned. Recording info is meaningless without both these pieces of info. The user is provided with two keys now: QUIT, which quits the form and deletes all entered info about Recording X, and BACK TO FORM (softkey 0) which returns the user to the form.

# Appendix B.

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## BLANK CDE FORMS

This appendix contains blank CDE forms intended for use as aids in the planning before data entry. For information on the actual CDE forms, refer to the main body of this document. Further information on individual features is contained in Practice 9109-096-105-NA, Features Description.

Forms that cannot be edited are not shown in this appendix. Not all software generics use the same form numbering scheme. Refer to Chapter 3 for form numbers of a particular software generic (see Table 3-1).

# FORM 01 – SYSTEM CONFIGURATION

## For the 336-Port Variant

FORM 01 – SYSTEM CONFIGURATION 336 PORT VARIANT										
BAY	SLT	CCT	PROGRAMMED	COMMENTS		BAY	SLT	CCT	PROGRAMMED	COMMENTS
1	1	—				3	5	—		
1	2	—				for universal modules only	1			
1	3	—			2					
1	4	—			3					
1	5	—			4					
for universal modules only	1					3	6	—		
	2				for universal modules only	1				
	3			2						
	4			3						
1	6	—		4						
for universal modules only	1				3	7	—			
	2				for universal modules only	1				
	3			2						
	4			3						
1	7	—		4						
for universal modules only	1				3	8	—			
	2				for universal modules only	1				
	3			2						
	4			3						
1	8	—		4						
for universal modules only	1				4	1	—			
	2				4	2	—			
	3				4	3	—			
	4				4	4	—			
2	1	—			4	5	—			
2	2	—			for universal modules only	1				
2	3	—		2						
for universal modules only	1					3				
	2					4				
2	4	—			4	6	—			
for universal modules only	1				for universal modules only	1				
	2					2				
	3					3				
	4					4				
3	1	—			4	7	—			
3	2	—			for universal modules only	1				
3	3	—		2						
3	4	—								
					4	8	—			
					for universal modules only	1				
						2				
						3				
						4				



**FORM 01 – SYSTEM CONFIGURATION**  
*For the 480-Port Variant*

FORM 01 – SYSTEM CONFIGURATION 480 PORT VARIANT										
BAY	SLT	CCT	PROGRAMMED	COMMENTS		BAY	SLT	CCT	PROGRAMMED	COMMENTS
1	1	—				3	4	—		
1	2	—				3	5	—		
1	3	—				3	6	—		
1	4	—				3	7	—		
1	5	—				3	8	—		
for universal modules only	1			_____		3	9	—		
	2			_____		3	10	—		
	3			_____		3	11	—		
	4			_____		3	12	—		
1	6	—				3	13	—		
for universal modules only	1			_____		3	14	—		
	2			_____		3	15	—		
	3			_____		4	1	—		
	4			_____		4	2	—		
1	7	—				4	3	—		
for universal modules only	1			_____		4	4	—		
	2			_____		4	5	—		
	3			_____		4	6	—		
	4			_____		4	7	—		
1	8	—				4	8	—		
for universal modules only	1			_____		4	9	—		
	2			_____		4	10	—		
	3			_____		4	11	—		
	4			_____		4	12	—		
2	1	—				4	13	—		
2	2	—				4	14	—		
2	3	—				4	15	—		
for universal modules only	1			_____		5	1	—		
	2			_____		5	2	—		
	3			_____		5	3	—		
	4			_____		5	4	—		
2	4	—				5	5	—		
for universal modules only	1			_____		5	6	—		
	2			_____		5	7	—		
	3			_____		5	8	—		
	4			_____		5	9	—		
3	1	—				5	10	—		
3	2	—				5	11	—		
3	3	—				5	12	—		

**FORM 01 – SYSTEM CONFIGURATION**  
*For the 672-Port or SX-200 FD Variants*

FORM 01 – SYSTEM CONFIGURATION 672-PORT & SX-200 FD VARIANT									
BAY	SLT	CCT	PROGRAMMED	COMMENTS	BAY	SLT	CCT	PROGRAMMED	COMMENTS
1	1	—			2	8	—		
1	2	—			for		1		
1	3	—			universal		2		
1	4	—			modules		3		
1	5	—			only		4		
for		1			3	1	—		
universal		2			3	2	—		
modules		3			3	3	—		
only		4			3	4	—		
1	6	—			3	5	—		
for		2			for		1		
universal		3			universal		2		
modules		4			modules		3		
only		4			only		4		
1	7	—			3	6	—		
for		2			for		1		
universal		3			universal		2		
modules		4			modules		3		
only		4			only		4		
1	8	—			3	7	—		
for		2			for		1		
universal		3			universal		2		
modules		4			modules		3		
only		4			only		4		
2	1	—			3	8	—		
2	2	—			for		1		
2	3	—			universal		2		
2	4	—			modules		3		
2	5	—			only		4		
for		1			4	1	—		
universal		2			4	2	—		
modules		3			4	3	—		
only		4			4	4	—		
2	6	—			4	5	—		
for		2			for		1		
universal		3			universal		2		
modules		4			modules		3		
only		4			only		4		
2	7	—			4	6	—		
for		2			for		1		
universal		3			universal		2		
modules		4			modules		3		
only		4			only		4		

FORM 01 – SYSTEM CONFIGURATION 672-PORT & SX-200 FD VARIANT					(continued)				
BAY	SLT	CCT	PROGRAMMED	COMMENTS	BAY	SLT	CCT	PROGRAMMED	COMMENTS
4	7	—			6	6	—		
for universal modules only		2		_____	for universal modules only		1		_____
		3		_____			2		_____
		4		_____			3		_____
		4		_____			4		_____
4	8	—			6	7	—		
for universal modules only		2		_____	for universal modules only		1		_____
		3		_____			2		_____
		4		_____			3		_____
		4		_____			4		_____
5	1	—			6	8	—		
5	2	—			for universal modules only		1		_____
5	3	—					2		_____
5	4	—					3		_____
5	5	—					4		_____
for universal modules only		1		_____	7	1	—		
		2		_____	7	2	—		
		3		_____	7	3	—		
		4		_____	7	4	—		
5	6	—			7	5	—		
for universal modules only		2		_____	for universal modules only		1		_____
		3		_____			2		_____
		4		_____			3		_____
		4		_____			4		_____
5	7	—			7	6	—		
for universal modules only		2		_____	for universal modules only		1		_____
		3		_____			2		_____
		4		_____			3		_____
		4		_____			4		_____
5	8	—			7	7	—		
for universal modules only		2		_____	for universal modules only		1		_____
		3		_____			2		_____
		4		_____			3		_____
		4		_____			4		_____
6	1	—			7	8	—		
6	2	—			for universal modules only		1		_____
6	3	—					2		_____
6	4	—					3		_____
6	5	—					4		_____
for universal modules only		1		_____					
		2		_____					
		3		_____					
		4		_____					

## FORM 02 – FEATURE ACCESS CODES

FORM 02 – FEATURE ACCESS CODES				
Feature Numbers For			Feature Names	Assigned Access Codes
G1001	G1002 G1003	G1004 G1005		
01	01	01	Account Code Access	
02	02	02	Auto-Answer Activation	
—	—	03	Call Forwarding – All Calls	
—	—	04	Call Forwarding – Internal Only	
—	—	05	Call Forwarding – External Only	
07	07	06	Call Forwarding – I Am Here	
—	—	07	Call Forwarding – Cancel I Am Here	
03	03	—	Call Forwarding – Busy	
04	04	—	Call Forwarding – Don't Answer	
05	05	—	Call Forwarding – Busy / Don't Answer	
06	06	—	Call Forwarding – Follow Me	
08	08	08	Dial Call Pickup	
09	09	09	Directed Call Pickup	
10	10	10	Do Not Disturb	
11	11	11	Extension General Attendant Access	
12	12	12	Paging Access To Default Zone(s)	
13	13	13	Paging Access To Specific Zones	
14	14	14	TAFAS – Any	
15	15	15	TAFAS – Local Tenant	
16	16	16	Hold Pickup Access (Attendant Hold Slots)	
17	17	17	Console Lockout Access Code	
18	18	18	Maintenance Functions (Test Line)	
19	19	19	Direct Inward System Access	
20	20	20	Callback Busy <<single digit>>	
21	21	21	Call Hold	
22	22	22	Call Hold Retrieve (Local)	
23	23	23	Call Hold Retrieve (Remote)	
24	24	24	Abbreviated Dial Access	
25	25	25	Clear All Features	
26	26	26	SUPERSET 4 Telephone Loopback Test	
27	27	27	Tone Demonstration	
—	28	28	ADL Call Setup	
—	29	29	ADL Disconnect	
—	30	30	RESERVED	
30	31	31	Executive Busy Override <<single digit>>	
31	32	32	Automatic Wakeup	
32	33	33	Call Park	

\* Not available in Generic 1002.

\*\*\* Not available in Non-ACD Generic Loads.

**FORM 02 – FEATURE ACCESS CODES (continued)**

Feature Numbers For			Feature Names	Assigned Access Codes
G1001	G1002 G1003	G1004 G1005		
33	34	34	Node ID	
34	35	35	Maid In Room	
35	36	36	<i>SUPERSET 4</i> Tel. Room Status Display	
36	37	37	Direct To ARS	
—	38 *	38	UCD Agent Login / Logout	
—	39 *	39	Analogue Network Accept Caller's Extension	
—	40 *	40	<i>SUPERSET 4</i> Tel. Maid In Room Status Display	
—	41	41	Send Message	
—	42	42	Call Message Sender of Oldest Message	
—	43	43	Callback – No Answer	
—	44 ***	44 ***	ACD Login / Logout	
—	45 ***	45 ***	ACD Silent Monitoring	
—	—	46	Flash Over Trunk	
—	—	47	Program Feature Key	
—	—	48	Key System – Direct Paging Access	
—	—	49	Key System – Group Page Meet–Me–Answer	
—	—	50	Key System – Direct CO Line Select	
—	—	51	Key System – Store Personal Speed Call	
—	—	52	Key System – Retrieve Personal Speed Call	
—	—	53	Double Flash Over Trunk	

Page 2 of 2

\* Not available in Generic 1002.

\*\*\* Not available in Non-ACD Generic Loads.

**FORM 03 – CLASS OF SERVICE DEFINE**

FORM 03 – CLASS OF SERVICE OPTIONS								
			<p align="center"><b>Enter the COS NAME</b> (UP TO 8 CHARACTERS) (Not available in Generic 1001 or Generic 1002)</p>					
COS Option Numbers For			Class Of Service Option Name	COS Option Status				
G1001	G1002 G1003	G1004 G1005		Enter COS # (01 to 50)				
				—	—	—	—	—
100	100	100	Attendant Bell Off					
101	101	101	Attendant O/G Restriction/Room Status Setup					
102	102	102	Attendant Display of System Alarms					
103	103	103	Attendant DISA Code Setup					
104	104	104	Attendant Flexible Night Service Setup					
105	105	105	Attendant Guest Room Key					
106	106	106	Attendant New Call Tone					
107	107	107	Attendant Automatic Call Forward – No Answer					
108	108	108	Attendant Audible Lockout Alarm					
109	109	109	Attendant Serial Call					
110	110	110	Attendant Abbreviated Dial Confidential Number Display					
111	111	111	Attendant Abbreviated Dial Programming					
112	112	112	Attendant Station Busy-Out					
113	113	113	Attendant Call Block Key					
114	114	114	Attendant Trunk Busy-Out					
115	115	115	Attendant – Timed Recall (No Answer) 5 –240 Sec; 0=Disabled					
116	116	116	Attendant – Timed Recall (Hold) 5 – 240 Seconds; 0=Disabled					
117	117	117	Attendant – Timed Recall (Camp On) 5 – 240 Sec; 0=Disabled					
118	118	118	Attendant Call Forward – No Answer Timer 10 – 240 Sec.					
—	119	119	Attendant Tone Signalling					
—	120	120	Attendant Conference Disable					
—	121*	—	Attendant Hold Position Security					
—	—	121	Attendant Station Do Not Disturb					
—	122*	—	Attendant Multi-New Call Tone					
—	—	122	Attendant Setup Time/Date					
—	—	123	Attendant Call Forward Setup and Cancel					
—	—	124	Attendant Hold Position Security					
—	—	125	Attendant Multi-New Call Tone					
—	—	126	RESERVED					
—	—	150	Sub-Attendant Station Setup Advisory Messages					
—	—	151	RESERVED					
—	—	152	RESERVED					
—	—	153	RESERVED					
200	200	200	Account Code, Forced Entry – External Calls					
201	201	201	Account Code, Forced Entry – Long Distance Calls					
202	202	202	Alarm Call					

\* Not available in Generic 1002 except in software load D09 and above. Page 1 of 5  
 \*\* Not available in Generic 1005 FPGK1 / LIT96. \*\*\* Not available in Generic 1002.  
 ♥ Not available in Generic 1004. ♥♥ Not available in Generic 1004, Generic 1005 FPGK1 / LIT96.

FORM 03 – CLASS OF SERVICE OPTIONS (continued)								
COS Option Numbers For			Class Of Service Option Name	COS Option Status				
G1001	G1002 G1003	G1004 G1005		Enter COS # (01 to 50)				
				—	—	—	—	—
203	203	203	Broker's Call					
204	204	204	Call Block Applies (Room To Room)					
205	—	—	Call Distribution Agent Position					
—	205	205	Flash For Waiting Call					
206	206	206	Call Forwarding – Busy					
207	207	207	Call Forwarding – Don't Answer					
208	208	208	Call Forwarding – External					
209	209	209	Call Forwarding – Follow Me					
210	210	210	Call Forwarding Inhibit on Dial-In Trunks					
211	211	211	Call Hold and Retrieve Access					
212	212	212	Can Flash If Talking to an Incoming Trunk					
213	213	213	Can Flash If Talking to an Outgoing Trunk					
214	214	214	Cannot Dial a Trunk after Flashing					
215	215	215	Cannot Dial a Trunk if Holding or in Conference with One					
216	216	216	Data Security					
217	217	217	Direct To ARS					
218	218	218	Directed Call Pickup					
219	219	219	Discriminating Dial Tone					
220	220	220	Do Not Disturb					
221	221	221	Clear All Features					
222	222	222	Call Forward Inhibit on Hold Timeout					
223	223	223	Flash Disable					
224	224	224	Flash for Attendant					
225	225	225	Hold Pickup (Attendant Paged Access)					
226	226	226	Inward Restriction (DID)					
227	227	227	Lockout Alarm Applies					
228	228	228	Manual Line (Dial 0 Hotline)					
229	229	229	COV Voice Mail Port					
230	230	230	Message Register Overflow Alarm					
231	231	231	Message Waiting Setup – Bell					
232	232	232	Message Waiting Setup – Lamp					
233	233	233	Never a Consultee					
234	234	234	Never a Forwardee					
235	235	235	Originate Only					
236	236	236	Outgoing Trunk Callback					
237	237	237	Outgoing Trunk Camp-On					
238	238	238	Override Security					
239	239	239	Priority Dial 0					
240	240	240	Line Privacy					
241	241	241	Receive Only					
242	242	242	Repeated Camp-On Beep					
243	243	243	Non-Busy Extension					
244	244	244	Room Status Display					
245	245	245	Abbreviated Dialing Access					
805	246	246	SMDR – Extended Record					
808	247	247	SMDR – Record Meter Pulses					

\* Not available in Generic 1002 except in software load D09 and above. Page 2 of 5  
 \*\* Not available in Generic 1005 FPGK1 / LIT96. \*\*\* Not available in Generic 1002.  
 ♥ Not available in Generic 1004. ♥♥ Not available in Generic 1004, Generic 1005 FPKG1 / LIT96.

**FORM 03 – CLASS OF SERVICE OPTIONS (continued)**

COS Option Numbers For			Class Of Service Option Name	COS Option Status				
G1001	G1002 G1003	G1004 G1005		Enter COS # (01 to 50)				
				—	—	—	—	—
246	248	248	TAFAS Any Access					
247	249	249	TAFAS Access Tenant					
248	250	250	TAFAS Access During Day Service					
249	251	251	Transfer Dial Tone					
250	252	252	Broker's Call with Transfer					
251	253	253	Call Forward – Don't Answer Timer (2 – 6 Rings)					
252	254	254	Call Hold Recall Timer (PBX Telephones) 1 – 10 Minutes					
253	255	255	Repeated Camp-On Beeps Timer (5 – 15 Seconds)					
254	256	256	UCD Music On Hold Timer (0 – 50 Minutes)					
—	—	257	Flash Over Trunk					
—	258 *	258	Display Prime as Forwarder					
—	259 *	259	Message Sending					
—	—	260	Internal / External Split Call Forwarding					
—	—	261 **	ONS Voice Mail Port					
—	—	262	RESERVED					
—	—	263	RESERVED					
—	—	264	RESERVED					
—	—	265	RESERVED					
300	300	300	Automatic Callback					
301	301	301	Camp-On					
302	302	302	Flash-in Conference					
303	303	303	Paging Zone 1 Access					
304	304	304	Paging Zone 2 Access					
305	305	305	Paging Zone 3 Access					
306	306	306	Paging Zone 4 Access					
307	307	307	Paging Zone 5 Access					
308	308	308	Paging Zone 6 Access					
309	309	309	Paging Zone 7 Access					
310	310	310	Paging Zone 8 Access					
311	311	311	Paging Zone 9 Access					
312	312	312	Paging Default (0 – 9) (0 Gives All Enabled Zones)					
313	313	313	CO Trunk to CO Trunk Connect					
314	314	314	CO Trunk to TIE Trunk Connect					
415	315	315	CO Trunk to DID Trunk Connect					
316	316	316	TIE Trunk to TIE Trunk Connect					
317	317	317	TIE Trunk to DID Trunk Connect					
318	318	318	DID Trunk to DID Trunk Connect					
319	319	319	Extension Non-CO Trunk to Trunk Connect					
—	320	320	Transparent Multi-Console Operation					
—	321	321	RESERVED					
—	322	322	RESERVED					
—	323	323	RESERVED					
—	324	324	RESERVED					
—	325	325	RESERVED					
—	326	326 **	Account Code, Forced Entry – Data Internal Calls					
—	327	327 **	Account Code, Forced Entry – Data External Calls					

\* Not available in Generic 1002 except in software load D09 and above. Page 3 of 5  
 \*\* Not available in Generic 1005 FPKG1 / LIT96. \*\*\* Not available in Generic 1002.  
 ♥ Not available in Generic 1004. ♥♥ Not available in Generic 1004, Generic 1005 FPKG1 / LIT96.

FORM 03 – CLASS OF SERVICE OPTIONS (continued)								
COS Option Numbers For			Class Of Service Option Name	COS Option Status				
G1001	G1002 G1003	G1004 G1005		Enter COS # (01 to 50)				
				—	—	—	—	—
—	328	328 **	Account Code, Forced Entry – Data Long Distance Calls					
—	—	329	RESERVED					
—	—	330	RESERVED					
—	—	331	RESERVED					
400	400	400	Contact Monitor					
401	401	401	Call Park					
402	402	402	Long Loop (Off-Premise Extensions Only)					
403	403	403	Trunk Recall Partial Inhibit					
—	404 *	404	Recording Failure to Hangup Timer (1 – 255 Seconds)					
—	405	405	RESERVED					
—	406	406	RESERVED					
—	407	407	RESERVED					
500	500	500	Override					
501	501	501	Override Announce					
—	502	502 ♥♥	Display ANI/DNIS Information					
—	503	503	RESERVED					
—	—	504	RESERVED					
600	600	600	SUPERSET Tel. – Auto-Answer					
601	601	601	SUPERSET Tel. – Auto-Hold Disable					
602	602	602	SUPERSET Tel. – Background Music					
603	603	603	SUPERSET Tel. – Disconnect Alarm					
604	604	604	PBX SUPERSET Tel. – Automatic Outgoing Line					
605	605	605	SUPERSET Tel. – Message Program					
606	606	—	SUPERSET Tel. – Sub-Attendant					
—	—	606	SUPERSET Tel. – Enhanced Answering Position					
607	607	607	SUPERSET Tel. – Associated Modem Line					
608	608	608	SUPERSET Tel. – Room Status Display					
609	609	609	SUPERSET Tel. – Night Service Switching					
—	610 *	610	SUPERSET Tel. – Guest Room Template (0 – 3) (DN)					
—	611	611	SUPERSET Tel. – Limited New Call Ring					
—	612	612	SUPERSET Tel. – Headset Operation					
—	613	613	Display ANI Information Only					
—	614	614	RESERVED					
—	615	615	RESERVED					
—	650 ***	650 **	ACD – Agent Template (0 – 3; 0 = Disable)					
—	651 ***	651 **	ACD – Supervisor Template (0 – 3; 0 = Disable)					
—	652 ***	652 **	ACD – Senior Supervisor Template (0 – 3; 0 = Disable)					
—	653 ***	653 **	ACD – Agent Always Auto-Answer					
—	654	654	RESERVED					
—	655	655	RESERVED					
—	656	656	RESERVED					
—	657	657	RESERVED					
—	658	658	RESERVED					
—	—	680	Key System – Direct CO Access					
—	—	681	Key Set/Sub Att. – Call Hold Notify Timer (0 – 600 s)					
—	—	682	Key System – Auto Answer – Internal Calls					

\* Not available in Generic 1002 except in software load D09 and above. Page 4 of 5  
 \*\* Not available in Generic 1005 FPKG1 / LIT96. \*\*\* Not available in Generic 1002.  
 ♥ Not available in Generic 1004. ♥♥ Not available in Generic 1004, Generic 1005 FPKG1 / LIT96.

FORM 03 – CLASS OF SERVICE OPTIONS (continued)								
COS Option Numbers For			Class Of Service Option Name	COS Option Status				
G1001	G1002 G1003	G1004 G1005		Enter COS # (01 to 50)				
				—	—	—	—	—
—	—	683 ♥	Key System – Direct Paging Handsfree Answerback					
—	—	684	RESERVED					
700	700	700	SMDR – Does Not Apply					
701	701	701	No Dial Tone					
702	702	702	SMDR – Overwrite Buffer					
—	703	703	Message Register Applies					
—	704 *	704 **	Incoming / Internal Modem Pooling Access					
—	705 *	705	Automatic Overflow From Attendant					
—	706	706	RESERVED					
—	707	707	RESERVED					
—	—	708	RESERVED					
—	—	709	RESERVED					
—	—	710	RESERVED					
800	800	800	ANI Applies					
801	801	801	Incoming Trunk Call Rotary					
802	802	802	Limited Wait for Dial Tone					
803	803	803	SMDR – Drop Calls < n Digits (0 ... 11, 0 = disable)					
804	804	804	SMDR – Drop Incomplete Outgoing Calls					
—	805	805	Trunk No Dial Tone Alarm					
807	806	806	SMDR – Record Incoming Calls					
—	807	807	SMDR – Display Private Speedcall					
810	808	808	Special DISA					
811	809	809	Standard Ring Applies					
812	810	810	DISA During Night Service Only					
—	811	811 ♥♥	ANI/DNIS Trunk					
—	812 ***	812 **	Loop Start Trunk to ACD Path Connect					
—	813	813	RESERVED					
—	814	814 ♥♥	SMDR – Record ANI/DNIS					
—	—	815	RESERVED					
—	—	816	RESERVED					
—	900	900 **	Data Station Queuing					
—	901	901 **	DTRX Herald					
—	902	902 **	DTRX Message Code					
—	903	903 **	DTRX Message Code Text					
—	904	904 **	DTRX Complete Message Text					
—	905	905 **	DTRX Herald Text Select (1– 4)					
—	906	906 **	DATA SMDR – Does Not Apply					
—	907	907 **	DATA SMDR – Extended Record					
—	908	908 **	DATA SMDR – Overwrite Buffer					
—	909	909	RESERVED					
—	910	910	RESERVED					
—	—	911	RESERVED					

\* Not available in Generic 1002 except in software load D09 and above.

\*\* Not available in Generic 1005 FPKG1 / LIT96. \*\*\* Not available in Generic 1002.

♥ Not available in Generic 1004. ♥♥ Not available in Generic 1004, Generic 1005 FPKG1 / LIT96.

## CDE FORM 04 – SYSTEM OPTIONS & TIMERS

<b>FORM 04 – SYSTEM OPTIONS &amp; TIMERS</b>				
<b>Option Numbers For</b>			<b>System Options / System Timers</b>	<b>System Option Status</b>
<b>G1001</b>	<b>G1002 G1003</b>	<b>G1004 G1005</b>		
01	01	01	24 Hour Clock	
—	02	02	Message Lamp test	
—	03	03	Single Paging Amplifier	
04	04	04	Message Waiting and Message Register Clear Print	
05	05	05	Verified Account Codes	
—	06	06	Analogue Networking SMDR	
—	07	07	Cancel 24-Hour Message Waiting	
—	—	08	5-Digit SMDR	
09	09	09	Attendant Call Block	
10	10	10	Attendant Conference Beeps	
11	11	11	Automatic Wakeup	
12	12	12	Automatic Wakeup Alarm	
13	13	13	Automatic Wakeup Print	
14	14	14	Automatic Wakeup Music	
15	15	15	Data Demultiplexer	
16	16 *	16 **	Automated Attendant	
17	17	17	Discriminating Ringing	
18	18	18	Discriminating Ringing Always	
—	—	19 **	Mitel Application Interface	
20	20	20	Holiday Messages	
21	21	21	Incoming to Outgoing Call Forward	
22	22	22	Last Party Clear – Dial Tone	
23	23	23	Message Register Count Additional Supervisions	
24	24	24	Message Register Audit	
25	25	25	Message Register Zero After Audit	
26	26	26	No Overlap Outpulsing	
27	27	27	Room Status Audit	
28	28	28	SMDR Indicate Long Call	
29	29	29	<i>SUPERSET</i> Telephone Last Number Redial	
30	30	30	RESERVED	
31	31	31	Satellite PBX	
32	32	32	Outgoing Call Restriction	
33	33	33	Room Status	
34	34	34	Auto Room Status Conversion / Auto Wakeup Print	
—	35	35 **	Property Management System	
—	36	36	End Of Dial Character (#)	
—	37	37	Calibrated Flash	

\* Not available in Generic 1002.

\*\* Not available in Generic 1005 FPGK1 or Generic 1005 LIT96.

♣♣ Not available in Generic 1003 (Non-ACD) and Generic 1002.

Page 1 of 2

<b>FORM 04 – SYSTEM OPTIONS &amp; TIMERS (continued)</b>				
<b>Option Numbers For</b>			<b>System Options / System Timers</b>	<b>System Option Status</b>
<b>G1001</b>	<b>G1002 G1003</b>	<b>G1004 G1005</b>		
—	38	38	Switch-Hook Flash	
—	39	39 **	DATA SMDR Indicate Long Calls	
—	40	40	Message Register Follows Talker	
—	41 ♣♣	41 **	Automatic Call Distribution (ACD)	
—	42 ♣♣	42 **	ACD Silent Monitoring	
—	43 ♣♣	43 **	ACD Silent Monitoring Beeps	
—	44 ♣♣	44 **	ACD Reports	
—	45	45	RESERVED	
35	46	46	Digit Translation Plan (0 – 3)	
36	47	47	ARS Unknown Digit Length Time-out (2 – 15 Seconds)	
37	48	48	Limited Wait For Dial Tone (1 – 15 Seconds)	
38	49	49	Pseudo Answer Supervision Timer (10 – 60 Seconds)	
39	50	50	Dialing Conflict Timer (2 – 10 Seconds)	
40	51	51	Final Ring Time-out (1 – 30 Minutes)	
41	52	52	Minimum Flash Timer (20 – 50 ms; in 10 ms increments)	
42	53	53	Maximum Flash Timer (20 – 150 ms; in 10 ms increments)	
43	54	54	DISA Answer Timer (1 – 8 Seconds)	
44	55	55	Account Code Length (Variable or 4 – 12 Digits)	
45	56	56	Auto Room Status Conversion / Wakeup Print Timer	
46	57	57	Vacant / Reserved Room Default Call Restriction	
—	58	58	Occupied Room Default Call Restriction	
—	59 ♣♣	59 **	Receivers Reserved for Non-Auto-Attendant Use	
—	60	60	Tone Plan	
61	61	61	RESERVED	
62	62	62	RESERVED	
63	63	63	RESERVED	
64	64	64	RESERVED	
65	65	65	RESERVED	

\* Not available in Generic 1002.

\*\* Not available in Generic 1005 FPGK1 or Generic 1005 LIT96.

♣♣ Not available in Generic 1003 (Non-ACD) and Generic 1002.

Page 2 of 2

**FORM 05 – TENANT INTERCONNECTION TABLE**

FORM 05 – TENANT INTERCONNECTION TABLE																											
Tenant Name	Tenant Number																										
	-	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	
	01	-																									
	02		-																								
	03			-																							
	04				-																						
	05					-																					
	06						-																				
	07							-																			
	08								-																		
	09									-																	
	10										-																
	11											-															
	12												-														
	13													-													
	14														-												
	15															-											
	16																-										
	17																	-									
	18																		-								
	19																			-							
	20																				-						
	21																					-					
	22																						-				
	23																							-			
	24																								-		
	25																									-	

**FORM 06 – TENANT NIGHT SWITCHING CONTROL**

FORM 06 – TENANT NIGHT SWITCHING CONTROL																										
Tenant Name	Tenant Number																									
	-	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
	01	-																								
	02		-																							
	03			-																						
	04				-																					
	05					-																				
	06						-																			
	07							-																		
	08								-																	
	09									-																
	10										-															
	11											-														
	12												-													
	13													-												
	14														-											
	15															-										
	16																-									
	17																	-								
	18																		-							
	19																			-						
	20																				-					
	21																					-				
	22																						-			
	23																							-		
	24																								-	
	25																									-



**FORM 08 – ATTENDANT LDN ASSIGNMENTS**

Sheet      of     

<b>FORM 08 – ATTENDANT LDN ASSIGNMENTS</b>			
Bay/Sit/Cct:: <u>          </u>		Console Extension Number: <u>          </u>	
KEY	DIR NUMBER	LABEL	COMMENTS
2			
3			
4			
5			
6			
7			
8			
9			
0			

Bay/Sit/Cct:: <u>          </u>		Console Extension Number: <u>          </u>	
KEY	DIR NUMBER	LABEL	COMMENTS
2			
3			
4			
5			
6			
7			
8			
9			
0			



FORM 09\* – "EXPAND SET" SUBFORM

**SUPERSET Telephone Lines**

Sheet \_\_\_ of \_\_\_

FORM 09* – SUPERSET TELEPHONE LINES								
Bay/Slt/Cct: _____			Set Type : _____			Extension Number: _____		
KEY *	TYPE	DIR	RING	SEC	DSS **	EXT NUM	TRK NUM	LABEL ***
01	Prime	In/Out	Immed	No	No			
02								
03								
04								
05								
06								
07								
08								
09								
10								
11								
12								
13 *								
14 *								
15 *								

\* The SUPERSET 3 has 3 line keys, the SUPERSET 4 has 15 Line keys, the SUPERSET 410 has 6 Line keys, all other sets have 12 Line keys.  
 \*\* The DSS field is not available in Generic 1001 or Generic 1002.  
 \*\*\* The LABEL field is not available in Generic 1001, Generic 1002 or Generic 1003.

# FORM 09\* – "EXPAND SET" SUBFORM

## SUPERSET DSS Module Lines

Sheet \_\_\_ of \_\_\_

<b>FORM 09* – SUPERSET DSS MODULE LINES</b>								
<small>(This subform does not apply to Generic 1001 or Generic 1002.)</small>								
KEY	TYPE	DIR	RING	SEC	DSS	EXT NUM	TRK NUM	LABEL **
01								
02								
03								
04								
05								
06								
07								
08								
09								
10								
11								
12								
13								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								
31								
32								

\*\* The LABEL field is not available in Generic 1003.



# FORM 11 – DATA CIRCUIT DESCRIPTORS

## FORM 11 – DATA CIRCUIT DESCRIPTORS

(This form does not apply to Generic 1001)

DESCRIPTOR	NUMBER OF DATA CIRCUITS ASSIGNED **	COMMENTS
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		

\*\* This field is automatically updated by the system based on entries in Form 12.

FORM 11\* – "SELECT OPTION" SUBFORM

Data Circuit Descriptor Options

FORM 11* – DATA CIRCUIT DESCRIPTOR OPTIONS										
OPTION NAME	DATA CIRCUIT DESCRIPTOR NUMBER (1 – 25)									
	_1	_2	_3	_4	_5	_6	_7	_8	_9	_0
<b>Session Inactivity Disconnect Timer</b> 0 – 255 minutes										
<b>Guard Timer</b> 0 – 99 seconds										
<b>Minimum Baud Rate</b> 110, 150, 300, 600, 1200, 2400, 4800, 9600 or 19.2K										
<b>Default Baud Rate</b> 110, 150, 300, 600, 1200, 2400, 4800, 9600 or 19.2K										
<b>Maximum Baud Rate</b> 110, 150, 300, 600, 1200, 2400, 4800, 9600 or 19.2K										
<b>Always Use Default Baud Rate When Called</b> YES or NO										
<b>DTR Off Disconnect Timer</b> 0 – 9 seconds										
<b>DTR to CTS Delay Timer</b> 0 – 9900 msec (100 msec increments)										
<b>DTR Forced High</b> YES or NO										
<b>RTS Forced High</b> YES or NO										
<b>DSR is Held High When Device is Idle</b> YES or NO										
<b>CTS is Held High When Device is Idle</b> YES or NO										
<b>Originate A DTRX Call With a Low ⇒ High Transition of DTR</b> YES or NO										
<b>Action Taken if the Idle DTE has DTR Low (Auto-Answer)</b> TOGGLE RI, RAISE DSR, RAISE DCD or REFUSE										
<b>Pooled Modem Communication Established Indicator</b> DCD or DSR										
<b>First Modem Tone</b> 2025, 2100 or 2225 Hz										
<b>Second Modem Tone</b> 2025, 2100 or 2225 Hz										
<b>ASYNC: Keyboard Origination Allowed (Auto Baud)</b> ENABLE or DISABLE										
<b>ASYNC: ADL Auto Baud</b> ENABLE or DISABLE										
<b>ASYNC: Flow Control</b> CTS, XON/XOFF, NONE, PIN 25HI/CTS or PIN 25LO/CTS										





**FORM 13 – TRUNK CIRCUIT DESCRIPTORS**

<b>FORM 13 – TRUNK CIRCUIT DESCRIPTORS</b>		
<b>DESCRIPTOR</b>	<b>TRUNK TYPE</b>	<b>COMMENTS</b>
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		

FORM 13\* – "SELECT OPTION" SUBFORM

4-Circuit CO / 4-Circuit DISA Trunks

FORM 13* – TRUNK CIRCUIT DESCRIPTOR OPTIONS											
4-CIRCUIT CO TRUNK and 4-CIRCUIT DISA TRUNK OPTIONS		TRUNK CIRCUIT DESCRIPTOR NUMBER (1 – 25)									
		_1	_2	_3	_4	_5	_6	_7	_8	_9	_0
Reverse to Idle	YES or NO										
Far-End Gives Answer Supervision	YES or NO										
Inhibit Automatic Supervision	YES or NO										
No Seize Alarm	YES or NO										
No Release Alarm	YES or NO										
Toll Office	YES or NO										
Is this a CO	YES or NO										
DTMF	YES or NO										
Save Busy-Out Status	YES or NO										
Impedance	600 Ohms or COMPLEX										

# FORM 13\* – "SELECT OPTION" SUBFORM

## 6-Circuit CO / 6-Circuit DISA Trunks

Sheet \_\_\_ of \_\_\_

FORM 13* – TRUNK CIRCUIT DESCRIPTOR OPTIONS		(continued)																			
6-CIRCUIT CO TRUNK and 6-CIRCUIT DISA TRUNK OPTIONS		TRUNK CIRCUIT DESCRIPTOR NUMBER (1 – 25)																			
		_1	_2	_3	_4	_5	_6	_7	_8	_9	_0										
Reverse to Idle	YES or NO																				
Far-End Gives Answer Supervision	YES or NO																				
Inhibit Automatic Supervision	YES or NO																				
No Seize Alarm	YES or NO																				
No Release Alarm	YES or NO																				
Toll Office	YES or NO																				
Is this a CO	YES or NO																				
DTMF	YES or NO																				
Save Busy-Out Status	YES or NO																				
Post Call Metering	0 – 15 sec																				
Calling Party Disconnect Timer	1 – 12 min																				
Dictation Trunk	YES or NO																				
Ignore Remote Disconnect	YES or NO																				
Disconnect Timer	100 – 9900 ms (100 ms inc)																				
Supervision Direction: Incoming Calls Also	YES or NO																				
Guard Timer	0 – 3000 ms (100 ms inc)																				
Ring Cycle Timer	6 – 10 sec																				
Ignore Line Reversal During Seizure	YES or NO																				
Ringling Expected	YES or NO																				
Ringling Debounce Timer	5 – 12 sec																				
Seize Timer	10 – 60 sec (10 sec inc)																				
Flash Timer	200 – 700 ms (100 ms inc)																				
Flash Type	LOOP FLASH or RING GROUND																				
Flash Over Trunk	YES or NO																				
Interdigit Timer	300 – 800 ms (100 ms inc)																				
Digit Outputing Ratio	60/40, 30/20 or 66/33																				
Impedance	600 Ohms or COMPLEX																				

FORM 13\* – "SELECT OPTION" SUBFORM

E&M Module / E&M Module DISA Trunks

Sheet \_\_\_ of \_\_\_

FORM 13* – TRUNK CIRCUIT DESCRIPTOR OPTIONS		(continued)																			
E&M MODULE and E&M MODULE DISA OPTIONS		TRUNK CIRCUIT DESCRIPTOR NUMBER (1 – 25)																			
		_1	_2	_3	_4	_5	_6	_7	_8	_9	_0										
Reverse to Idle	YES or NO																				
Far-End Gives Answer Supervision	YES or NO																				
Inhibit Automatic Supervision	YES or NO																				
No Seize Alarm	YES or NO																				
No Release Alarm	YES or NO																				
Toll Office	YES or NO																				
Is this a CO	YES or NO																				
DTMF	YES or NO																				
Save Busy-Out Status	YES or NO																				
E Lead Invert	YES or NO																				
M Lead Invert	** for Type 5 operation ** YES or NO																				
Disconnect Timer	150 – 300 ms (50 ms inc)																				
Release Acknowledge Timer	2000 – 9900 ms (100 ms inc)																				
Guard Timer	200 – 1000 ms (100 ms inc)																				
Dictation Trunk	YES or NO																				
Incoming Start Type	IMMED, WINK or DELAY																				
Debounce Timer	20 – 150 ms (10 ms inc)																				
Wink Timer	150 – 300 ms (50 ms inc)																				
Outgoing Start Type	IMMED, WINK, DELAY or DELAY INT																				
Digit Outputing Ratio	60/40, 30/20 or 66/33																				
Output Delay Timer	100 – 2000 ms (100 ms inc)																				
Flash Timer	200 – 700 ms (100 ms inc)																				
Flash Type	LOOP FLSH or RING GRND																				
Flash Over Trunk	YES or NO																				
Interdigit Timer	300 – 800 ms (100 ms inc)																				
Wait For Delay Timer	300 – 5000 ms (100 ms inc)																				
Remote End Is a Satellite	YES or NO																				
Remote End Is a Satellite with OPS Lines	YES or NO																				
Impedance	600 Ohms or COMPLEX ** use the DIP switch on the module to program **																				

# FORM 13\* – "SELECT OPTION" SUBFORM

## E&M Card / E&M Card DISA Trunks

Sheet \_\_\_ of \_\_\_

FORM 13* – TRUNK CIRCUIT DESCRIPTOR OPTIONS		(continued)																			
E&M CARD and E&M TRUNK DISA OPTIONS		TRUNK CIRCUIT DESCRIPTOR NUMBER (1 – 25)																			
		_1	_2	_3	_4	_5	_6	_7	_8	_9	_0										
Reverse to Idle	YES or NO																				
Far-End Gives Answer Supervision	YES or NO																				
Inhibit Automatic Supervision	YES or NO																				
No Seize Alarm	YES or NO																				
No Release Alarm	YES or NO																				
Toll Office	YES or NO																				
Is this a CO	YES or NO																				
DTMF	YES or NO																				
Save Busy-Out Status	YES or NO																				
Remote End is a Satellite	YES or NO																				
Remote End is a Satellite with OPS Lines	YES or NO																				
Dictation Trunk	YES or NO																				
Impedance	600 Ohms or COMPLEX																				

FORM 13\* – "SELECT OPTION" SUBFORM

2-Circuit DID/TIE / 2-Circuit TIE DISA Trunks

Sheet \_\_\_ of \_\_\_

FORM 13* – TRUNK CIRCUIT DESCRIPTOR OPTIONS		(continued)												
E&M CARD and E&M TRUNK DISA OPTIONS		TRUNK CIRCUIT DESCRIPTOR NUMBER (1 – 25)												
		_1	_2	_3	_4	_5	_6	_7	_8	_9	_0			
Reverse to Idle	YES or NO													
Far-End Gives Answer Supervision	YES or NO													
Inhibit Automatic Supervision	YES or NO													
No Seize Alarm	YES or NO													
No Release Alarm	YES or NO													
Toll Office	YES or NO													
Is this a CO	YES or NO													
DTMF	YES or NO													
Save Busy-Out Status	YES or NO													
Remote End Is a Satellite	YES or NO													
Remote End Is a Satellite with OPS Lines	YES or NO													
Impedance	600 Ohms or COMPLEX													

# FORM 13\* – "SELECT OPTION" SUBFORM

## 6-Circuit DID Trunk

Sheet \_\_\_ of \_\_\_

FORM 13* – TRUNK CIRCUIT DESCRIPTOR OPTIONS		(continued)												
6-CIRCUIT DID OPTIONS		TRUNK CIRCUIT DESCRIPTOR NUMBER (1 – 25)												
		_1	_2	_3	_4	_5	_6	_7	_8	_9	_0			
Reverse to Idle	YES or NO													
Far-End Gives Answer Supervision	YES or NO													
Inhibit Automatic Supervision	YES or NO													
No Seize Alarm	YES or NO													
No Release Alarm	YES or NO													
Toll Office	YES or NO													
Is this a CO	YES or NO													
DTMF	YES or NO													
Save Busy-Out Status	YES or NO													
Disconnect Timer	150 – 300 ms (50 ms inc)													
Release Acknowledge Timer	2 – 120 sec													
Guard Timer	200 – 1000 ms (100 ms inc)													
Start Type	IMMED, WINK or DELAY													
Debounce Timer	20 – 150 ms (10 ms inc)													
Wink Timer	150 – 300 ms (50 ms inc)													
Remote End is a Satellite	YES or NO													
Remote End is a Satellite with OPS Lines	YES or NO													
Impedance	600 Ohms or COMPLEX													

FORM 13\* – "SELECT OPTION" SUBFORM

T1 E&M / T1 E&M DISA Trunks

Sheet \_\_\_ of \_\_\_

FORM 13* – TRUNK CIRCUIT DESCRIPTOR OPTIONS		(continued)																			
T1 E&M and T1 E&M DISA OPTIONS		TRUNK CIRCUIT DESCRIPTOR NUMBER (1 – 25)																			
		_1	_2	_3	_4	_5	_6	_7	_8	_9	_0										
Reverse to Idle	YES or NO																				
Far-End Gives Answer Supervision	YES or NO																				
Inhibit Automatic Supervision	YES or NO																				
No Seize Alarm	YES or NO																				
No Release Alarm	YES or NO																				
Toll Office	YES or NO																				
Is this a CO	YES or NO																				
DTMF	YES or NO																				
Save Busy-Out Status	YES or NO																				
Disconnect Timer	150 – 300 ms (50 ms inc)																				
Release Acknowledge Timer	2 – 240 sec (2sec inc)																				
Guard Timer	200 – 1000 ms (100 ms inc)																				
Incoming Start Type	IMMED, WINK or DELAY																				
Debounce Timer	20 – 150 ms (10 ms inc)																				
Wink Timer	150 – 300 ms (50 ms inc)																				
Outgoing Start Type	IMMED, WINK, DELAY or DELAY INT																				
Digit Outputpulsing Ratio	60/40, 30/20 or 66/33																				
Outputpulsing Delay Timer	100 – 2000 ms (100 ms inc)																				
Flash Timer	200 – 700 ms (100 ms inc)																				
Flash Type	LOOP FLSH or RING GRND																				
Flash Over Trunk	YES or NO																				
Interdigit Timer	300 – 800 ms (100 ms inc)																				
Wait For Delay Timer	300 – 5000 ms (100 ms inc)																				
Remote End is a Satellite	YES or NO																				
Remote End is a Satellite with OPS Lines	YES or NO																				

# FORM 13\* – "SELECT OPTION" SUBFORM

## T1 DID/TIE / T1 TIE DISA Trunks

Sheet \_\_\_ of \_\_\_

T1 DID/TIE and T1 TIE DISA OPTIONS		TRUNK CIRCUIT DESCRIPTOR NUMBER (1 – 25)																		
		_1	_2	_3	_4	_5	_6	_7	_8	_9	_0									
Far-End Gives Answer Supervision	YES or NO																			
Inhibit Automatic Supervision	YES or NO																			
No Seize Alarm	YES or NO																			
No Release Alarm	YES or NO																			
Toll Office	YES or NO																			
Is this a CO	YES or NO																			
DTMF	YES or NO																			
Save Busy-Out Status	YES or NO																			
Disconnect Timer	150 – 300 ms (50 ms inc)																			
Release Acknowledge Timer	2 – 120 sec																			
Guard Timer	200 – 1000 ms (100 ms inc)																			
Incoming Start Type	IMMED, WINK or DELAY																			
Debounce Timer	20 – 150 ms (10 ms inc)																			
Wink Timer	150 – 300 ms (50 ms inc)																			
Outgoing Start Type	IMMED, WINK, DELAY or DELAY INT																			
Digit Outpulsing Ratio	60/40, 30/20 or 66/33																			
Outpulse Delay Timer	100 – 2000 ms (100 ms inc)																			
Flash Timer	200 – 700 ms (100 ms inc)																			
Flash Type	LOOP FLSH or RING GRND																			
Flash Over Trunk	YES or NO																			
Interdigit Timer	300 – 800 ms (100 ms inc)																			
Wait For Delay Timer	300 – 5000 ms (100 ms inc)																			
Remote End is a Satellite	YES or NO																			
Remote End is a Satellite with OPS Lines	YES or NO																			

**FORM 13\* – "SELECT OPTION" SUBFORM**

**T1 LS/GS / T1 CO DISA Trunks**

Sheet \_\_\_ of \_\_\_

FORM 13* – TRUNK CIRCUIT DESCRIPTOR OPTIONS		(continued)																		
T1 LS/GS TRUNK and T1 CO DISA OPTIONS		TRUNK CIRCUIT DESCRIPTOR NUMBER (1 – 25)																		
		_1	_2	_3	_4	_5	_6	_7	_8	_9	_0									
No Seize Alarm	YES or NO																			
No Release Alarm	YES or NO																			
Toll Office	YES or NO																			
Is this a CO	YES or NO																			
DTMF	YES or NO																			
Save Busy-Out Status	YES or NO																			
Loop Start or Ground Start	T1LS or T1GS																			
Calling Party Disconnect Timer	1 – 12 min																			
Disconnect Timer	100 – 9900 ms (100 ms inc)																			
Guard Timer	0 – 3000 ms (100 ms inc)																			
Ring Cycle Timer	6 – 10 sec																			
Ringing Expected	YES or NO																			
Ringing Debounce Timer	5 – 12 sec																			
Seize Timer	10 – 60 sec (10 sec inc)																			
Flash Timer	200 – 700 ms (100 ms inc)																			
Flash Type	LOOP FLASH or RING GROUND																			
Flash Over Trunk	YES or NO																			
Interdigit Timer	300 – 800 ms (100 ms inc)																			





**FORM 16 – TRUNK GROUPS**

Sheet \_\_\_ of \_\_\_

<b>FORM 16 – TRUNK GROUPS</b>									
Trunk Group's Function:									
TRUNK GROUP NUMBER (1 – 50): _____					TRUNK GROUP NAME:				
HUNTING (Terminal or Circular):					SMDR (YES or NO):				
<b>TRUNK NUMBERS</b>									

Trunk Group's Function:									
TRUNK GROUP NUMBER (1 – 50): _____					TRUNK GROUP NAME:				
HUNTING (Terminal or Circular):					SMDR (YES or NO):				
<b>TRUNK NUMBERS</b>									

Trunk Group's Function:									
TRUNK GROUP NUMBER (1 – 50): _____					TRUNK GROUP NAME:				
HUNTING (Terminal or Circular):					SMDR (YES or NO):				
<b>TRUNK NUMBERS</b>									

# FORM 17 – HUNT GROUPS

Sheet \_\_\_ of \_\_\_

<b>FORM 17 – HUNT GROUPS</b>									
Hunt Group's Function:									
HUNT GROUP NUM (1 – 50 *): _____				ACCESS CODE:			GROUP TYPE:		
HUNTING (Terminal or Circular):					HUNT GROUP NAME:				
<b>OPTIONS</b>									
Overflow <sup>(1)</sup> :					Msg Length <sup>(2)</sup> (mm:ss):				
Default Destination <sup>(3)</sup> :					Dialing Over Recording <sup>(3)</sup> (Y/N):				
Wait For Resources <sup>(3)</sup> (mm:ss):					Prefix Digits <sup>(3)</sup> :				
DTRX <sup>(4)</sup> (Y/N):					Default Modem Group <sup>(4)</sup> (Y/N):				
<b>EXTENSION NUMBERS</b>									
(1) Does not apply to GROUP TYPE "RECORDING" or "AUTO-ATT"					(2) Applies only to GROUP TYPE "RECORDING" or "AUTO-ATT"				
(3) Applies only to GROUP TYPE "AUTO-ATT"					(4) Applies only to GROUP TYPE "MODEM"				

\* (1 – 100) in Generic 1004 and Generic 1005

Hunt Group's Function:									
HUNT GROUP NUM (1 – 50 *): _____				ACCESS CODE:			GROUP TYPE:		
HUNTING (Terminal or Circular):					HUNT GROUP NAME:				
<b>OPTIONS</b>									
Overflow <sup>(1)</sup> :					Msg Length <sup>(2)</sup> (mm:ss):				
Default Destination <sup>(3)</sup> :					Dialing Over Recording <sup>(3)</sup> (Y/N):				
Wait For Resources <sup>(3)</sup> (mm:ss):					Prefix Digits <sup>(3)</sup> :				
DTRX <sup>(4)</sup> (Y/N):					Default Modem Group <sup>(4)</sup> (Y/N):				
<b>EXTENSION NUMBERS</b>									
(1) Does not apply to GROUP TYPE "RECORDING" or "AUTO-ATT"					(2) Applies only to GROUP TYPE "RECORDING" or "AUTO-ATT"				
(3) Applies only to GROUP TYPE "AUTO-ATT"					(4) Applies only to GROUP TYPE "MODEM"				

\* (1 – 100) in Generic 1004 and Generic 1005

**FORM 18 – MISCELLANEOUS SYSTEM PORTS**

FORM 18 – MISCELLANEOUS SYSTEM PORTS						
ENTRY NUMBER	DESCRIPTION	BAY	SLT	CCT	SCT	EXTENSION NUMBER
1	Music On Hold				---	_____
2	Pager 1				---	_____
3	Pager 2				---	_____
4	Pager 3				---	_____
5	Pager 4				---	_____
6	Pager 5				---	_____
7	Pager 6				---	_____
8	Pager 7				---	_____
9	Pager 8				---	_____
10	Pager 9				---	_____
11	Minor Alarm					
12	Major Alarm					
13	Critical Alarm					
14	Night Bell 1					
15	Night Bell 2					
16	Night Bell 3					
17	Night Bell 4					
18	Night Bell 5					
19	Night Bell 6					
20	Night Bell 7					
21	Night Bell 8					
22	Night Bell 9					
23	Night Bell 10					
24	Night Bell 11					
25	Night Bell 12					
26	Night Bell 13					
27	Night Bell 14					
28	Night Bell 15					
29	Night Bell 16					
30	Night Bell 17					
31	Night Bell 18					
32	Night Bell 19					
33	Night Bell 20					
34	Night Bell 21					
35	Night Bell 22					
36	Night Bell 23					
37	Night Bell 24					
38	Night Bell 25					

**FORM 19 – CALL REROUTING TABLE**

Sheet \_\_\_ of \_\_\_

<b>FORM 19 – CALL REROUTING TABLE</b>			
<b>TENANT NUMBER (1 – 25):</b>		<b>TENANT NAME:</b>	
<b>TYPE OF CALL</b>	<b>DAY</b>	<b>N1</b>	<b>N2</b>
Station Dial 0 Routing			
Priority Dial 0 Routing			
DID Recall Point on Busy			
DID Recall Point on No Answer			
DID Routing for Calls into this Tenant			
DID Illegal # Intercept for this Tenant			
DID Vacant Number Routing for this Tenant			
DID Attendant Access Night Points	_____		
Non Dial-In Trunk Alternate Recall Points			
Dial-In Tie Recall Points on Busy			
Dial-In Tie Recall Points on No Answer			
Dial-In Tie Routing for Calls into this Tenant			
Dial-In Tie Illegal # Intercept for this Tenant			
Dial-In Tie Vacant Number Routing for this Tenant			
Dial-In Tie Attendant Access Night Points	_____		
DND Intercept Routing for this Tenant			
Automatic Wake-up Routing for this Tenant			
UCD/Attendant Recording for this Tenant			
UCD On Hold Time-out for this Tenant			
DISA Day Service Routing for this Tenant		_____	_____
Station Vacant Number Routing for this Tenant			
Station Illegal Number Routing for this Tenant			
CO Line Rerouting Points on No Answer			

**FORM 20 – ARS: CLASS OF RESTRICTION GROUPS**

Sheet \_\_\_ of \_\_\_

<b>FORM 20 – ARS: CLASS OF RESTRICTION GROUPS</b>				
COR GROUP NUMBER (1 – 50): _____				
<b>COR GROUP MEMBERS</b> (Enter the COR Number of the denied decices below)				
COMMENTS:				

COR GROUP NUMBER (1 – 50): _____				
<b>COR GROUP MEMBERS</b> (Enter the COR Number of the denied decices below)				
COMMENTS:				

COR GROUP NUMBER (1 – 50): _____				
<b>COR GROUP MEMBERS</b> (Enter the COR Number of the denied decices below)				
COMMENTS:				

**FORM 21 – ARS: DAY ZONE DEFINITION**

<b>FORM 21 – ARS: DAY ZONE DEFINITION</b>							
<b>DAY ZONE</b>	<b>MON.</b>	<b>TUES.</b>	<b>WED.</b>	<b>THU.</b>	<b>FRI.</b>	<b>SAT.</b>	<b>SUN.</b>
01							
02							
03							

**FORM 22 – ARS: MODIFIED DIGIT TABLE**

Sheet \_\_\_ of \_\_\_

<b>FORM 22 – ARS: MODIFIED DIGIT TABLE</b>			
<b>ENTRY NUM (1 – 100) *</b>	<b>QTY TO DELETE</b>	<b>DIGITS TO BE INSERTED</b>	<b>COMMENTS</b>
___ 1			
___ 2			
___ 3			
___ 4			
___ 5			
___ 6			
___ 7			
___ 8			
___ 9			
___ 0			
___ 1			
___ 2			
___ 3			
___ 4			
___ 5			
___ 6			
___ 7			
___ 8			
___ 9			
___ 0			
___ 1			
___ 2			
___ 3			
___ 4			
___ 5			
___ 6			
___ 7			
___ 8			
___ 9			
___ 0			

\* (1 – 50) for Generic 1001

**FORM 23– ARS: ROUTE DEFINITION**

Sheet \_\_\_ of \_\_\_

<b>FORM 23 – ARS: ROUTE DEFINITION</b>				
<b>ROUTE NUM (1 – 200)</b>	<b>TRUNK GROUP (1 – 50)</b>	<b>COR GROUP (1 – 50)</b>	<b>MOD DIGIT ENTRY (1 – 100)</b>	<b>COMMENTS</b>
__ 1				
__ 2				
__ 3				
__ 4				
__ 5				
__ 6				
__ 7				
__ 8				
__ 9				
__ 0				
__ 1				
__ 2				
__ 3				
__ 4				
__ 5				
__ 6				
__ 7				
__ 8				
__ 9				
__ 0				
__ 1				
__ 2				
__ 3				
__ 4				
__ 5				
__ 6				
__ 7				
__ 8				
__ 9				
__ 0				

**FORM 24- ARS: ROUTE LIST**

Sheet \_\_\_ of \_\_\_

FORM 24 - ARS: ROUTE LIST											
LIST NUM (1 - 100)	FIRST	SECOND	WT	THIRD	WT	FOURTH	WT	FIFTH	WT	SIXTH	WT
___ 1											
___ 2											
___ 3											
___ 4											
___ 5											
___ 6											
___ 7											
___ 8											
___ 9											
___ 0											
___ 1											
___ 2											
___ 3											
___ 4											
___ 5											
___ 6											
___ 7											
___ 8											
___ 9											
___ 0											
___ 1											
___ 2											
___ 3											
___ 4											
___ 5											
___ 6											
___ 7											
___ 8											
___ 9											
___ 0											

**FORM 25 – ARS: ROUTE PLANS**

Sheet \_\_\_ of \_\_\_

<b>FORM 25 – ARS: ROUTE PLANS</b>						
ROUTE PLAN (1 – 50): _____			Route Plan Function : _____			
TIME	DAY ZONE 1		DAY ZONE 2		DAY ZONE 3	
ZONE	START HOUR	ROUTE LIST	START HOUR	ROUTE LIST	START HOUR	ROUTE LIST
01						
02						
03						
04						
05						
06						

<b>ROUTE PLAN (1 – 50): _____</b>						
ROUTE PLAN (1 – 50): _____			Route Plan Function : _____			
TIME	DAY ZONE 1		DAY ZONE 2		DAY ZONE 3	
ZONE	START HOUR	ROUTE LIST	START HOUR	ROUTE LIST	START HOUR	ROUTE LIST
01						
02						
03						
04						
05						
06						

<b>ROUTE PLAN (1 – 50): _____</b>						
ROUTE PLAN (1 – 50): _____			Route Plan Function : _____			
TIME	DAY ZONE 1		DAY ZONE 2		DAY ZONE 3	
ZONE	START HOUR	ROUTE LIST	START HOUR	ROUTE LIST	START HOUR	ROUTE LIST
01						
02						
03						
04						
05						
06						





**FORM 27 – ARS: MAXIMUM DIALED DIGITS**

<b>FORM 27 – ARS: MAXIMUM DIALED DIGITS</b>	
<b>COR</b>	<b>MAXIMUM NUMBER OF DIALED DIGITS</b>
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	

## FORM 28 – FORM ACCESS RESTRICTION DEF'N

FORM 28 – FORM ACCESS RESTRICTION DEF'N					
FORM NAME	INST	MAINT1	MAINT2	SUPER	ATT
FORM 1 = SYSTEM CONFIGURATION	R/W				
FORM 2 = FEATURE ACCESS CODES	R/W				
FORM 3 = CLASS OF SERVICE DEFINE	R/W				
FORM 4 = SYSTEM OPTIONS / TIMERS	R/W				
FORM 5 = TENANT INTERCONNECTION	R/W				
FORM 6 = TENANT NIGHT SWITCHING	R/W				
FORM 7 = CONSOLE ASSIGNMENT	R/W				
FORM 8 = ATTENDANT LDN ASSIGNMENT	R/W				
FORM 9 = STATION / SUPERSET TELEPHONES	R/W				
FORM 10 = PICKUP GROUP	R/W				
FORM 11 = DATA CIRCUIT DESCRIPTOR	R/W				
FORM 12 = DATA ASSIGNMENT	R/W				
FORM 13 = TRUNK CRICUIT DESCRIPTOR	R/W				
FORM 14 = NON-DIAL-IN TRUNKS	R/W				
FORM 15 = DIAL-IN TRUNKS	R/W				
FORM 16 = TRUNK GROUPS	R/W				
FORM 17 = HUNT GROUPS	R/W				
FORM 18 = MISCELLANEOUS SYSTEM PORTS	R/W				
FORM 19 = CALL REROUTING TABLE	R/W				
FORM 20 = ARS: COR GROUP DEFINITION	R/W				
FORM 21 = ARS: DAY ZONE DEFINITION	R/W				
FORM 22 = ARS: MODIFIED DIGITS TABLE	R/W				
FORM 23 = ARS: ROUTE DEFINITION	R/W				
FORM 24 = ARS: ROUTE LIST	R/W				
FORM 25 = ARS: ROUTE PLAN	R/W				
FORM 26 = ARS: DIGITS STRINGS	R/W				
FORM 27 = ARS: MAXIMUM DIALED DIGITS	R/W				
FORM 28 = FORM ACCESS RESTRICTION	R/W				
FORM 29 = DTE PROFILE	R/W				
FORM 30 = DEVICE INTERCONNECTION TABLE	R/W				
FORM 31 = SYSTEM ABBREVIATED DIAL ENTRY	R/W				
FORM 32 = CDE DATA PRINT	R/W				
FORM 33 = ACCOUNT CODE ENTRY	R/W				
FORM 34 = DIRECTED I/O	R/W				
FORM 35 = GLOBAL FIND ACCESS CODE	R/W				
FORM 36 = MODEM ASSIGNMENT	R/W				
FORM 37 = GUEST RM SUPERSET KEYS TEMPLATE	R/W				
FORM 38 = ACD KEYS TEMPLATE	R/W				
FORM 39 = ACD AGENT GROUPS	R/W				
FORM 40 = ACD SUPERVISORS	R/W				
FORM 41 = ACD PATHS	R/W				
FORM 42 = T1 LINK DESCRIPTORS	R/W				
FORM 43 = T1 LINK ASSIGNMENTS	R/W				
FORM 44 = T1 NETWORK SYNCHRONIZATION	R/W				
FORM 45 = KEY SYSTEM TELEPHONES	R/W				
FORM 46 = KEY SYSTEM TOLL CONTROL	R/W				

**FORM 29 – DTE PROFILE**

**FORM 29 – DTE PROFILE**

(This form does not apply to Generic 1001)

<b>PROFILE NUMBER</b>	<b>NUMBER OF DATA SETS ASSIGNED **</b>	<b>COMMENTS</b>
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		

\*\* This field is automatically updated by the system based on entries in Form 12.

# FORM 29\* – "SELECT OPTION" SUBFORM

## DTE Profile Options

Sheet \_\_\_ of \_\_\_

FORM 29* – DTE PROFILE OPTIONS										
DTE OPTIONS	DTE PROFILE NUMBER (1 – 25)									
	_1	_2	_3	_4	_5	_6	_7	_8	_9	_0
<b>Terminal Type</b> VIDEO TERM or TELEPRINTER										
<b>Language</b> ENGLISH or FRENCH										
<b>DTRX Echoplex</b> ENABLED or DISABLED										
<b>Editing</b> ENABLED or DISABLED										
<b>Editing Character Delete</b> 0 –127, Decimal value of ASCII code										
<b>Editing Line Display</b> 0 –127, Decimal value of ASCII code										
<b>Inject &lt;LF&gt; after &lt;CR&gt;</b> ALWAYS, NEVER, FROM DTE, or FROM SYSTEM										
<b>Number of Pads after &lt;CR&gt;</b> 0 – 7										
<b>Number of Pads after &lt;LF&gt;</b> 0 – 7										
<b>DTRX Inactivity Timer</b> 1 – 60 seconds										

**FORM 30 – DEVICE INTERCONNECTION TABLE**

<b>FORM 30 – DEVICE INTERCONNECTION TABLE</b>										
<b>DEVICE TYPE</b>		<b>01</b>	<b>02</b>	<b>03</b>	<b>04</b>	<b>05</b>	<b>06</b>	<b>07</b>	<b>...</b>	<b>25</b>
Station / Set	<b>01</b>									
Console	<b>02</b>									
Loop Start Trunk	<b>03</b>									
Ground Start Trunk	<b>04</b>									
DID/Tie Trunk	<b>05</b>									
E&M Trunk (2 or 4 Wire)	<b>06</b>									
RESERVED	<b>07</b>									
RESERVED	<b>...</b>									
RESERVED	<b>25</b>									









**FORM 37 – GUEST ROOM SUPERSET KEYS TEMPLATES**

Sheet 1 of 2

<b>FORM 37 – GUEST ROOM SUPERSET KEYS TEMPLATE</b>			
<i>(This form does not apply to Generic 1001 or Generic 1002.)</i>			
<b>TEMPLATE 1</b>			
<b>KEY</b>	<b>TYPE</b>	<b>SPEED CALL NUMBER</b>	<b>PRIVATE</b>
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			

<b>TEMPLATE 2</b>			
<b>KEY</b>	<b>TYPE</b>	<b>SPEED CALL NUMBER</b>	<b>PRIVATE</b>
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			

**FORM 37 – GUEST ROOM SUPERSET KEYS TEMPLATE**

**(continued)**

**TEMPLATE 3**

<b>KEY</b>	<b>TYPE</b>	<b>SPEED CALL NUMBER</b>	<b>PRIVATE</b>
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			

**FORM 38 – ACD KEYS TEMPLATES**

Sheet 1 of 5

**FORM 38 – ACD KEYS TEMPLATE**

(This form does not apply to Generic 1001 Generic 1002, Generic 1005 FPKG1 or Generic 1005 LIT96.)

**AGENT TEMPLATE 1**

KEY	TYPE	SPEED CALL NUMBER	PRIVATE
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			

**AGENT TEMPLATE 2**

KEY	TYPE	SPEED CALL NUMBER	PRIVATE
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			

**FORM 38 – ACD KEYS TEMPLATE** **(continued)**

<b>AGENT TEMPLATE 3</b>			
<b>KEY</b>	<b>TYPE</b>	<b>SPEED CALL NUMBER</b>	<b>PRIVATE</b>
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			

<b>SUPERVISOR TEMPLATE 1</b>			
<b>KEY</b>	<b>TYPE</b>	<b>SPEED CALL NUMBER</b>	<b>PRIVATE</b>
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			

<b>FORM 38 – ACD KEYS TEMPLATE</b>			
<b>(continued)</b>			
<b>SUPERVISOR TEMPLATE 2</b>			
<b>KEY</b>	<b>TYPE</b>	<b>SPEED CALL NUMBER</b>	<b>PRIVATE</b>
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			

<b>SUPERVISOR TEMPLATE 3</b>			
<b>KEY</b>	<b>TYPE</b>	<b>SPEED CALL NUMBER</b>	<b>PRIVATE</b>
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			

<b>FORM 38 – ACD KEYS TEMPLATE</b>			
<b>(continued)</b>			
<b>SENIOR SUPERVISOR TEMPLATE 1</b>			
<b>KEY</b>	<b>TYPE</b>	<b>SPEED CALL NUMBER</b>	<b>PRIVATE</b>
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			

<b>SENIOR SUPERVISOR TEMPLATE 2</b>			
<b>KEY</b>	<b>TYPE</b>	<b>SPEED CALL NUMBER</b>	<b>PRIVATE</b>
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			

**FORM 38 – ACD KEYS TEMPLATE**

**(continued)**

**SENIOR SUPERVISOR TEMPLATE 3**

<b>KEY</b>	<b>TYPE</b>	<b>SPEED CALL NUMBER</b>	<b>PRIVATE</b>
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			



FORM 39\* – "SELECT OPTIONS" SUBFORM

ACD Agent Group Options

Sheet \_\_\_ of \_\_\_

<b>FORM 39* – ACD AGENT GROUP OPTIONS</b>		
ACD Group Number (1 – 50): _____ ACD Group Name: _____		
	<b>OPTIONS</b>	<b>STATUS</b>
Afterwork Timer	(mm:ss) 00:00 – 15:00 (default 00:00)	
Overflow Timer	(mm:ss) 00:00 – 54:00 (default 09:00)	
First Status Threshold	(mm:ss) 00:00 – 54:00 (default 03:00)	
Second Status Threshold	(mm:ss) 00:00 – 54:00 (default 06:00)	

ACD Group Number (1 – 50): _____ ACD Group Name: _____		
	<b>OPTIONS</b>	<b>STATUS</b>
Afterwork Timer	(mm:ss) 00:00 – 15:00 (default 00:00)	
Overflow Timer	(mm:ss) 00:00 – 54:00 (default 09:00)	
First Status Threshold	(mm:ss) 00:00 – 54:00 (default 03:00)	
Second Status Threshold	(mm:ss) 00:00 – 54:00 (default 06:00)	

ACD Group Number (1 – 50): _____ ACD Group Name: _____		
	<b>OPTIONS</b>	<b>STATUS</b>
Afterwork Timer	(mm:ss) 00:00 – 15:00 (default 00:00)	
Overflow Timer	(mm:ss) 00:00 – 54:00 (default 09:00)	
First Status Threshold	(mm:ss) 00:00 – 54:00 (default 03:00)	
Second Status Threshold	(mm:ss) 00:00 – 54:00 (default 06:00)	

ACD Group Number (1 – 50): _____ ACD Group Name: _____		
	<b>OPTIONS</b>	<b>STATUS</b>
Afterwork Timer	(mm:ss) 00:00 – 15:00 (default 00:00)	
Overflow Timer	(mm:ss) 00:00 – 54:00 (default 09:00)	
First Status Threshold	(mm:ss) 00:00 – 54:00 (default 03:00)	
Second Status Threshold	(mm:ss) 00:00 – 54:00 (default 06:00)	





# FORM 41 – ACD PATH

Sheet \_\_\_ of \_\_\_

FORM 41 – ACD PATH	
(This form does not apply to Generic 1001, Generic 1002, Generic 1005 FPKG1 or Generic 1005 LIT96.)	
ACD Path Number (1 – 99): _____ ACD Path Name: _____	
OPTIONS	STATUS
Access Code for this ACD Path	
Primary ACD Agent Group	
Delay for Ringback (mm:ss) 00:01 – 54:00 (default 00:03)	
Recording 1: Start Time (mm:ss) 00:00 – 54:00	
Recording 1: Access Code	
Recording 1: Music Source Following	
Recording 2: Start Time (mm:ss) 00:00 – 54:00	
Recording 2: Access Code	
Recording 2: Music Source Following	
Recording 3: Start Time (mm:ss) 00:00 – 54:00	
Recording 3: Access Code	
Recording 3: Music Source Following	
Recording 4: Start Time (mm:ss) 00:00 – 54:00	
Recording 4: Access Code	
Recording 4: Music Source Following	
Overflow 1 Agent Group	
Overflow 2 Agent Group	
Overflow 3 Agent Group	
Interflow Enable YES or NO (default = NO)	
Interflow Timeout (mm:ss) 00:01 – 54:00 (default = 54:00)	
Interflow Point Access Code (default = DROP CALL)	
Allow Overflow to Interflow Point before Timeout (default = NO)	
Priority 1 – 99 (default = 99, the lowest priority)	
Service Time (mm:ss) 00:01 – 54:00 (default = 03:00)	

**FORM 42 – T1 LINK DESCRIPTORS**

<b>FORM 42 – T1 LINK DESCRIPTORS</b>			
(This form does not apply to Generic 1001 or Generic 1002.)			
DESCRIPTOR	LINK TYPE	NUM OF LINKS ASSIGNED **	COMMENTS
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

\*\* This field is automatically updated by the system based on entries in Form 43.

**FORM 42\* – "SELECT OPTION" SUBFORM**

<b>FORM 42* – T1 LINK DESCRIPTOR OPTIONS</b>										
OPTIONS	T1 LINK DESCRIPTOR NUMBER									
	1	2	3	4	5	6	7	8	9	10
<b>Alarm Debounce Timer</b> 300 – 3200 (default = 2500)										
<b>B8ZS Zero Code Suppression</b> YES or NO (default = NO)										
<b>Slip Rate – Maintenance Limit</b> (0 – 9000)/24 hrs (default = 255)										
<b>Slip Rate – Service Limit</b> (0 – 9000)/24 hrs (default = 7000)										
<b>Slip Rate – Network Sync Limit</b> (0 – 9000)/24 hrs (default = 7)										
<b>BER – Maintenance Limit</b> (10** –n, n= 3, 4, 5, 6)/hr (default = 4)										
<b>BER – Service Limit</b> (10** –n, n= 3, 4, 5, 6)/hr (default = 3)										
<b>Framing Losses – Maintenance Limit</b> (0 – 9000)/24 hrs (default = 255)										
<b>Framing Losses – Service Limit</b> (0 – 9000)/24 hrs (default = 9000)										
<b>RTS Timer – Service Limit Exceeded</b> 1 – 225 min (default = 30)										
<b>RTS Timer – Net Slip Limit Exceeded</b> 1 – 225 min (default = 30)										
<b>RTS Timer – After Alarm</b> 1 – 225 min (default = 30)										



**FORM 44 – T1 NETWORK SYNCHRONIZATION****FORM 44 – T1 NETWORK SYNCHRONIZATION**

(This form does not apply to Generic 1001 or Generic 1002.)

DESCRIPTION	BAY	SLOT	COMMENTS
First Clock Source			
Second Clock Source			
Third Clock Source			
Fourth Clock Source			
Fifth Clock Source			
Sixth Clock Source			
Seventh Clock Source			
Eighth Clock Source			



FORM 45\* – "EXPAND SET" SUBFORM

KEY SYSTEM – Telephone Lines

Sheet \_\_\_ of \_\_\_

FORM 45* – KEY SYSTEM TELEPHONE LINES								
Bay/Slr/Cct: _____			Set Type : _____			Extension Number: _____		
KEY +	TYPE	DIR	RING	SEC	DSS	EXT NUM	TRK ACC	LABEL
*01	Intercom	In/Out	Immed	No	No			
02								
03								
04								
05								
06								
07								
08								
09								
10								
11								
12								

+ The SUPERSET 410 has 6 Line keys, all other sets have 12 Line keys.

FORM 45* – KEY SYSTEM TELEPHONE LINES								
Bay/Slr/Cct: _____			Set Type : _____			Extension Number: _____		
KEY +	TYPE	DIR	RING	SEC	DSS	EXT NUM	TRK ACC	LABEL
*01	Intercom	In/Out	Immed	No	No			
02								
03								
04								
05								
06								
07								
08								
09								
10								
11								
12								

+ The SUPERSET 410 has 6 Line keys, all other sets have 12 Line keys.







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Feb. 1992

**SX-200® DIGITAL PABX**

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# Troubleshooting

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**FOR EMERGENCY  
TROUBLESHOOTING  
GO TO  
Table 2-1  
ON PAGE 350 2-1**

**THE FOLLOWING POINTS SHOULD BE CAREFULLY NOTED AND THE INSTRUCTIONS THEREIN STRICTLY OBSERVED :**

- Handle circuit cards by the edges only, and ensure that a anti-static strap is used. Card damage may otherwise result.
- Before replacing a card, remove the original card, check for bent or damaged connectors, inspect the backplane, and reseal the original card.
- If a problem has been eliminated through the replacement of a card, temporarily reinsert the original card to verify that the fault is located therein.
- Always provide the maximum amount of relevant data on the card repair tag accompanying a faulty card (see Appendix F) – never return a card without a repair tag.
- Return faulty cards, etc. to MITEL for repair.
- Ensure that a system fault record is always up-to-date, and kept on site.

1.

## INTRODUCTION

Before troubleshooting is attempted, maintenance personnel should become very familiar with the *SX-200*® DIGITAL maintenance system. A complete description of the maintenance system is provided in Practice 9109-096-353-NA, General Maintenance Information. Further maintenance related documentation may be found in the documents listed below:

**Table 1-1 *SX-200* DIGITAL Maintenance Related Practices**

9109-096-100-NA	General Description
9109-096-105-NA	Features Description
9109-096-180-NA	Engineering Information
9109-096-200-NA	Installation Information
9109-096-210-NA	Customer Data Entry
9109-096-351-NA	Maintenance Commands
9109-096-353-NA	General Maintenance Information
9109-096-355-NA	Field-Replaceable Units

### How to Use this Document

- 1.1 If the *SX-200* DIGITAL PABX is not functioning, refer to the Emergency Troubleshooting Procedures in Table 9-1 on page 350 2-1. If there is a problem or problems with a specific part, or parts of the system, consult the table of contents for the applicable entry.

### Reason for Issue

- 1.2 This document is intended to accompany all releases of the *SX-200* DIGITAL system. This is the first issue of this document.

## Troubleshooting

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## 2.

## TROUBLESHOOTING – GENERAL

## Emergency Procedures

- 2.1 When any switching machine is totally inoperative, the prime requirement is the restoration of service to the system or the part that has been affected. Table 9–1 shows how to achieve this in the shortest possible time. Once service has been restored, the other procedures (see Table of Contents) may be used to determine the cause of the failure.

Table 2–1 Emergency Troubleshooting Procedures

Step	Action	Description / Follow-Up
1.	At the 336, 456 or 480–port system's Bay 2, or at the 672–port system's Bay 0, or the SX–200 FD Control cabinet, check if the green <i>ACTIVE</i> indicator on the Main Control card front panel is flashing.	Yes: • Go to step 9. No: • Go to step 2.
2.	Press the <i>SYSTEM RESET</i> pushbutton on the front panel of the Main Control card.	• If the Main Control card numeric displays are blank, go to step 3; otherwise go to step 11.
3.	<b>For 336,456 &amp; 480–port Systems:</b> Check if the <i>POWER ON</i> indicator on the Bay Power Supply (BPS) of Bay 2 (Control Bay) is on (ensure switch is in ON position). <b>For 672–port Systems:</b> Check if the <i>POWER ON</i> indicator on the Bay Power Supply (BPS) of Bay 0 (Control Bay) is on (ensure switch is in ON position). <b>For SX–200 FD Systems:</b> Check if the <i>POWER ON</i> indicator on the Control cabinet Power Supply is on (ensure switch on back of cabinet is in ON position).	Yes: • Go to step 4. No: • Go to step 8.
4.	Turn the Control Ba/FD Control cabinet power supply off, reseal the Main Control card, and turn the power on again. Any indication on numeric display?	Yes: • Go to step 11. No: • Go to step 5.
5.	Turn the Control Bay/FD Control cabinet power supply off, unplug the Main Control card, and verify that the flea clips are properly connected (particularly W4 and W8). See Figure 2–1. For Rev A and later, flea clips are not required.	• Reseat the Main Control card; turn the power back on. • If the problem persists, go to step 6.

**Table 2-1 Emergency Troubleshooting Procedures  
(continued)**

Step	Action	Description / Follow-Up
6.	Check power rails and continuity on the backplane. See Figure 2-2 / Figure 2-3 / Figure 2-4.	<ul style="list-style-type: none"> <li>• Verify that the required voltage signals actually are present at the Main Control card edge connectors.</li> <li>• Once verified, go to step 7.</li> </ul>
7.	Power down the Control Bay/FD Control cabinet, remove the Main Control card, and check if EPROM IC is securely installed – see Figure 2-5.	<p>Yes:</p> <ul style="list-style-type: none"> <li>• Possible EPROM problem (check revision label) – replace Main Control card.</li> </ul> <p>No:</p> <ul style="list-style-type: none"> <li>• Install EPROM properly and go back to step 2.</li> </ul>
8.	Remove T1 clock module (if present), replace flea clip W8 (if pre-Rev A). See Figure 2-1. Does problem persist?	<p>No:</p> <ul style="list-style-type: none"> <li>• Power down and replace the T1 clock module.</li> </ul> <p>Yes:</p> <ul style="list-style-type: none"> <li>• Faulty Main Control card – replace.</li> </ul> <ul style="list-style-type: none"> <li>• If neither is applicable, go to step 9.</li> </ul>
9.	<p>Ensure power supply is firmly seated into the backplane. Is power cord firmly connected to the rear of the Control Bay's power supply?</p> <p>Check for loose PSU power cable connections in the SX-200 FD Control cabinet</p>	<p>No:</p> <ul style="list-style-type: none"> <li>• Plug in securely; go back to step 2.</li> </ul> <p>Yes:</p> <ul style="list-style-type: none"> <li>• Check all other AC connections through the AC distribution frame, to the AC source.</li> <li>• If no wiring problems are found, refer to the Bay Power Supply procedures.</li> </ul>
10.	Attempt a station-to-station call – is Call Processing functioning?	<p>Yes:</p> <ul style="list-style-type: none"> <li>• Stop. Continue to monitor system.</li> </ul> <p>No:</p> <ul style="list-style-type: none"> <li>• Press the SYSTEM RESET push-button on the Main Control card front panel, and go to step 11.</li> </ul>
11.	Power down Control Bay/FD Control cabinet, pull out the Main Control card, and check if flea clip W6 is properly attached. (If Rev A or later, go to step 12.)	<ul style="list-style-type: none"> <li>• If clip is attached properly, reinsert card, power up bay, and go to step 12. If not, attach it properly, and go back to step 2.</li> </ul>
12.	Check for error codes on the Main Control card numeric display.	<ul style="list-style-type: none"> <li>• Refer to Table 2-2.</li> </ul>

### Main Control Card Power-Up Error Codes

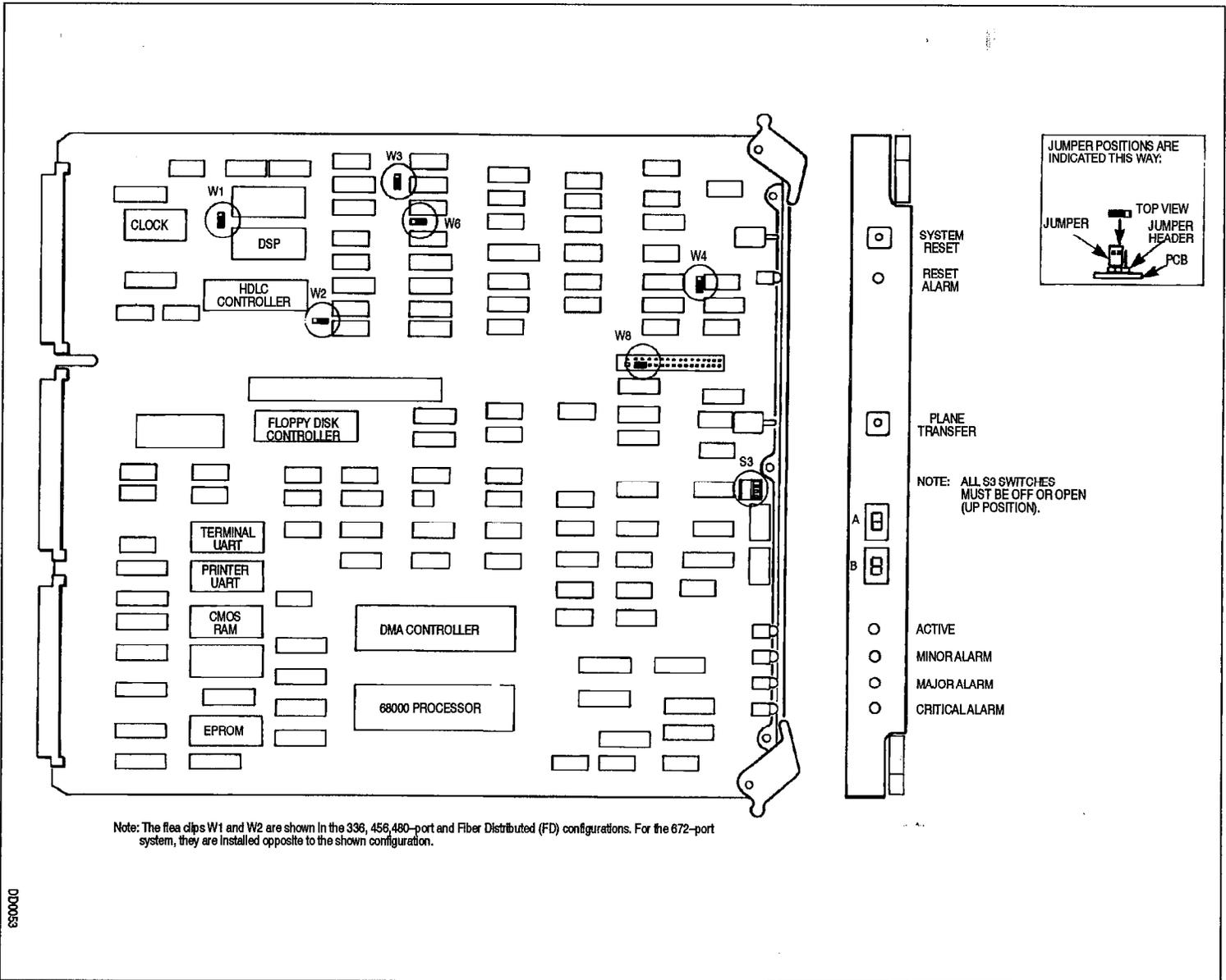
Table 2-2 shows the all of the Main Control card numeric display error codes which may appear during start-up. Also shown are the most likely causes of the error condition.

Table 2-2 Main Control Card Error Code Summary	
Error Code	Likely Cause(s)
(blank)	<ul style="list-style-type: none"> <li>Faulty power system – refer to that procedure.</li> <li>Faulty Main Control card.</li> </ul>
0	<ul style="list-style-type: none"> <li>Faulty or loose flea clip W3 (if applicable) – see Figure 2-1.</li> <li>Faulty Main Control card.</li> </ul>
E 0	<ul style="list-style-type: none"> <li>Unseated DRAM Module or DX Module.</li> <li>Faulty DRAM or DX module. (see Note 1.)</li> </ul>
E 1    E 3    E 4    or    E 5	<ul style="list-style-type: none"> <li>Faulty Main Control card.</li> </ul>
E 2	<ul style="list-style-type: none"> <li>Unseated EPROM IC.</li> <li>Faulty EPROM IC – replace Main Control card.</li> </ul>
E 6    E 7    E 8    or    E 9	<ul style="list-style-type: none"> <li>Unseated DRAM Module.</li> <li>Faulty DRAM Module – replace Main Control card.</li> </ul>
E b.	<ul style="list-style-type: none"> <li>Please note difference between “E” and “E.”. (See below in this table for E. codes)</li> <li>Faulty disk drive connections.</li> <li>Faulty installation of diskette.</li> <li>Incorrect or damaged diskette – ensure that the write protect sticker has been removed.</li> <li>Faulty diskette – replace.</li> <li>Incorrect setting of switch S3 on Main Control card – ensure that it is in the OFF, or OPEN position (pointed upward with respect to the board).</li> <li>Faulty disk drive.</li> <li>Faulty Main Control card.</li> </ul>
Sequence: 2    8    9    b    E b	<ul style="list-style-type: none"> <li>Unseated decryption module.</li> <li>Faulty power system – refer to that procedure.</li> <li>Faulty decryption module.</li> </ul>

**Table 2-2 Main Control Card Error Code Summary  
(continued)**

Error Code	Likely Cause(s)
2 3 4 5 6 7 0 0 0 0 0 or 0	<ul style="list-style-type: none"> <li>Problem in a digital bay/node – upper digit is the bay number. Refer to Bay Control card procedures.</li> </ul>
2 3 4 5 6 7 n n n n n or n (where n is any number)	<ul style="list-style-type: none"> <li>Problem in a peripheral bay/node – upper digit is the bay/node number, lower digit is the card slot number. Use SHOW ALARMS command to gain further information. (see note 2.)</li> </ul>
E. n (where n is any number)	<ul style="list-style-type: none"> <li>Please note difference between “E” and “E.”. (see above in this table for “E” codes)</li> <li>Problem with Disk Subsystem – refer to Floppy Disk Subsystem Troubleshooting.</li> </ul>
– –	<ul style="list-style-type: none"> <li>Nothing – indicates successful software download. This display may be immediately changed to display post boot-up codes. (see note 2.)</li> </ul>
(any other code)	<ul style="list-style-type: none"> <li>Faulty Main Control card (see note 2.).</li> </ul>

- Notes:**
- The SX-200 FD system must be equipped with the Switch Matrix Module not the DX Module as used by the 336, 456 & 480-port systems nor Switch Matrix Card as used in the 672 -port system.
  - A normal running system may show other codes (card diagnostics or errors). However, during start-up, only the codes in this table are possible. Any other code shown during start-up indicates a faulty Main Control Card.
  - Codes possible AFTER start-up include card diagnostics codes (last card location tested, top number indicates bay number, bottom number indicates card slot number – maintenance logs give results of test, i.e., pass or fail with cause), or disk error codes (see Floppy Disk Subsystem).



DD0053

Figure 2-1 Main Control Card — Flea Clip and Device Locations

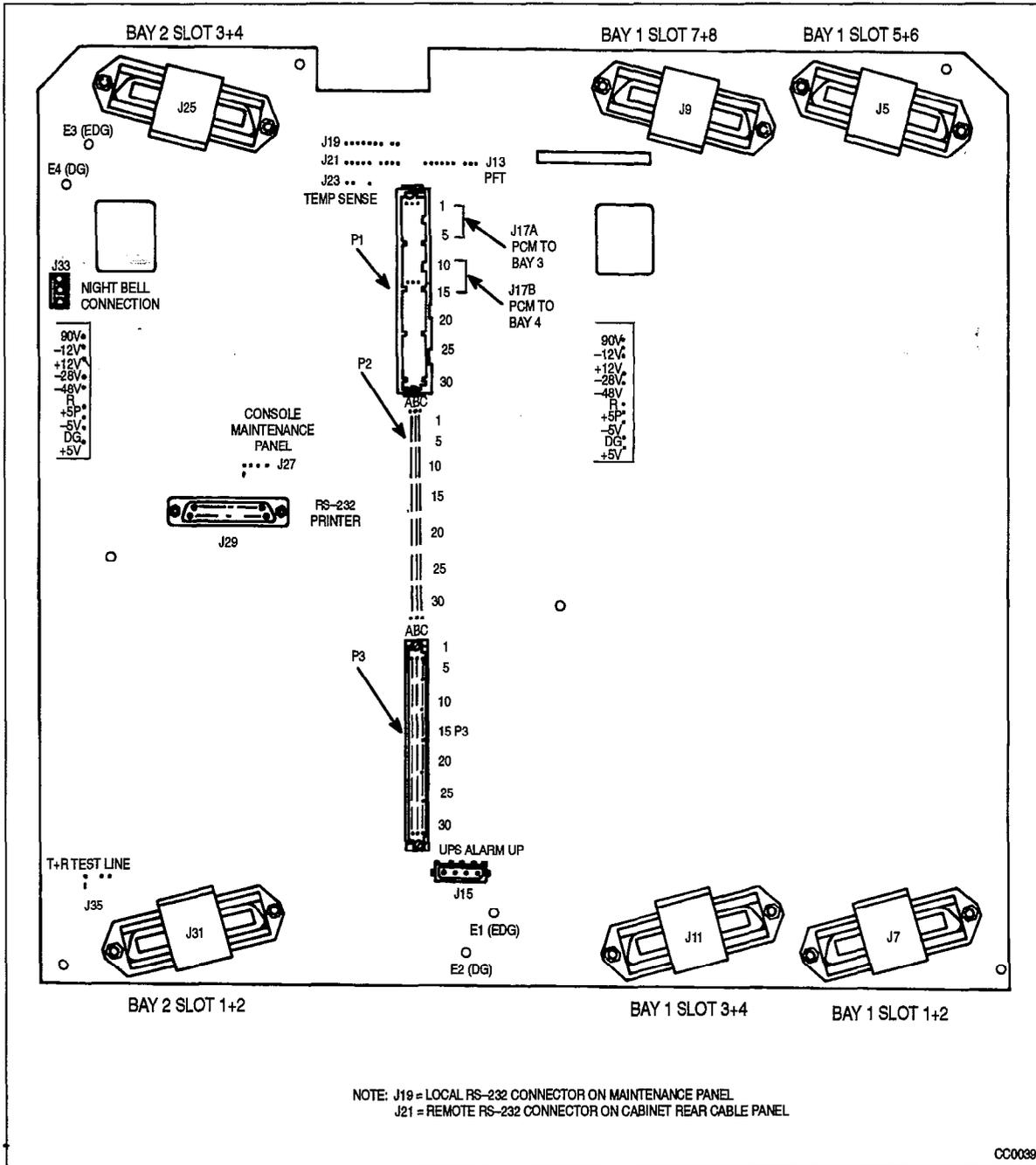


Figure 2-2 336 / 480 / 456 Port Backplane

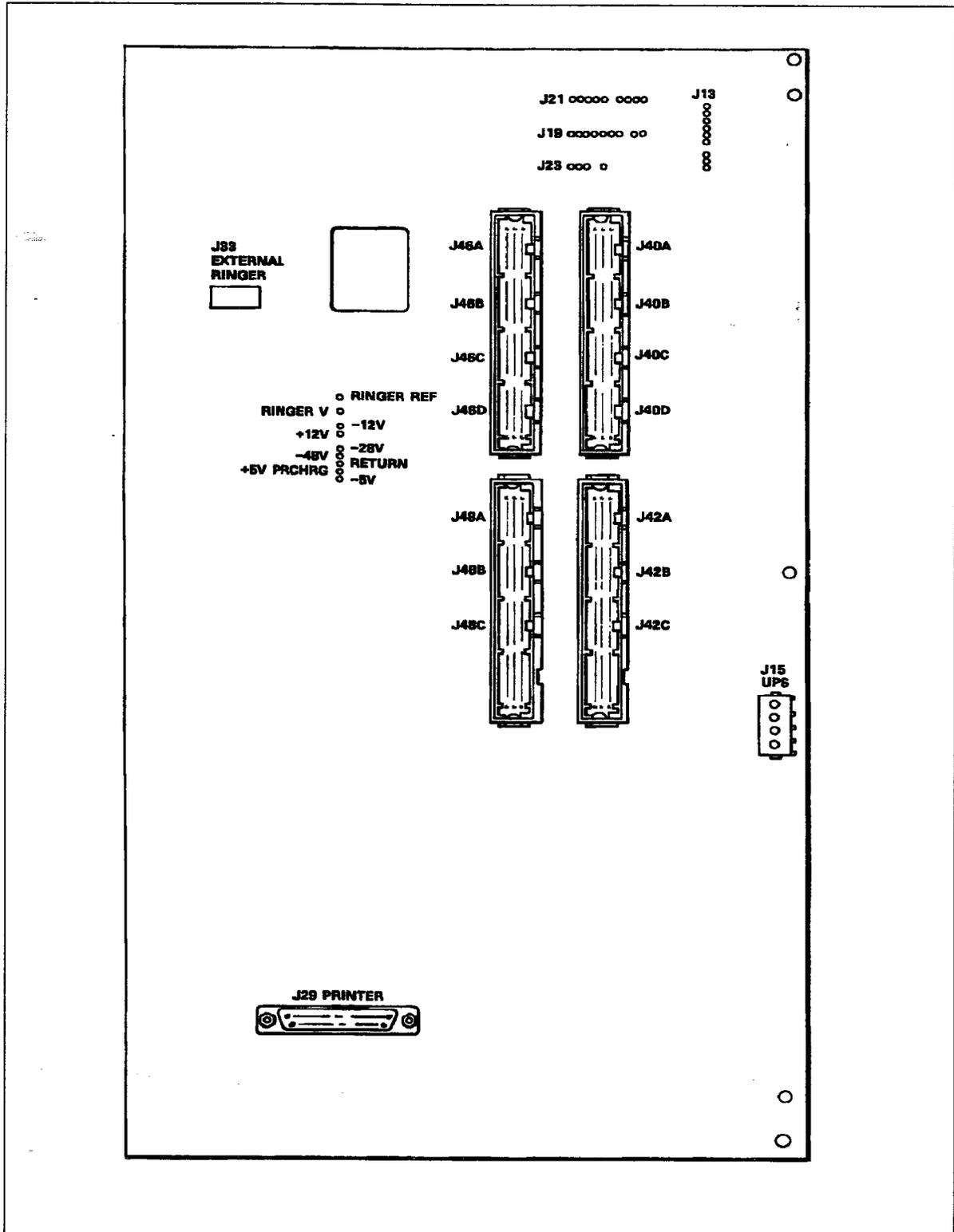


Figure 2-3 672 Port Backplane

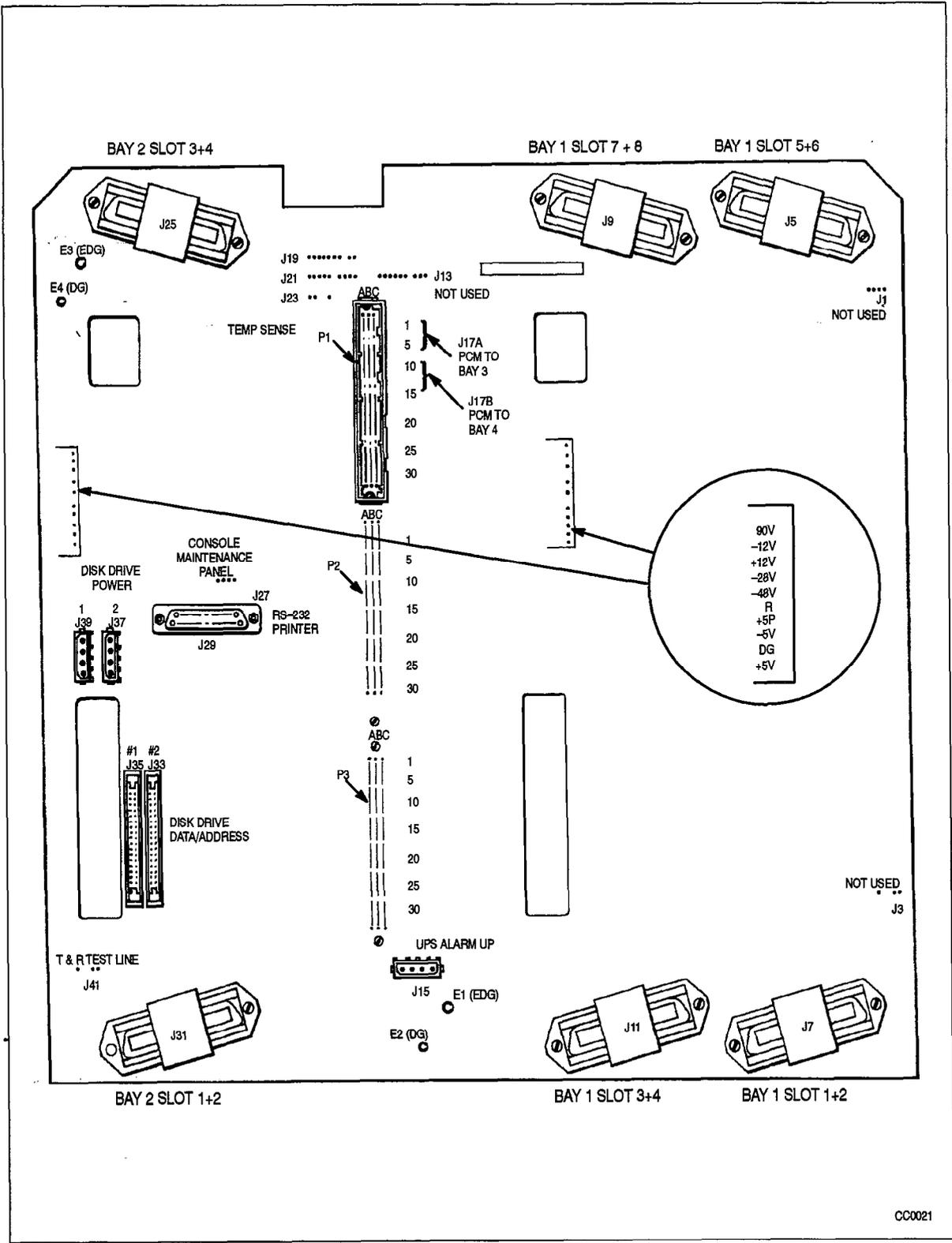


Figure 2-4 480 Port Backplane (Welded Cabinet)

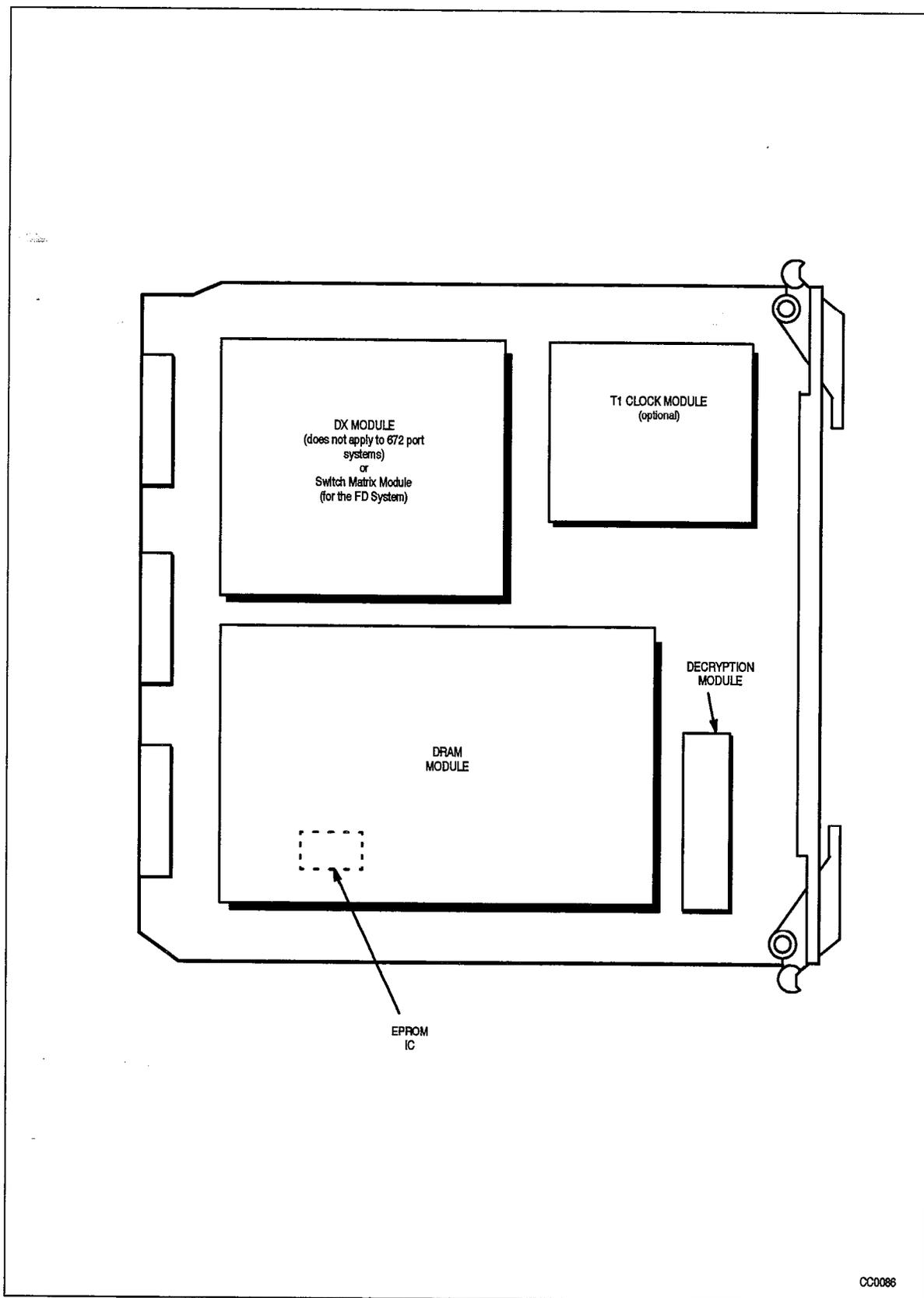


Figure 2-5 Main Control Card Module Locations

## Troubleshooting Methodology

### General

2.2 Troubleshooting a malfunction in any complex electronic system is accomplished in a series of logical steps. This Section assumes the following basic steps in the troubleshooting of a malfunction:

- GATHERING of information
- CLARIFICATION of the problem
- CONFIRMATION of the problem
- ISOLATION of the problem
- CORRECTION and DOCUMENTATION

When investigating a problem, the troubleshooter should continually verify each step in the isolation process so as to ensure that the system and the symptoms of the malfunction are clearly understood. This will ensure that the malfunction is accurately categorized so that appropriate diagnostics, where applicable, may be invoked.

### Information Gathering and Problem Clarification

Chart 2-1 provides a list of the information which may be necessary in order to adequately categorize a fault. All relevant information should be gathered and entered into a site fault record. If the fault has resulted in total or partial shutdown of the system, much of this data will be unobtainable or irrelevant. In such cases, reference should be made to the EMERGENCY TROUBLESHOOTING PROCEDURES.

<b>Chart 2-1 Information Gathering and Clarification</b>		
<b>Step</b>	<b>Action</b>	<b>Description Follow-up</b>
1.	Talk to station users.	Obtain the following information: <ul style="list-style-type: none"> <li>- frequency of occurrence</li> <li>- intermittent or continuous nature</li> <li>- time period during which the fault occurs.</li> </ul>
2.	Check Maintenance Alarm indications.	<ul style="list-style-type: none"> <li>- Check maintenance log for fault/ alarm reports (see Note 1)</li> <li>- Check system LED and numeric display indicators for error codes.</li> </ul>

**Chart 2–1 Information Gathering and Clarification  
(continued)**

Step	Action	Description Follow-up
3.	Collect data concerning environmental conditions.	<ul style="list-style-type: none"> <li>– Check if the system is located close to a heat source or a source of power radiation (see Note 2).</li> <li>– Note the temperature and humidity conditions and compare with specified operating parameters.</li> <li>– Check the susceptibility of the area with respect to static electricity generation.</li> <li>– The following can seriously affect the performance of the system:               <ul style="list-style-type: none"> <li>– power fluctuations</li> <li>– lightning storms</li> <li>– excessively high humidity</li> <li>– excessively high temperature</li> <li>– dust</li> <li>– rf interference.</li> </ul> </li> </ul>
4.	Verify system programming.	<ul style="list-style-type: none"> <li>– Check the existing programming to ensure that the correct options and features have been enabled (see Note 3).</li> <li>– Verify the Class Of Service assignments, trunk descriptors, and feature access codes.</li> </ul>
5.	Make special checks for new installations, additions or modifications.	<ul style="list-style-type: none"> <li>– Check that the procedures specified in Practice 9109–096–200–NA, Installation Information, have been properly implemented.</li> <li>– Verify that any changes have been made in accordance with the appropriate practices, and to the prescribed standards.</li> <li>– Check for possible conflicts if features have been added or deleted, or if other programming changes have been made.</li> </ul>
6.	Make random miscellaneous checks.	<ul style="list-style-type: none"> <li>– Ensure all circuit cards are properly seated.</li> <li>– Verify that the system fans are running.</li> <li>– Check the main distribution field for loose or damaged wiring, improperly seated connectors, or other signs of trouble.</li> </ul>
7.	Check for minor alarm indications – these assist in isolating and categorizing faults.	<ul style="list-style-type: none"> <li>– Record relevant data and note the affected area of the system.</li> </ul>

Page 2 of 2

- Notes:**
1. Refer to Practice 9109–096–351–NA, RS–232 Maintenance Terminal, for details on procedures.
  2. Refer to Practice 9109–096–180–NA, Engineering Information, for the specified operating parameters.
  3. Refer to Practices 9109–096–105–NA, Features Description and 9109–096–210–NA, Customer Data Entry.

**Problem Confirmation**

Many faults, particularly intermittent faults, “disappear” before the troubleshooter is able to make a positive trace. Wherever possible, attempts should be made to force the problem to recur, such that the effects may be observed and hence the cause determined. The information gathered up to this point may be used to set up conditions relating as closely as possible to those under which the fault originally manifested itself.

**Problem Isolation**

The aids listed in Table 2–3 are useful in isolating fault conditions.

<b>Table 2–3 Troubleshooting Aids</b>	
<b>Troubleshooting Aid</b>	<b>Description and Use</b>
Maintenance Log	<ul style="list-style-type: none"> <li>– Provides a record of maintenance activities and causes of alarms (the primary source of troubleshooting information).</li> </ul>
Maintenance Terminal	<ul style="list-style-type: none"> <li>– Primary access to the maintenance log.</li> <li>– Provides ability to query Alarm status, along with a variety of status reports.</li> <li>– Allows testing of individual functional units, using directed diagnostics.</li> </ul>
Circuit card Numeric Displays	<ul style="list-style-type: none"> <li>– Allow system power-up testing and operation to be monitored.</li> </ul>
Status LEDs (on peripheral cards)	<ul style="list-style-type: none"> <li>– Used to determine if circuit is in use, idle, or not functioning.</li> </ul>
Maintenance Panel	<ul style="list-style-type: none"> <li>– Provide ability to manually initiate activity switches and software reloads.</li> </ul>

**Correction and Documentation**

Once a problem is isolated, the table of contents of this document should be consulted, and the appropriate procedure referenced. Many procedures contain instructions requiring control circuit cards to be reset, removed, powered down or replaced; in these circumstances it should be noted that these actions will cause a partial or total loss of service. If possible, these procedures should be performed during periods of little or no traffic.

All repairs or adjustments to the system should be recorded into a log book which is kept permanently at the site. Faulty equipment should be returned in the same packaging as the replacement part (FRU), with the repair tag filled out (see Appendix F). For further information on FRU items, refer to Practice 9109–096–355–NA, Field-Replaceable Units.

## 3.

## PERIPHERAL EQUIPMENT TROUBLESHOOTING PROCEDURES

### Peripheral Interface Circuit Cards

#### ONS / OPS / Station Line Cards

- 3.1 This section covers the ONS Line card (PN 9109-010), the OPS Line card (PN 9109-040), and the Station Line card (PN 9110-110). Table 3-1 outlines the most likely items to cause malfunction. For ONS card problems involving Voice Mail, see Voice Mail – ONS Port.

**Table 3-1 ONS Line Card Troubleshooting Summary**

Step	Possible Malfunction Source
1.	Faulty connections between the telephone and the cross-connect field.
2.	Faulty connections between the cross-connect field and the <i>SX-200</i> DIGITAL system.
3.	Faulty CDE programming; likely forms: <ul style="list-style-type: none"> <li>• COS Define</li> <li>• Stations / <i>SUPERSET</i>™ Telephones</li> <li>• Device Interconnection Table</li> <li>• System Configuration</li> </ul>
4.	Faulty telephone set.
5.	Faulty line card.
6.	Faulty backplane cable connections. Note: (for Station Line cards only – 456 & 480-port systems): check for faulty connections between analog and digital bays; verify connection between digital bay backplane (J17A or J17B) and the analog bay Digital Interface card (J2) – see Figure 3-1.
7.	Faulty DIC card or Peripheral Control card (Station Line card only – 456 & 480 port systems).
8.	Faulty switching matrices – refer to 'Supplementary Peripheral Equipment Procedures'.
9.	Problem with DTMF Receivers (not enough for peak traffic load).
10.	Problem with analog bay junctor shortages – was system configured properly for expected traffic load (if applicable)? (456 & 480-port systems)

**Note:** Useful maintenance commands: SHOW STATUS, TEST, SHOW ALARMS – see Practice 9109-096-351-NA, RS-232 Maintenance Terminal.

**COV / SUPERSET Line Cards**

This section covers both the COV Line card (PN 9109-020) and the *SUPERSET* Line card (PN 9110-410). Table 3-2 outlines the most likely items to cause malfunction. For COV card problems involving Voice Mail, see Voice Mail – COV Port.

**Table 3-2 COV Line Card Troubleshooting Summary**

Step	Possible Malfunction Source
1.	Faulty connections between the <i>SUPERSET</i> telephone and the cross-connect field.
2.	Faulty connections between the cross-connect field and the <i>SX-200</i> DIGITAL system.
3.	Faulty CDE programming; likely forms: <ul style="list-style-type: none"> <li>• COS Define</li> <li>• Stations / <i>SUPERSET</i> Telephones</li> <li>• Device Interconnection Table</li> <li>• System Configuration</li> </ul>
4.	Faulty <i>SUPERSET</i> telephone set.
5.	Faulty line card.
6.	Faulty backplane cable connections. Note: (for <i>SUPERSET</i> Line cards only – 456 & 480-port systems): check for faulty connections between analog and digital bays; verify connection between digital bay backplane (J17A or J17B) and the analog bay Digital Interface card (J2) – see Figure 3-1.
7.	Faulty DIC card or Peripheral Control card ( <i>SUPERSET</i> Line card only – 456 & 480-port systems).
8.	Faulty switching matrices – refer to ‘Supplementary Peripheral Equipment Procedures’.
9.	Problem with DTMF Receivers (not enough for peak traffic load).
10.	Problem with analog bay junctor shortages – was system configured properly for expected traffic load (if applicable)? (456 & 480-port systems)

**Note:** Useful maintenance commands: SHOW STATUS, TEST, SHOW ALARMS, SHOW ERRORS SS3\_SS4 – see Practice 9109-096-351-NA, RS-232 Maintenance Commands.

## Digital Line Card

### General

Intermittent problems can be caused by improper bridge taps, or incorrect loop lengths. The following table lists the maximum loop lengths in meters with 24 or 26 AWG twisted pair wiring.

Table 3-3 Digital Line Card Loop Lengths		
Peripheral Device	Maximum Loop Length	
	Without Bridge Tap	With Bridge Tap
<i>SUPERSET 3™</i> DN Mk1 (9183-000-001)	1000m	not permitted
<i>SUPERSET 3</i> DN Mk2 (9183-000-200)	1000m	1000m
<i>SUPERSET 4™</i> DN Mk1 (9184-000-001)	1000m	not permitted
<i>SUPERSET 4</i> DN Mk2 (9184-000-200)	1000m	1000m
<i>SUPERSET 401™</i>	1000m	1000m
<i>SUPERSET 410™</i>	1000m	1000m
<i>SUPERSET 420™</i>	1000m	1000m
<i>SUPERSET 430™</i>	1000m	1000m
Dataset 1101	1000m	1000m
Dataset 1102	2000m	1000m
Dataset 1103	2000m	1000m
Dataset 2102	2000m	1000m
Dataset 2103	2000m	1000m
<i>MiLink™</i> Data Module	2000m	1000m
<i>SUPERCONSOLE 1000™</i> console	1000m	1000m

**SHOW ERRORS Command**

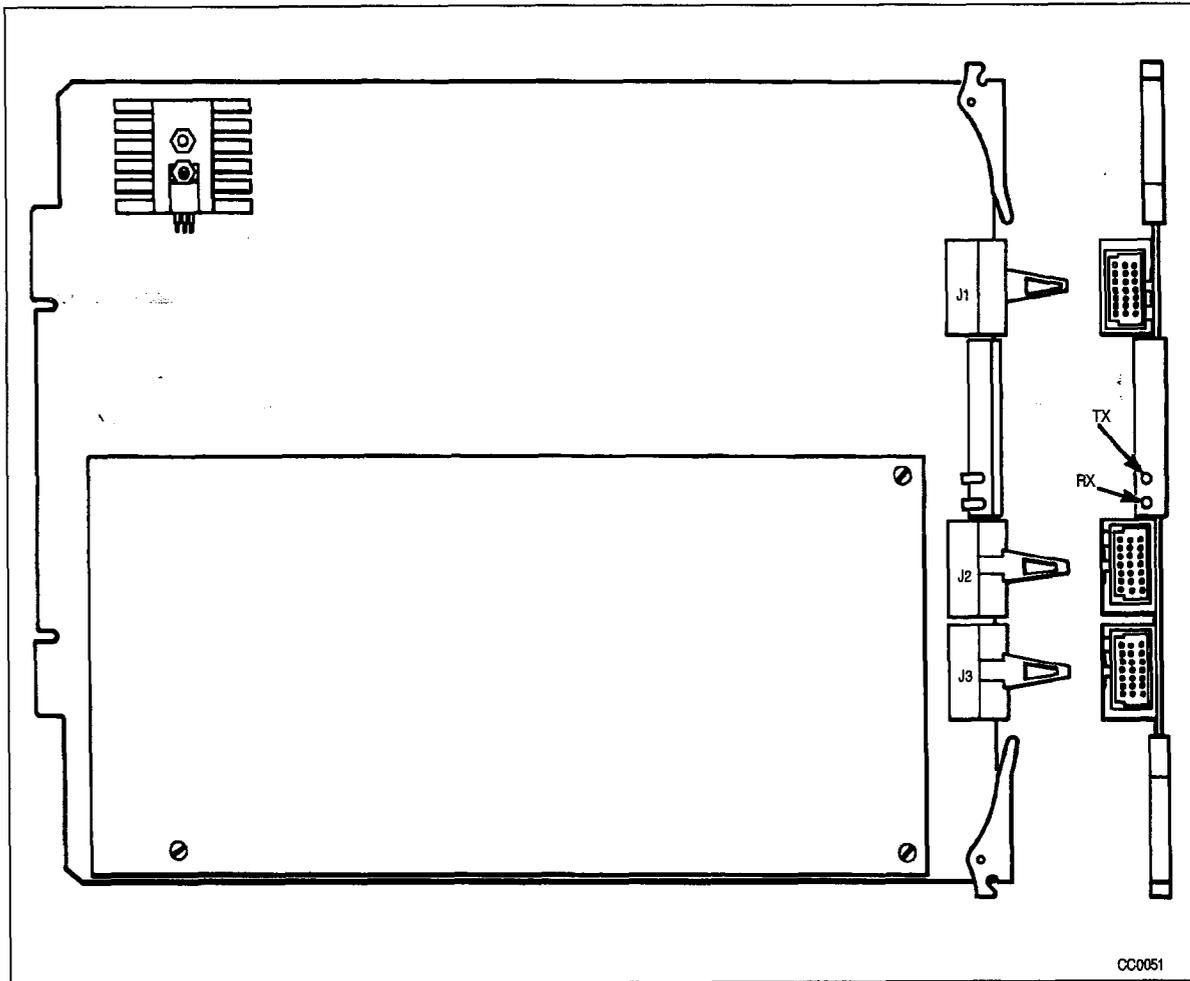
The SHOW ERRORS DATASET command can be a useful tool in the troubleshooting of both the Digital Line card and the Dataset. The following table lists the possible causes of the error types.

<b>Table 3-4 SHOW ERRORS Command</b>						
<b>Error Type</b>	<b>Call State</b>	<b>Possible Cause</b>				
		<b>Dataset</b>	<b>Cabling</b>	<b>DX Chip</b>	<b>Line Card</b>	<b>DTE/DCE</b>
CRCERR	any	yes	yes	yes	yes	no
RESETS	any	yes	yes	yes	yes	yes
<b>Error Type</b>	<b>Call State</b>	<b>Possible Cause</b>				
		<b>Dataset</b>	<b>Cabling</b>	<b>DX Chip</b>	<b>Line Card</b>	<b>DTE/DCE</b>
LINK FAIL	Call setup/ Talk	yes	yes	yes	yes	no
LINK ABORT	Call setup/ Talk	yes	yes	yes	yes	yes
PARITY	any	yes	no	no	no	yes
OVERFLOW	Talking	no	no	no	no	yes
OVERRUN	Talking	no	no	no	no	yes
FRAMING	Talking	no	no	no	no	yes
NOSYNC	any	yes	yes	no	yes	no

### Additional Troubleshooting

Digital Line cards are used for many applications. For additional troubleshooting information, refer to procedures for the specific application; i.e.:

- *SUPERSET 3* DN Telephone
- *SUPERSET 4* DN Telephones
- *SUPERSET 401* Telephones
- *SUPERSET 410* Telephones
- *SUPERSET 420* Telephones
- *SUPERSET 430* Telephones
- *SUPERSET DSS™* Module
- DATASET 1101
- DATASET 1102
- DATASET 1103
- DATASET 2102
- DATASET 2103
- *MiLink* Data Module
- Application Platform Package



**Figure 3-1 Digital Interface Card**

**Trunk Cards – General**

The procedures detailed below cover the isolation and correction of faults with the various trunk cards. Supplementary procedures are provided for specific trunk types where required. Table 3–5 summarizes troubleshooting for trunk cards. Note: do not use this procedure for digital trunks – refer to T1 Trunk procedures.

**Table 3–5 Trunk Card Troubleshooting Summary**

Step	Possible Malfunction Source
1.	Faulty connections between the external trunk equipment and the cross-connect field (see Note 3.).
2.	Faulty connections between the cross-connect field and the system.
3.	Faulty CDE programming; likely forms: <ul style="list-style-type: none"> <li>• COS Define</li> <li>• Trunk Circuit Descriptors</li> <li>• Non-Dial In Trunks</li> <li>• Dial In Trunks</li> <li>• Trunk Groups</li> <li>• Device Interconnection Table</li> <li>• System Configuration</li> </ul>
4.	Faulty external trunk equipment (see Note 4.).
5.	Incorrect jumper settings (LS/GS Trunk card only) – see Figure 3–2.
6.	Incorrect switch settings (E&M Trunk module or E&M card only) – see Figure 3–3 (and Note 5.).
7.	Faulty Universal card (E&M Trunk module only).
8.	Faulty LS/GS or DID trunk card (see Note 3.).
9.	Faulty backplane cable connections. Note: (for 9110 type trunk cards only – 456 & 480–port systems): check for faulty connections between analog and digital bays – verify connection between digital bay backplane (J17A or J17B) and the analog bay Digital Interface card (J2) – see Figure 3–1.
10.	Faulty DIC card or Peripheral Control card (9110 type cards only – 456 & 480–port systems).
11.	Faulty switching matrix – refer to ‘Supplementary Peripheral Equipment Procedures’.
12.	Problem with DTMF Receivers (not enough for peak traffic load, see Note 2.).
13.	Problem with analog bay junctor shortages – was system configured properly for expected traffic load (if applicable)? (456 & 480–port systems)

**Notes:** 1. Useful maintenance commands: SHOW STATUS, TEST, SHOW ALARMS – see Practice 9109–096–351–NA, RS–232 Maintenance Terminal.

2. Refer to Practice 9109–096–180–NA, Engineering Information, for details on CO Busy Hour and receiver provisioning.

3. If periodic 'opens' in loop current are experienced during call progression through a central office, and disconnect timing has been set for a short interval, loop disconnects may cause the trunk to drop. In such cases, the timing should be increased one step at a time, until the calls are no longer dropped.
4. When the system detects a trunk protocol failure, it removes the affected trunk circuit from service. Trunk protocol failures may indicate fault(s) with the trunk circuit, in which case the card should be tested and replaced. However, they may also indicate that the external trunk is faulty. In this case, the affected trunk circuit must stay out-of-service until the external equipment is repaired.
5. For further information on the 9110 type trunk cards, refer to the 9105/9110-091 series of documents.

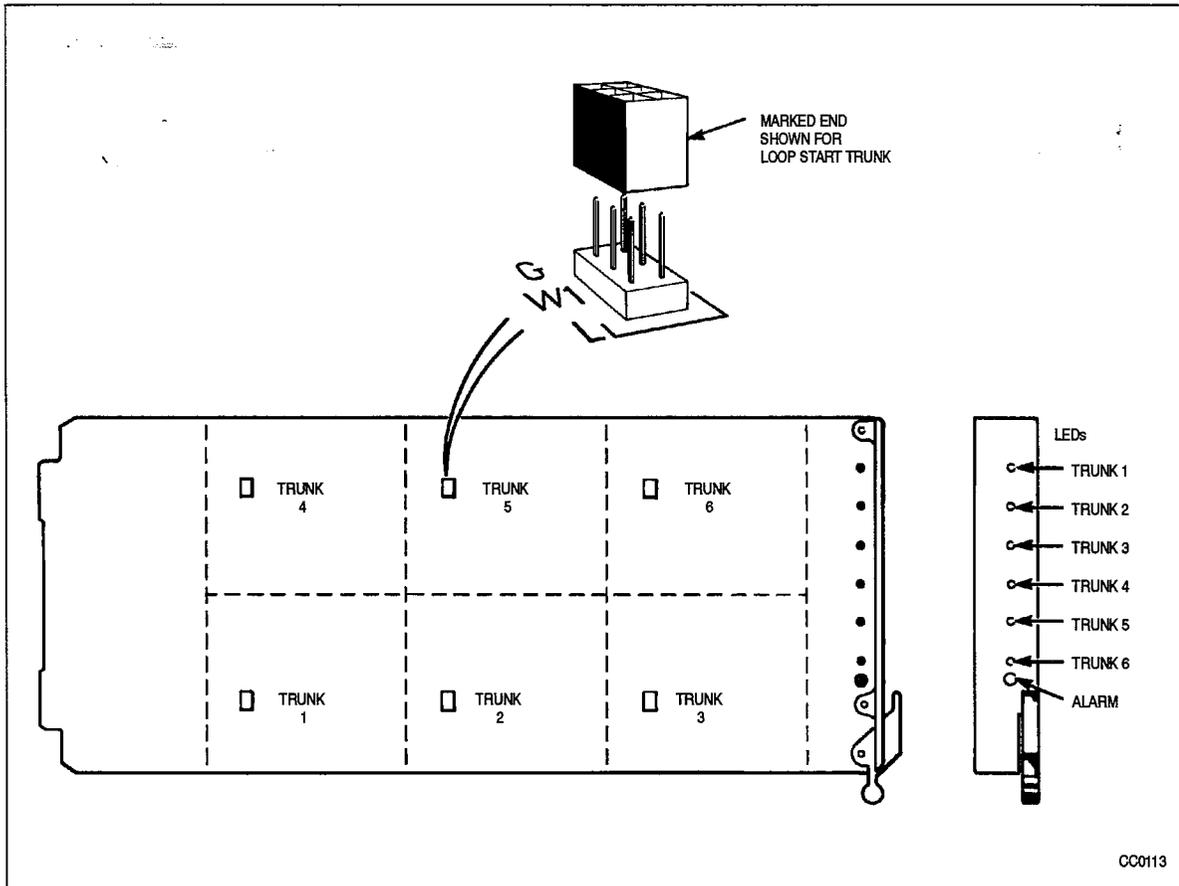


Figure 3-2 LS/GS Trunk Jumper Locations

Table 3-6 Trunk Voltage and Loop Current Readings

Circuit	Idle	Seized
E & M (Type 1)	Tip to gnd = 0 V Ring to gnd = 0 V Tip to Ring = 0 V E lead = -48 V M lead = 0 V E to M lead = 48 V I loop = 0mA	Tip to gnd = 0 V Ring to gnd = 0 V Tip to Ring = 0 V E lead = 0 V M lead = -48 V E to M lead = -48 V I loop = 0mA
LS/GS (Loop Start)	Tip to gnd = 0 V Ring to gnd = -48 V Tip to Ring = -48 V I loop = 0mA	Tip to gnd = -14 V to -22 V Ring to gnd = -34 V to -26 V Tip to Ring = -4 V to -20 V I loop = 10mA to 100mA
LS/GS (Ground Start)	Tip to gnd = -48 V Ring to gnd = -48 V Tip to Ring = 0 V I loop = 0mA	Tip to gnd = -14 V to -22 V Ring to gnd = -34 V to -26 V Tip to Ring = -4 V to -20 V I loop = 10mA to 100mA
DID	Tip to gnd = -2 V Ring to gnd = -48 V Tip to Ring = -46 V I loop = 0mA	Tip to gnd = -33 V to -44 V Ring to gnd = -17 V to -6 V Tip to Ring = 16 V to 38 V I loop = 12mA to 30mA
Loop/Tie	Tip to gnd = -2 V Ring to gnd = -48 V Tip to Ring = -46 V I loop = 0mA	Tip to gnd = -17 V to -6 V Ring to gnd = -33 V to -44 V Tip to Ring = -16 V to -38 V I loop = 12mA to 30mA

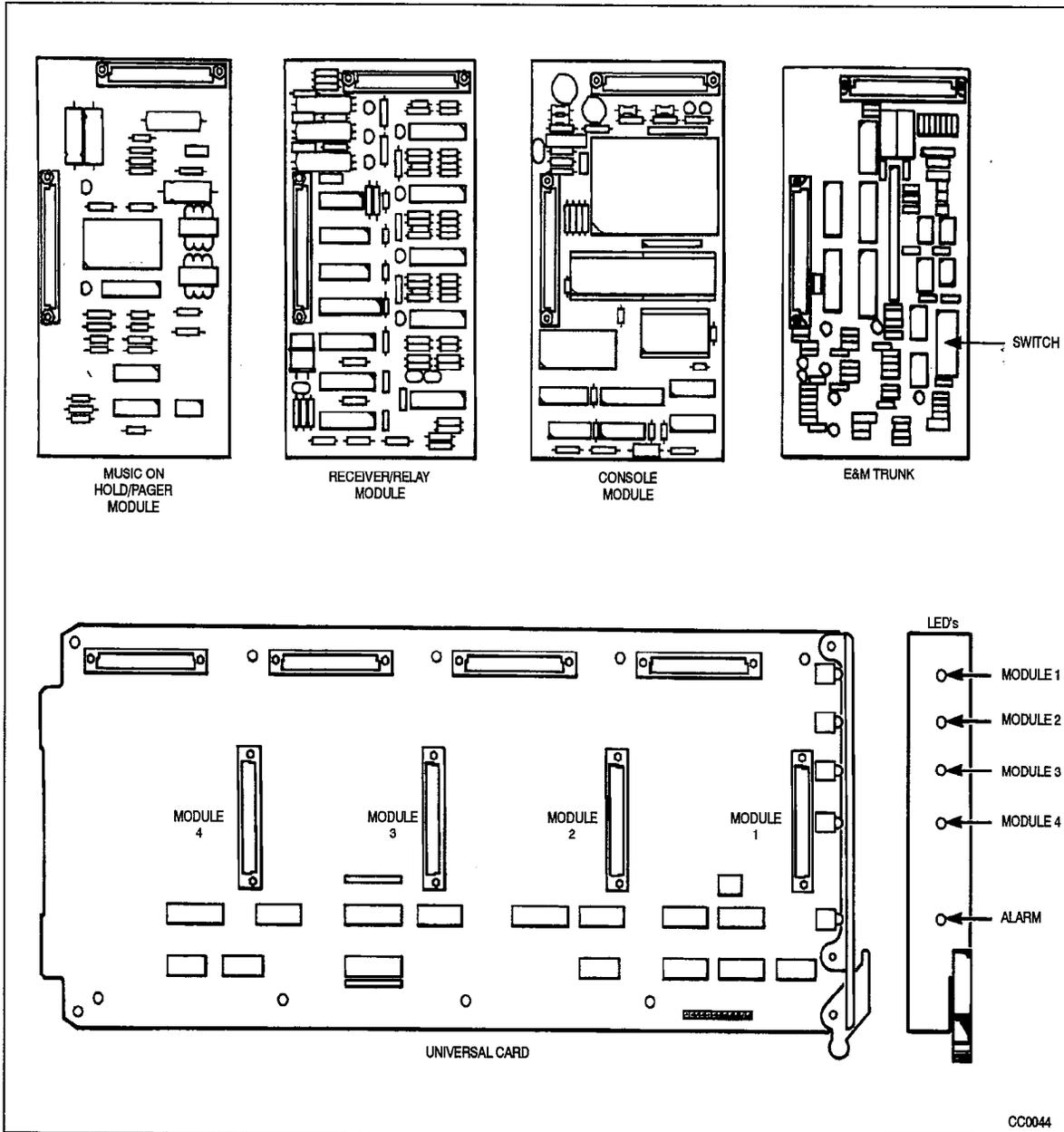


Figure 3-3 E&M Trunk Module With Universal Card

## Supplemental E&amp;M Trunk Card Troubleshooting Procedures

Table 3-7 Supplementary E&amp;M Trunk Troubleshooting Procedures

Step	Action	Description / Follow-Up
1.	Perform General Trunk procedures in Table 3-5.	<ul style="list-style-type: none"> <li>Go to step 2.</li> </ul>
2.	Disconnect the affected circuits from the cross-connect field.	<ul style="list-style-type: none"> <li>Go to step 3.</li> </ul>
3.	IDLE STATE TEST – connect voltmeter between –48V and the M lead. Reading should be –48V (see Figure 3-4).	<ul style="list-style-type: none"> <li>If not –48V, replace E&amp;M card, or E&amp;M module and/or Universal card. Otherwise, go to step 4.</li> </ul>
4.	INCOMING TEST – seize the trunk incoming – connect butt-set to E lead and ground. Circuit indicator should light when butt-set goes off-hook (see Figure 3-4).	<ul style="list-style-type: none"> <li>If not, replace card/module; if fault persists, possible control problem – go to step 11.</li> <li>Otherwise go to step 5.</li> </ul>
5.	Check if incoming wink is programmed.	Yes:   • Go to step 6. No:     • Go to step 7.
6.	Connect voltmeter to M lead and ground. Flash of –48V should be seen when butt-set goes off-hook (see Figure 3-4).	<ul style="list-style-type: none"> <li>If not, replace card/module; if fault persists, possible control problem – go to step 11.</li> <li>Otherwise go to step 7.</li> </ul>
7.	Connect voltmeter to M lead and ground. Complete a call to an extension – when call is completed, steady –48V should be seen (see Figure 3-4).	<ul style="list-style-type: none"> <li>If not, replace card/module; if fault persists, possible control problem – go to step 11.</li> <li>Otherwise go to step 8.</li> </ul>
8.	OUTGOING TEST – repeat step 3.	<ul style="list-style-type: none"> <li>Go to step 9.</li> </ul>
9.	Connect voltmeter to ground and the M lead.	<ul style="list-style-type: none"> <li>Go to step 10.</li> </ul>
10.	Connect butt-set to the E lead and ground, and dial the access code for a trunk group. The reading should be a steady –48V (see Figure 3-4).	<ul style="list-style-type: none"> <li>If not, replace card/module; if fault persists, possible control problem – go to step 11.</li> <li>Otherwise card is functioning.</li> </ul>
11.	Possible control problem – refer to Supplementary Peripheral Equipment Procedures.	

Supplemental DID / Loop-Tie Trunk Troubleshooting Procedures

**Table 3-8 Supplementary DID / Loop-Tie Trunk Troubleshooting Procedures**

Step	Action	Description / Follow-Up
1.	Perform General Trunk procedures in Table 3-5.	<ul style="list-style-type: none"> <li>Go to step 2.</li> </ul>
2.	Disconnect the affected circuits from the cross-connect field.	<ul style="list-style-type: none"> <li>Go to step 3.</li> </ul>
3.	Connect the butt-set across the Tip and Ring of the trunk circuit – the circuit indicator should light when the butt-set goes off-hook (see Figure 3-5).	<ul style="list-style-type: none"> <li>If not, replace card; if fault persists, possible control problem – go to step 9.</li> <li>Otherwise go to step 4.</li> </ul>
4.	Check if circuit is a DID trunk.	Yes:     • Go to step 5. No:       • Go to step 6.
5.	Use butt-set to simulate incoming digits – connection should be made to an extension/attendant, etc., depending upon call routing. The trunk circuit indicator should wink following digits pulsed.	<ul style="list-style-type: none"> <li>If not, ensure extension/attendant console, etc. is functioning properly – replace card; if fault persists, possible control problem – go to step 9.</li> <li>Otherwise go to step 7.</li> </ul>
6.	TIE TRUNK – dialing, or going off-hook from the butt-set should connect to an extension/attendant, etc., depending upon call routing.	<ul style="list-style-type: none"> <li>If not, ensure extension/attendant console, etc. is functioning properly – replace card; if fault persists, possible control problem – go to step 9.</li> <li>Otherwise go to step 7.</li> </ul>
7.	Connect voltmeter across the Tip and Ring of the trunk circuit (see Figure 3-5).	<ul style="list-style-type: none"> <li>To check wink start or answer back supervision, go to step 8.</li> </ul>
8.	Check the results during a simulated incoming call from the butt-set.	<ul style="list-style-type: none"> <li>When seized, meter should read –18 to –20 V.</li> <li>For a wink start, the meter should read a 180 ms positive flash, and back to –18 to –20 V.</li> <li>For answer back supervision, deflection to +18 to +20 V should be seen.</li> <li>If these readings are not seen, retry. If this persists, replace the suspect card; if fault still persists, possible control problem – go to step 9.</li> </ul>
9.	Replace card with a known working card.	<ul style="list-style-type: none"> <li>If problem persists, reinstall the original card, and go to step 10.</li> </ul>
10.	Refer to Peripheral Equipment Procedures.	

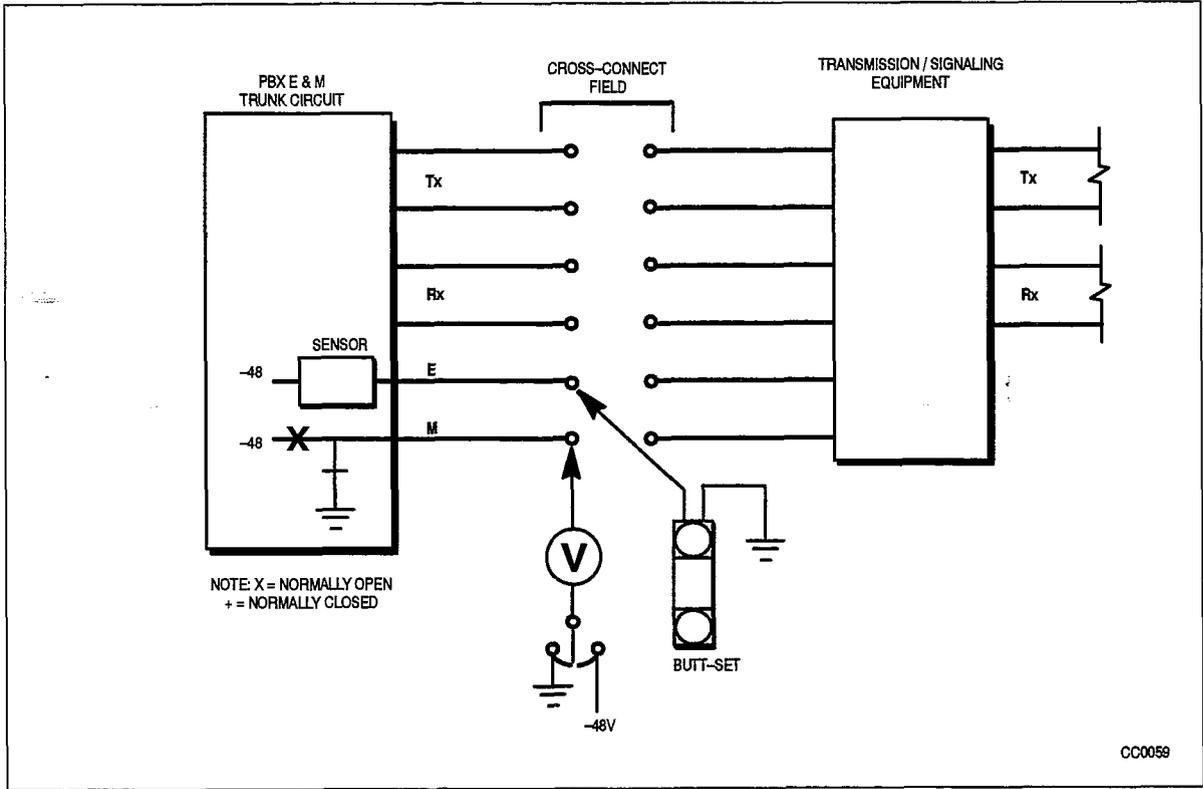


Figure 3-4 E&M Type 1 Trunk Testing

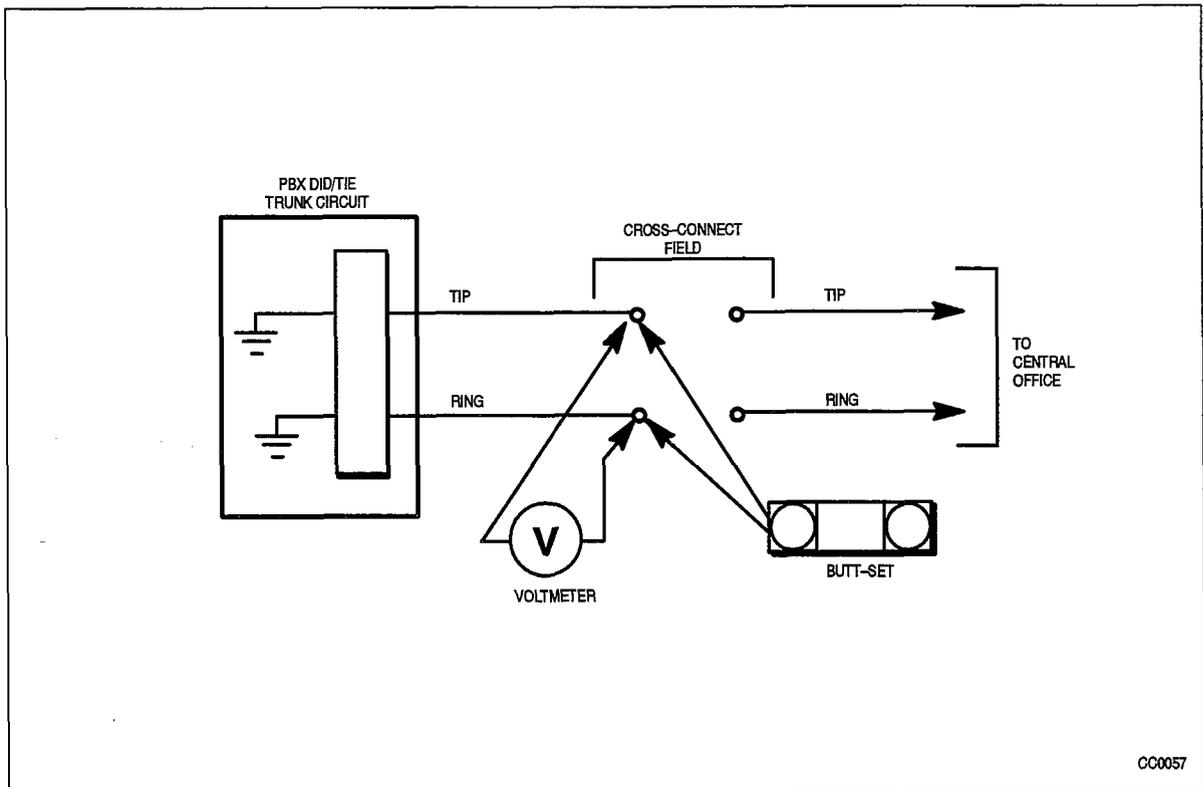


Figure 3-5 Loop Trunk Testing

### T1 (DS-1) Trunk

The T1 Trunk card provides an interface between the SX-200 DIGITAL system and external digital trunk facilities. Each card contains one 24 channel interface. The T1 Trunk card must be installed in a high power card slot, and there may be only one installed per bay.

**Table 3-9 T1 Trunk Card Troubleshooting Summary**

Step	Possible Malfunction Source
1.	Faulty external equipment or far end.
2.	T1 card not installed in proper slot. (Card must be installed in a high power slot – slot 6 (preferred) or slot 8 in Digital bays, or slot 4 in Combo Bay 2). Note: only one T1 Trunk card may be installed per bay.
3.	Faulty connections between the T1 Channel Service Unit and the cabinet end of the T1 Adapter Cable Assembly. See Figure 3-7 / Figure 3-8.
4.	Faulty connection between the T1 Adapter Cable Assembly and the T1 Adapter card.
5.	Faulty connection between the T1 Adapter card and the shelf backplane.
6.	Faulty CDE programming; likely forms: <ul style="list-style-type: none"> <li>• T1 Link Descriptor</li> <li>• T1 Link Assignment</li> <li>• T1 Network Sync</li> <li>• COS Define</li> <li>• Trunk Circuit Descriptors</li> <li>• Non-Dial In Trunks</li> <li>• Dial In Trunks</li> <li>• Trunk Groups</li> <li>• Device Interconnection Table</li> <li>• System Configuration</li> </ul>
7.	Faulty T1 Channel Service Unit (see Note 2.).
8.	Incorrect switch settings on T1 Trunk card (see Note 3.).
9.	Jumper clip W8 on/not on Main Control card (see Note 4.). See Figure 2-1.
10.	Faulty T1 Trunk card (see Note 2.).
11.	Faulty T1 Clock module on Main Control card.
12.	Faulty Main Control card.
13.	Faulty switching matrix – refer to 'Supplementary Peripheral Equipment Procedures'.

**Notes:** 1. Useful maintenance commands: SHOW STATUS, TEST, SHOW ALARMS, SHOW ERRORS  
T1\_TRUNK – see Practice 9109-096-351-NA, RS-232 Maintenance Terminal.

2. When the system detects a trunk protocol failure, it removes the affected trunk circuit/channel from service. Trunk protocol failures may indicate fault(s) with the trunk circuit/channel, in which case the card should be tested and replaced. However, they may also indicate that the external trunk is faulty. In this case, the affected trunk circuit/channel must stay out-of-service until the external equipment is repaired.

3. The switch settings are for cable length (not loop length) between the T1 card and the CSU. See Figure 3-6. The correct settings are:
  - 0 to 149 ft; set S1 CLOSED; S2-S8 OPEN.
  - 150 to 449 ft; set S2, S3, S4 CLOSED; S1, S5-S8 OPEN.
  - 450 to 655 ft; set S5, S6, S7 CLOSED; S1-S4, S8 OPEN.These switch settings all assume 22 gauge wire.
4. For "pre-REV A" MCC cards, if the T1 clock module is installed, jumper clip W8 must be removed. If there is no T1 clock module, the jumper must be installed (see Figure 2-1).

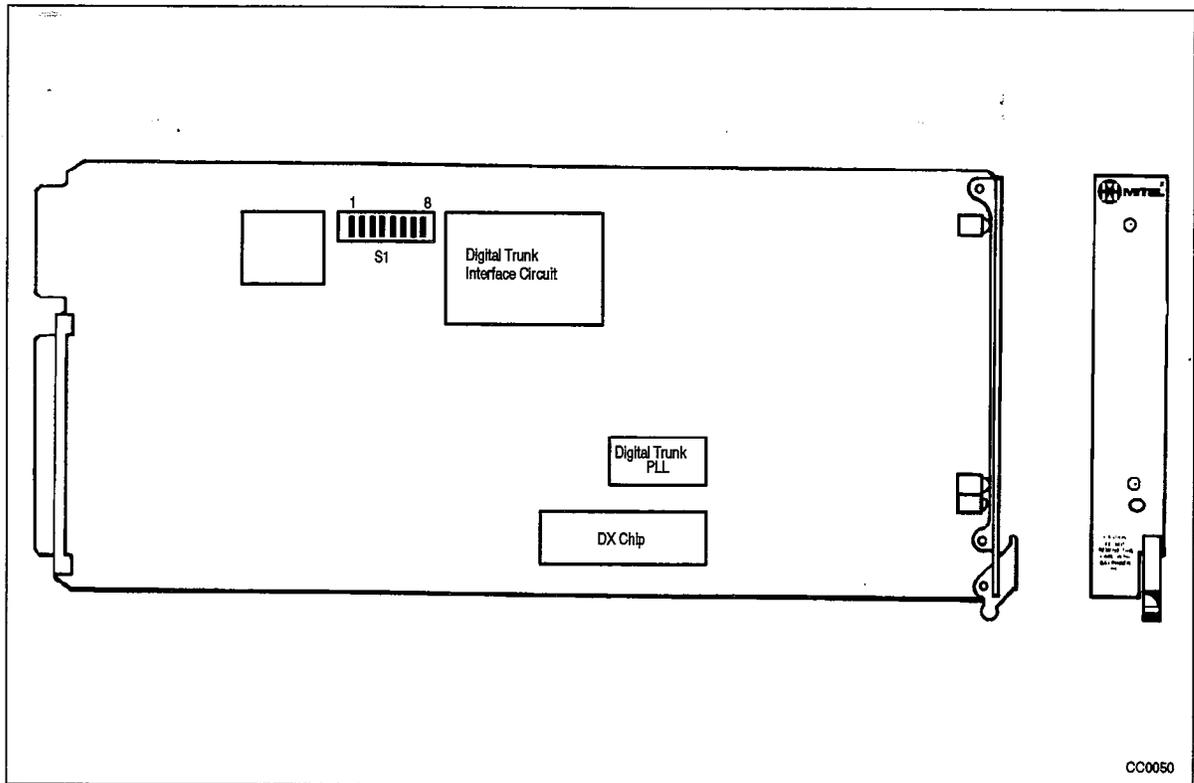
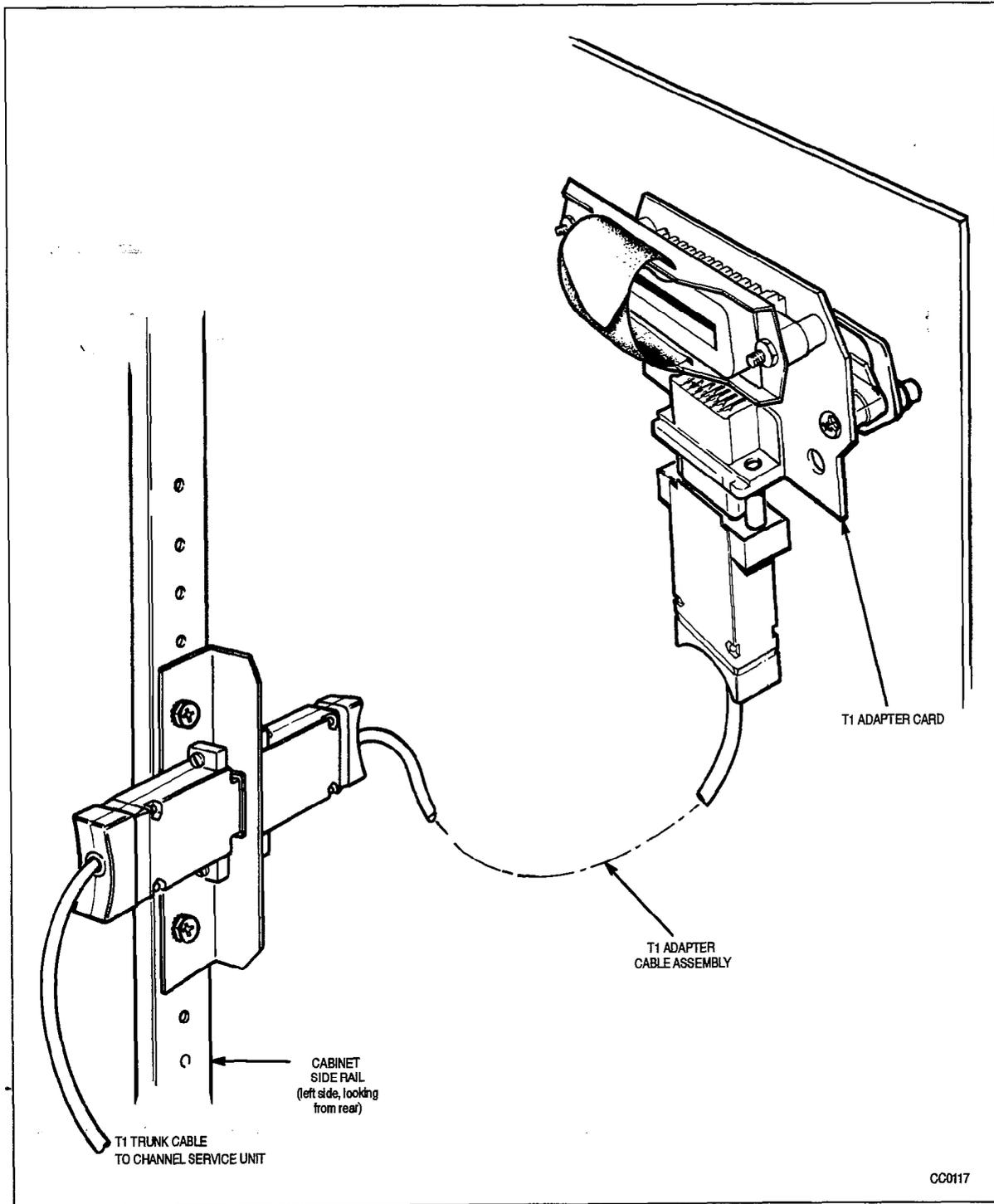


Figure 3-6 T1 Trunk Card



**Figure 3-7 T1 Adapter Card and Cable Assembly Connections**

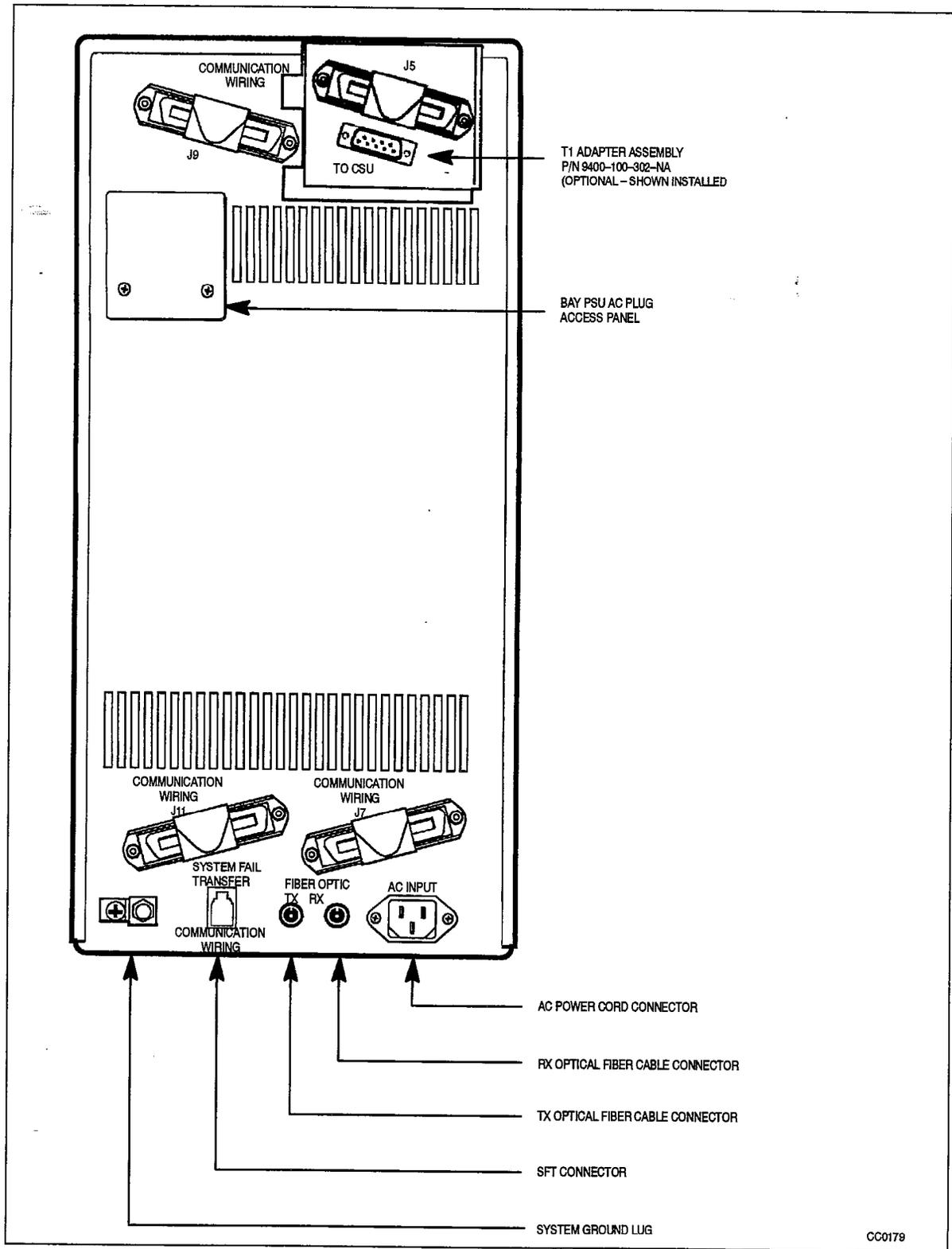


Figure 3-8 SX-200 FD Peripheral Node Rear View (with optional T1 Adapter)

## Universal Card

3.2 The Universal card is used for several applications. Refer to procedures for the specific application; i.e.:

- DTMF Receivers / Relays
- Music On Hold
- LCD Attendant Console
- Loudspeaker / Pager
- E&M Trunks (see Trunk Cards – General)

### DTMF Receivers / Relay

The DTMF Receiver module is installed on the Universal card. The module can be used as a DTMF receiver (4 circuits) and/or a relay (2 circuits) – see practice 9109–096–125–NA, Circuit Card Descriptions, for further information. The following table outlines the most likely causes of DTMF failure.

**Table 3–10 DTMF Receiver / Relay Troubleshooting Summary**

Step	Possible Malfunction Source
1.	Insufficient receiver circuits to handle peak traffic load (see Note 2.).
2.	Faulty connection between MDF and the system or MDF and the external equipment (applies to the relays only – for Night Bell control or external System Alarm indication). See Note 4.
3.	Faulty external equipment (applies to the relays only – for Night Bell control or external System Alarm indication). See Note 4.
4.	Faulty CDE programming; likely forms: <ul style="list-style-type: none"> <li>• System Configuration</li> <li>• Miscellaneous System Ports</li> <li>• Call Rerouting Table</li> </ul>
5.	Faulty or improperly installed DTMF Receiver module.
6.	Faulty Universal card.
7.	Faulty Universal card modules (see Note 3.).
8.	Faulty PCM cable connections between Bay Controller and Main Controller.
9.	Faulty DSP (replace Main Control card).
10.	Faulty switching matrices – refer to 'Supplementary Peripheral Equipment Procedures'.

- Notes:**
1. Useful maintenance commands: SHOW STATUS, TEST, SHOW ALARMS, SHOW ERRORS – see Practice 9109–096–351–NA, RS–232 Maintenance Terminal.
  2. Refer to practice 9109–096–180–NA, Engineering Information, for details on receiver provisioning.
  3. Receiver / relay module malfunction could be caused by the failure of other module(s) on the Universal card.
  4. A simple test for a relay circuit is: (a) disconnect the relay from external equipment at the MDF; (b) connect ohmmeter across relay leads – an open circuit should be read when the relay is open. If not, there is a problem with the module.

**Music On Hold (MOH)**

The Music On Hold / Pager module interfaces the *SX-200* DIGITAL system to an external music source for MOH. The module is installed on the Universal card. See practice 9109-096-125-NA, Circuit Card Descriptions, for further information. The following table outlines the most likely causes of MOH failure.

**Table 3-11 Music On Hold Troubleshooting Summary**

Step	Possible Malfunction Source
1.	Faulty music source.
2.	Faulty connection between the music source and the MDF.
3.	Faulty connection between the MDF and the system.
4.	Faulty CDE programming; likely forms: <ul style="list-style-type: none"> <li>• System Configuration</li> <li>• Miscellaneous System Ports</li> <li>• COS Define</li> <li>• Call Rerouting Table</li> </ul>
5.	Faulty or improperly installed MOH / Pager module.
6.	Faulty Universal card.
7.	Faulty Universal card modules (see Note 2.).
8.	Faulty PCM cable connections between Bay Controller and Main Controller (if applicable).
9.	Faulty switching matrices – refer to 'Supplementary Peripheral Equipment Procedures'.

**Notes:** 1. Useful maintenance commands: SHOW STATUS, TEST, SHOW ALARMS, SHOW ERRORS – see Practice 9109-096-351-NA, RS-232 Maintenance Terminal.

2. MOH / Pager module malfunction could be caused by the failure of other module(s) on the Universal card.

**Pager**

The Music On Hold / Pager module interfaces the SX-200 DIGITAL system to an external paging amplifier. The module is installed on the Universal card. See practice 9109-096-125-NA, Circuit Card Descriptions, for further information. The following table outlines the most likely causes of paging failure.

**Table 3-12 Pager Troubleshooting Summary**

Step	Possible Malfunction Source
1.	Faulty paging equipment.
2.	Faulty connection between the paging equipment and the MDF.
3.	Faulty connection between the MDF and the system.
4.	Faulty CDE programming; likely forms: <ul style="list-style-type: none"> <li>• System Configuration</li> <li>• Miscellaneous System Ports</li> <li>• COS Define</li> <li>• Call Rerouting Table</li> </ul>
5.	Faulty or improperly installed MOH / Pager module.
6.	Faulty Universal card.
7.	Faulty Universal card modules (see Note 2.).
8.	Faulty PCM cable connections between Bay Controller and Main Controller (if applicable).
9.	Faulty switching matrices – refer to ‘Supplementary Peripheral Equipment Procedures’.

**Notes:** 1. Useful maintenance commands: SHOW STATUS, TEST, SHOW ALARMS, SHOW ERRORS – see Practice 9109-096-351-NA, RS-232 Maintenance Terminal.

2. MOH / Pager module malfunction could be caused by the failure of other module(s) on the Universal card.

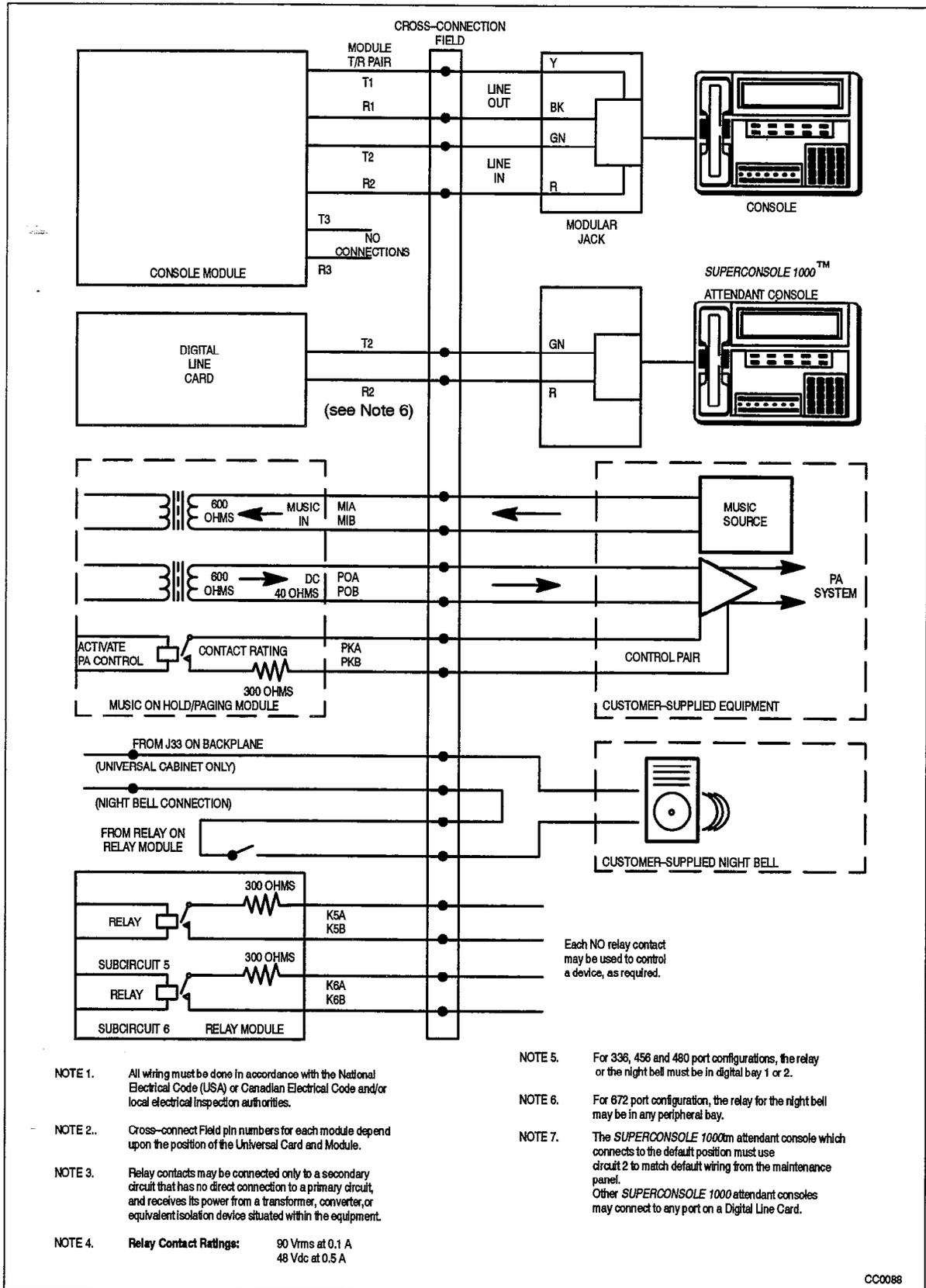


Figure 3-9 Music, Paging, Relay and Console Connections

**Analog Junctors / Channels**

If analog bays are present in an SX-200 DIGITAL system (456 & 480 port systems), the analog cards are connected to 32 common junctors, or voice paths, via analog crosspoint chips. These are located on the cards themselves, and are in turn connected to the 32 channels of the bay's digital link via the Digital Interface Card. Refer to practice 9109-096-180-NA, Engineering Information, for further details on this interface. The following table outlines the most likely causes of junctor failure.

**Table 3-13 Analog Junctor Troubleshooting Summary**

Step	Possible Malfunction Source
1.	<p>Faulty line or trunk card:  <b>Follow this process on a busy switch, wait for all LED's on the card to be off:</b>                      A. Unseat the card in slot 1 (or the closest card to slot 1) of the affected bay. If the problem disappears, that was the faulty card. If not, reseat the card, and go to B                      B. Repeat A for all of the peripheral cards on the affected shelf.</p> <p><b>Follow this process on an idle switch and only one card in the bay is suspect:</b>                      A. Unseat all of the cards in the affected bay. If the problem remains, the DIC card is faulty. If the problem disappears, the fault is in the peripheral cards and go to B.                      B. Install half of the suspected cards back in the bay. If the problem appears the faulty card is this half, if not the faulty card is in the other half, go to C.                      C. Unseat the "good half" and go to B. Repeat until the faulty card is isolated.</p> <p><b>Follow this process on an idle switch and multiple cards in the bay are suspect:</b>                      A. Unseat all of the cards in the affected bay. If the problem remains, the DIC card is faulty. If the problem disappears, the fault is in the peripheral cards and go to B.                      B. Install each peripheral card back in one at a time and check if the fault returns. Do this for each card ensuring only one peripheral card is plugged in at a time. Replace each faulty card found.                      C. Reseat all of the "good" cards and recheck for a fault.</p>
2.	<p>Faulty inter-bay connection – check for faulty connections between analog and digital bays; verify connection between digital control bay backplane (J17A or J17B) and the analog bay Digital Interface card (J2).</p>
3.	<p>Faulty CDE programming; likely form:</p> <ul style="list-style-type: none"> <li>• System Configuration</li> </ul>
4.	<p>Faulty Digital Interface card.</p>
5.	<p>Faulty Peripheral Control card.</p>
6.	<p>Faulty Scanner card.</p>
7.	<p>Faulty switching matrices – refer to 'Supplementary Peripheral Equipment Procedures'.</p>

**Notes:** 1. Useful maintenance commands: SHOW STATUS, TEST, SHOW ALARMS – see Practice 9109-096-351-NA, RS-232 Maintenance Terminal.

2. The analog bay link assignments are as follows:

Link 2: Bay 3  
Link 5: Bay 4  
Link 7: Bay 5

For further information, refer to practice 9109-096-180-NA, Engineering Information.

## Special Sets

### Attendant Console – LCD Console

This procedure applies to the LCD Console only. Do not use this procedure for the *SUPERCONSOLE 1000* attendant console – instead, refer to “Attendant Console – *SUPERCONSOLE 1000*”. Table 3–14 outlines the most likely items to cause LCD Console malfunction.

**Table 3–14 LCD Console Troubleshooting Summary**

Step	Possible Malfunction Source
1.	Ensure that the LCD Console is connected to a Console Module on a Universal Card and not connected to a <i>SUPERCONSOLE 1000</i> attendant console port (i.e., a Digital Line Card circuit).
2.	Faulty connections between the console and the cross-connect field (see Figure 3–9).
3.	Faulty connections between the cross-connect field and the <i>SX-200 DIGITAL</i> system. See Note 3.
4.	Faulty CDE programming; likely forms: <ul style="list-style-type: none"> <li>• COS Define</li> <li>• Console Assignment</li> <li>• Console LDN Assignments</li> <li>• Tenant Forms 05, 06</li> <li>• Device Interconnection Table</li> <li>• System Configuration</li> </ul>
5.	Console requires reset (disconnect, reconnect line cord). See Figure 3–10 and Table 3–15.
6.	Faulty console, handset and cord assembly, or headset assembly.
7.	Faulty / improperly installed Console module.
8.	Faulty Universal card.
9.	Faulty Universal card modules ( see Note 2.).
10.	Faulty backplane cable connections.
11.	Bay Control Card requires reload (if applicable) – power down bay, reseal BCC, power up bay.
12.	Main Control Card requires reload – press <i>SYSTEM RESET</i> button (see Figure 2–1).
13.	Faulty switching matrices – refer to ‘Supplementary Peripheral Equipment Procedures’.

**Notes:** 1. Useful maintenance commands: SHOW STATUS, TEST, SHOW ALARMS – see Practice 9109–096–351–NA, RS–232 Maintenance Terminal.

2. Console module malfunction could be caused by the failure of other module(s) on the Universal card.

3. Loop length can be no more than 1000 ft with 26 AWG wire (twisted pair – with no bridge taps). Voltage across Tip and Ring should be 48 volts dc.

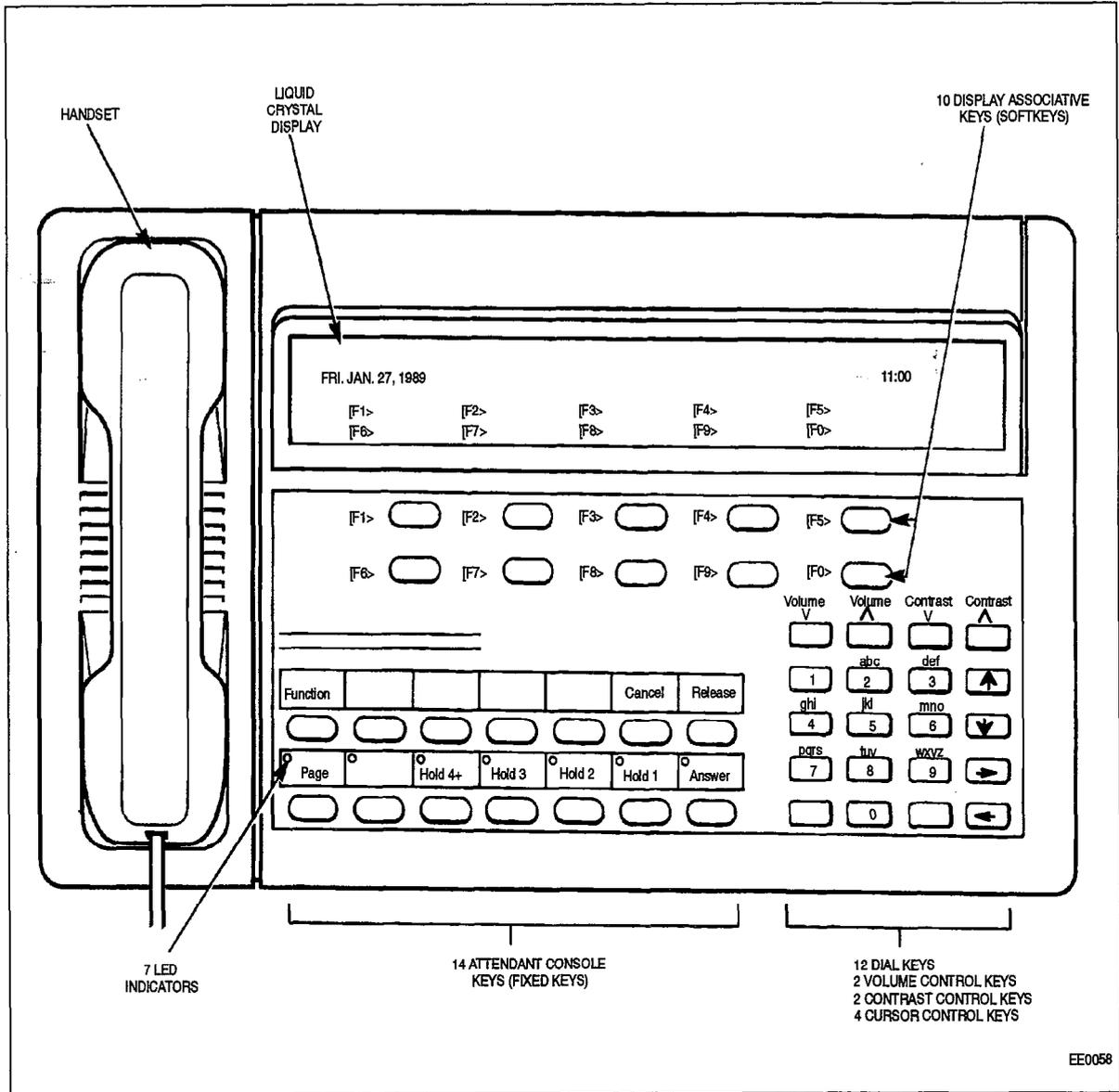


Figure 3-10 Attendant Console

**Table 3–15 Attendant Console Error Indications**

Indication	Meaning
<i>HOLD 1</i> indicator flashing (after reset)	Console fault – replace console.
<i>HOLD 2</i> indicator flashing (after reset)	Console fault – replace console.
<i>HOLD 3</i> indicator flashing (after reset)	Console fault – replace console.
All indicators on always (after reset)	Console fault – replace console.
message: CONSOLE HARDWARE PROBLEM 123456789 ERROR CODE 1 PLEASE NOTE DETAILS ON REPAIR TAG	Console fault – replace console.
message: WAITING FOR SYNCHRONIZATION 123456789 PLEASE WAIT	<ul style="list-style-type: none"> <li>• Wiring problem.</li> <li>• Problem with programming.</li> <li>• Problem with Universal card or Console module (LCD Console only).</li> <li>• Problem with Digital Line card (<i>SUPERCONSOLE 1000</i>).</li> <li>• Problem with console.</li> </ul>
message: WAITING FOR COMMUNICATION    123456789 PLEASE WAIT	<ul style="list-style-type: none"> <li>• Problem with programming.</li> <li>• Problem with console.</li> </ul>

**Attendant Console – SUPERCONSOLE 1000**

This procedure applies to the *SUPERCONSOLE 1000* only. Do not use this procedure for the LCD Console attendant console – instead, refer to “Attendant Console – LCD Console”. Table 3–16 outlines the most likely items to cause *SUPERCONSOLE 1000* malfunction.

**Table 3–16 SUPERCONSOLE 1000 Troubleshooting Summary**

Step	Possible Malfunction Source
1.	Ensure that the <i>SUPERCONSOLE 1000</i> attendant console is connected to a Digital Line Card circuit and not connected to an LCD Console port (i.e., a Console Module on a Universal Card).
2.	Faulty connections between the console and the cross-connect field (see Figure 3–9).
3.	Faulty connections between the cross-connect field and the <i>SX-200 DIGITAL</i> system. See Note 2.
4.	Faulty CDE programming; likely forms: <ul style="list-style-type: none"> <li>• COS Define</li> <li>• Console Assignment</li> <li>• Console LDN Assignments</li> <li>• Data Assignment</li> <li>• Data Circuit Descriptor</li> <li>• Tenant Forms 05, 06</li> <li>• Device Interconnection Table</li> <li>• System Configuration</li> </ul>
5.	Console requires reset (disconnect, reconnect line cord). See Figure 3–10 and Table 3–15.
6.	Digital Line Card requires reinitialization – reseal card.
7.	Faulty console, handset and cord assembly, or headset assembly.
8.	Faulty Digital Line Card.
9.	Faulty backplane cable connections.
10.	Bay Control Card requires reload (if applicable) – power down bay, reseal BCC, power up bay.
11.	Main Control Card requires reload – press <i>SYSTEM RESET</i> button (see Figure 2–1).
12.	Faulty switching matrices – refer to ‘Supplementary Peripheral Equipment Procedures’.

**Notes:** 1. Useful maintenance commands: SHOW STATUS, TEST, SHOW ALARMS, SHOW ERRORS CONSOLE – see Practice 9109–096–351–NA, RS–232 Maintenance Terminal.

2. Loop resistance should not exceed 200 ohms. Voltage across Tip and Ring should be between 40 and 48 volts dc.

**SUPERSET 3<sup>TM</sup> Telephone**

The following table outlines the most likely items to cause malfunction.

**Table 3-17 SUPERSET 3 Troubleshooting Summary**

Step	Possible Malfunction Source
1.	Faulty connections between the <i>SUPERSET</i> telephone and the cross-connect field.
2.	Faulty connections between the cross-connect field and the <i>SX-200 DIGITAL</i> system. See Note 2.
3.	Faulty CDE programming; likely forms: <ul style="list-style-type: none"> <li>• COS Define</li> <li>• Stations / <i>SUPERSET</i> Telephones</li> <li>• Device Interconnection Table</li> <li>• System Configuration</li> </ul>
4.	Set requires reset – disconnect, reconnect line cord.
5.	Faulty <i>SUPERSET</i> telephone set or handset/cord assembly.
6.	Line card requires reinitialization (reseat card).
7.	Faulty line card.
8.	Faulty backplane cable connections. Note: (for <i>SUPERSET</i> Line cards only – 456 & 480 port systems): check for faulty connections between analog and digital bays; verify connection between digital bay backplane (J17A or J17B) and the analog bay Digital Interface card (J2).
9.	Faulty switching matrices – refer to 'Supplementary Peripheral Equipment Procedures'.
10.	Problem with DTMF Receivers (not enough for peak traffic load).
11.	Problem with analog bay junctor shortages – was system configured properly for expected traffic load (if applicable)? (456 & 480-port systems)

**Notes:** 1. Useful maintenance commands: SHOW STATUS, TEST, SHOW ALARMS, SHOW ERRORS SS3\_SS4 – see Practice 9109-096-351-NA, RS-232 Maintenance Terminal.

2. Loop resistance should not exceed 200 ohms. Voltage across Tip and Ring should be between 40 and 48 volts dc. Loop length limits are: for *SUPERSET* Line circuits: 1550 ft with 26 AWG wire; for COV Line circuits: 3300 ft with 26 AWG wire (twisted pair – with no bridge taps).

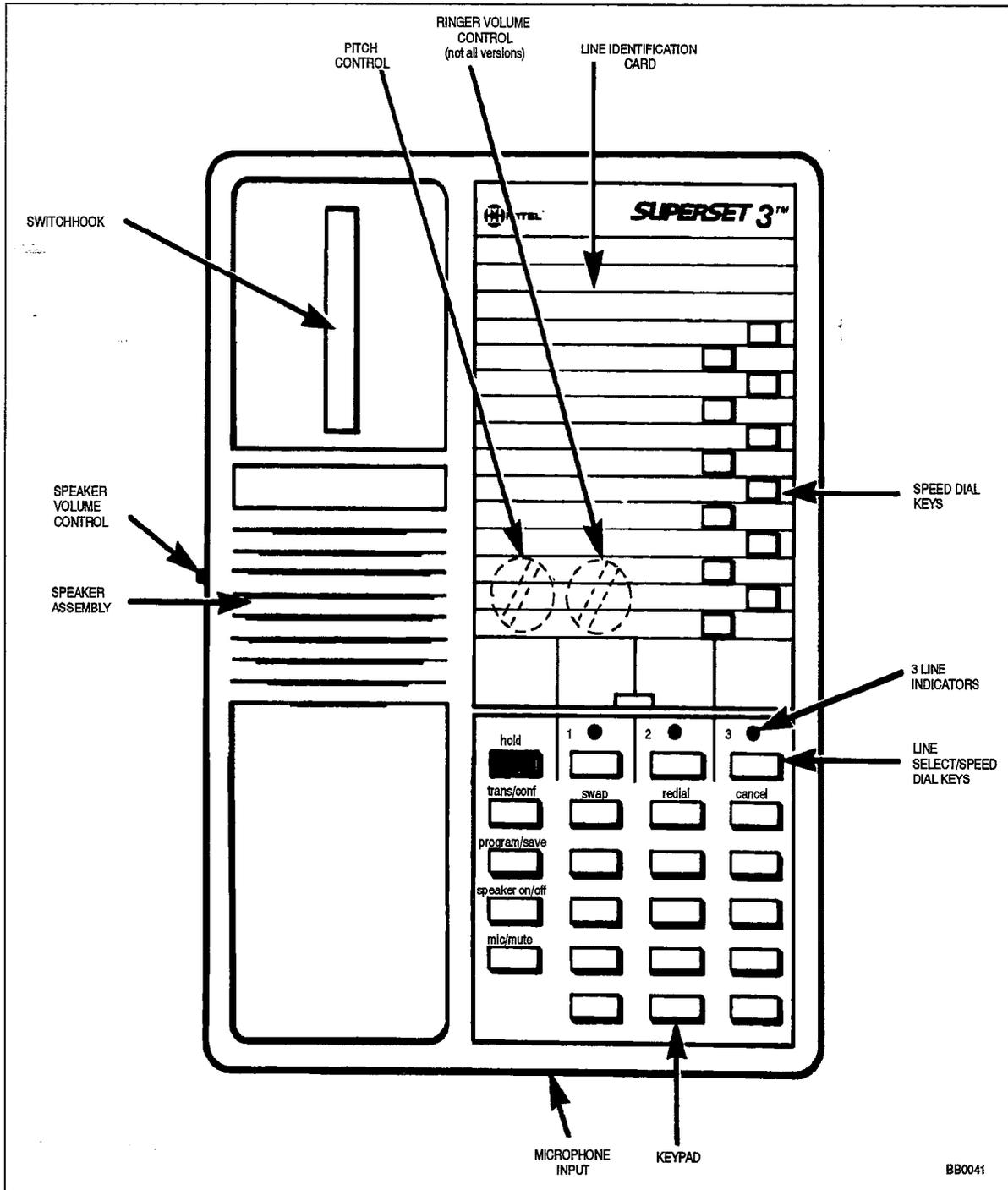


Figure 3-11 SUPERSET 3 General View

**SUPERSET 4® Telephone**

The following table outlines the most likely items to cause malfunction.

<b>Table 3-18 SUPERSET 4 Troubleshooting Summary</b>	
<b>Step</b>	<b>Possible Malfunction Source</b>
1.	Faulty connections between the <i>SUPERSET</i> telephone and the cross-connect field.
2.	Faulty connections between the cross-connect field and the <i>SX-200 DIGITAL</i> system. See Note 2.
3.	Faulty CDE programming; likely forms: <ul style="list-style-type: none"> <li>• COS Define</li> <li>• Stations / <i>SUPERSET</i> Telephones</li> <li>• Device Interconnection Table</li> <li>• System Configuration</li> </ul>
4.	Set requires reset – disconnect, reconnect line cord.
5.	Faulty <i>SUPERSET</i> telephone set or handset/cord assembly.
6.	Line card requires reinitialization (reseat card).
7.	Faulty line card.
8.	Faulty backplane cable connections. Note: (for <i>SUPERSET</i> Line cards only – 456 & 480-port systems): check for faulty connections between analog and digital bays; verify connection between digital bay backplane (J17A or J17B) and the analog bay Digital Interface card (J2).
9.	Faulty switching matrices – refer to 'Supplementary Peripheral Equipment Procedures'.
10.	Problem with DTMF Receivers (not enough for peak traffic load).
11.	Problem with analog bay junctor shortages – was system configured properly for expected traffic load (if applicable)? (456 & 480-port systems)

**Notes:** 1. Useful maintenance commands: SHOW STATUS, TEST, SHOW ALARMS, SHOW ERRORS SS3\_SS4 – see Practice 9109-096-351-NA, Maintenance Terminal.

2. Loop resistance should not exceed 200 ohms. Voltage across Tip and Ring should be between 40 and 48 volts dc. Loop length limits are: for *SUPERSET* Line circuits: 1550 ft with 26 AWG wire; for COV Line circuits: 3300 ft with 26 AWG wire (twisted pair – with no bridge taps).

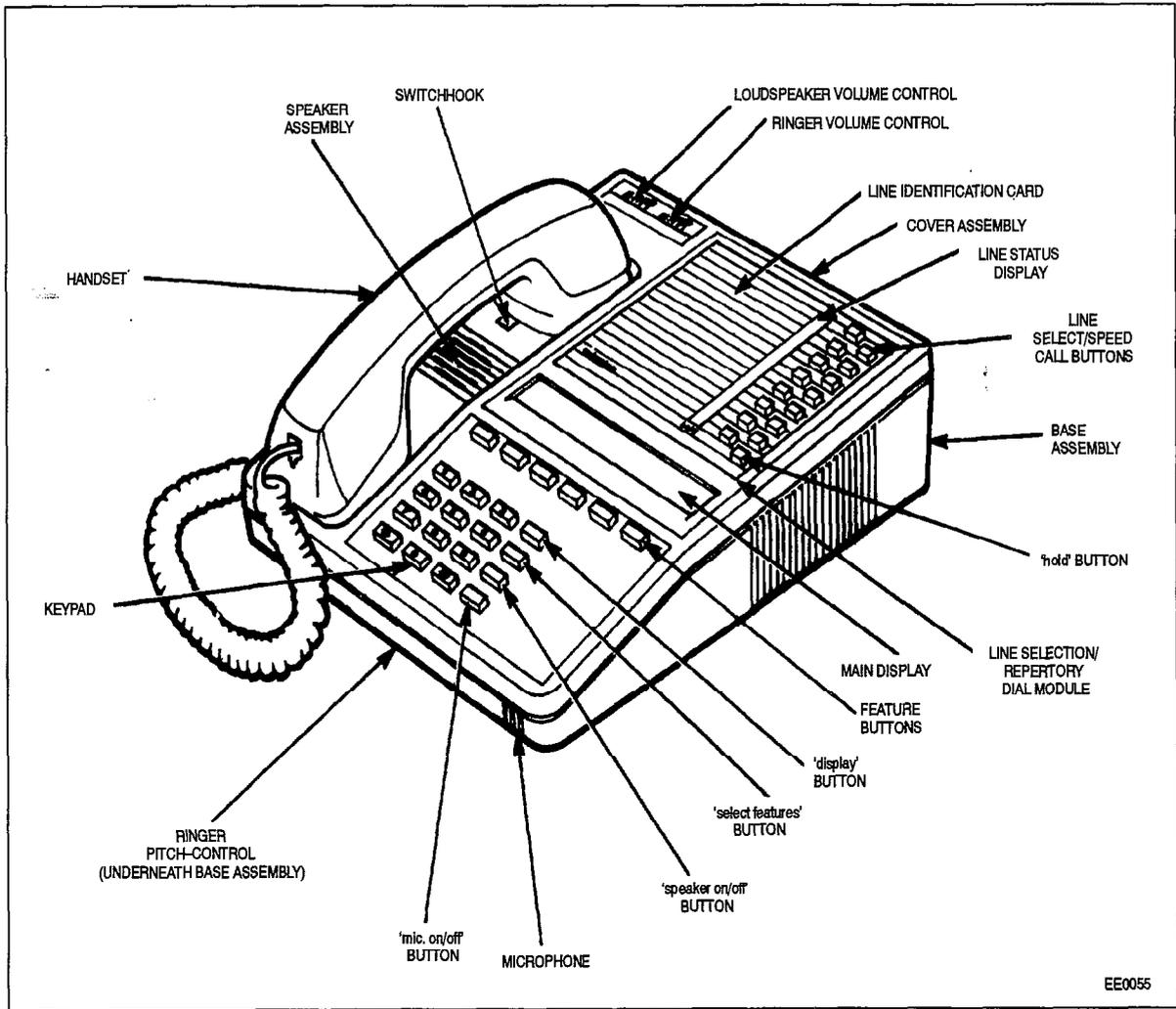
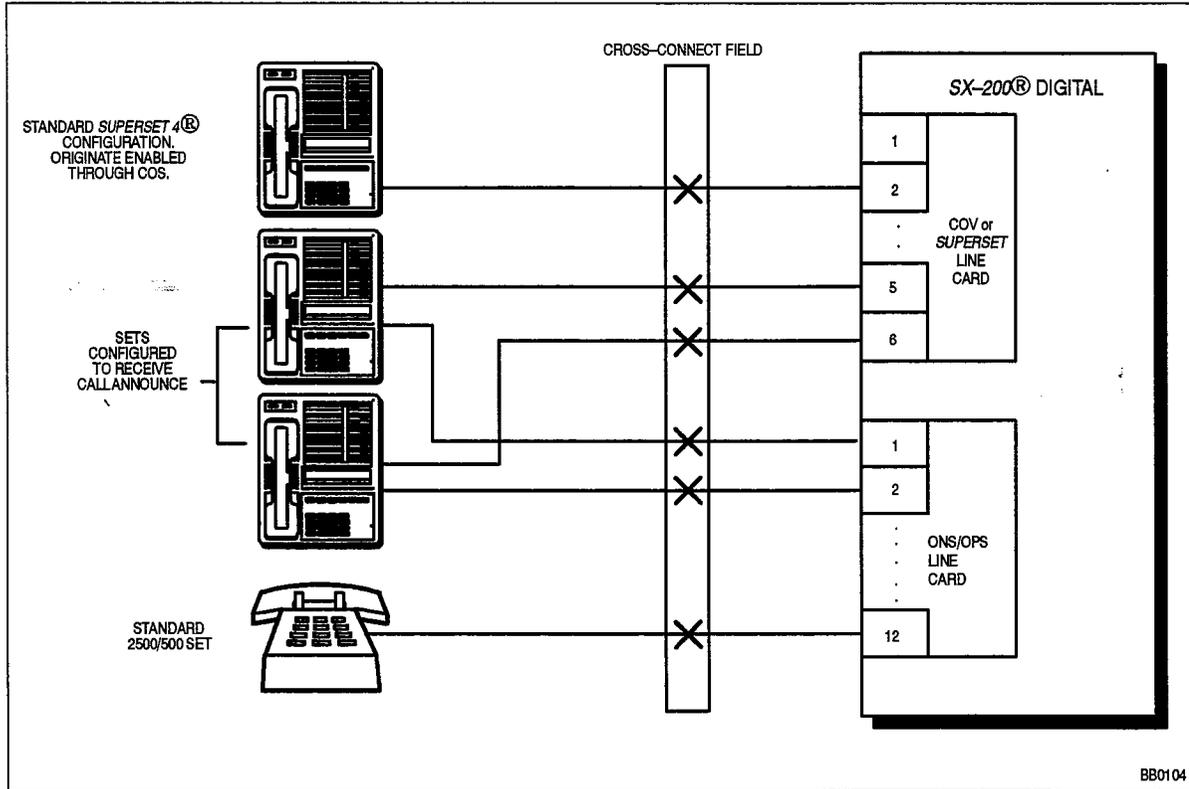


Figure 3-12 SUPERSET 4 General View



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Figure 3-13 SUPERSET 4 Connections

**SUPERSET 3 DN Telephone**

The following table outlines the most likely items to cause malfunction.

<b>Table 3-19 SUPERSET 3 DN Troubleshooting Summary</b>	
<b>Step</b>	<b>Possible Malfunction Source</b>
1.	Faulty connections between the <i>SUPERSET</i> telephone and the cross-connect field.
2.	Faulty connections between the cross-connect field and the <i>SX-200 DIGITAL</i> system.
3.	Faulty CDE programming; likely forms: <ul style="list-style-type: none"> <li>• COS Define</li> <li>• Stations / <i>SUPERSET</i> Telephones</li> <li>• Device Interconnection Table</li> <li>• System Configuration</li> </ul>
4.	Set requires reset – disconnect, reconnect line cord.
5.	Faulty <i>SUPERSET</i> telephone set or handset/cord assembly.
6.	Digital Line card requires reinitialization (reseat card).
7.	Bay Control Card / Main Control Card requires reset (power down bay or press <i>SYSTEM RESET</i> on MCC).
8.	Faulty Digital Line Card.
9.	Faulty backplane cable connections.
10.	Faulty switching matrices – refer to 'Supplementary Peripheral Equipment Procedures'.
11.	Problem with DTMF Receivers (not enough for peak traffic load).

**Notes:** 1. Useful maintenance commands: SHOW STATUS, TEST, SHOW ALARMS, SHOW ERRORS  
DIGITAL\_SETS – see Practice 9109-096-351-NA, RS-232 Maintenance Terminal.

2. Loop length limit is: 3300 ft with 26 AWG wire (twisted pair – with no bridge taps).

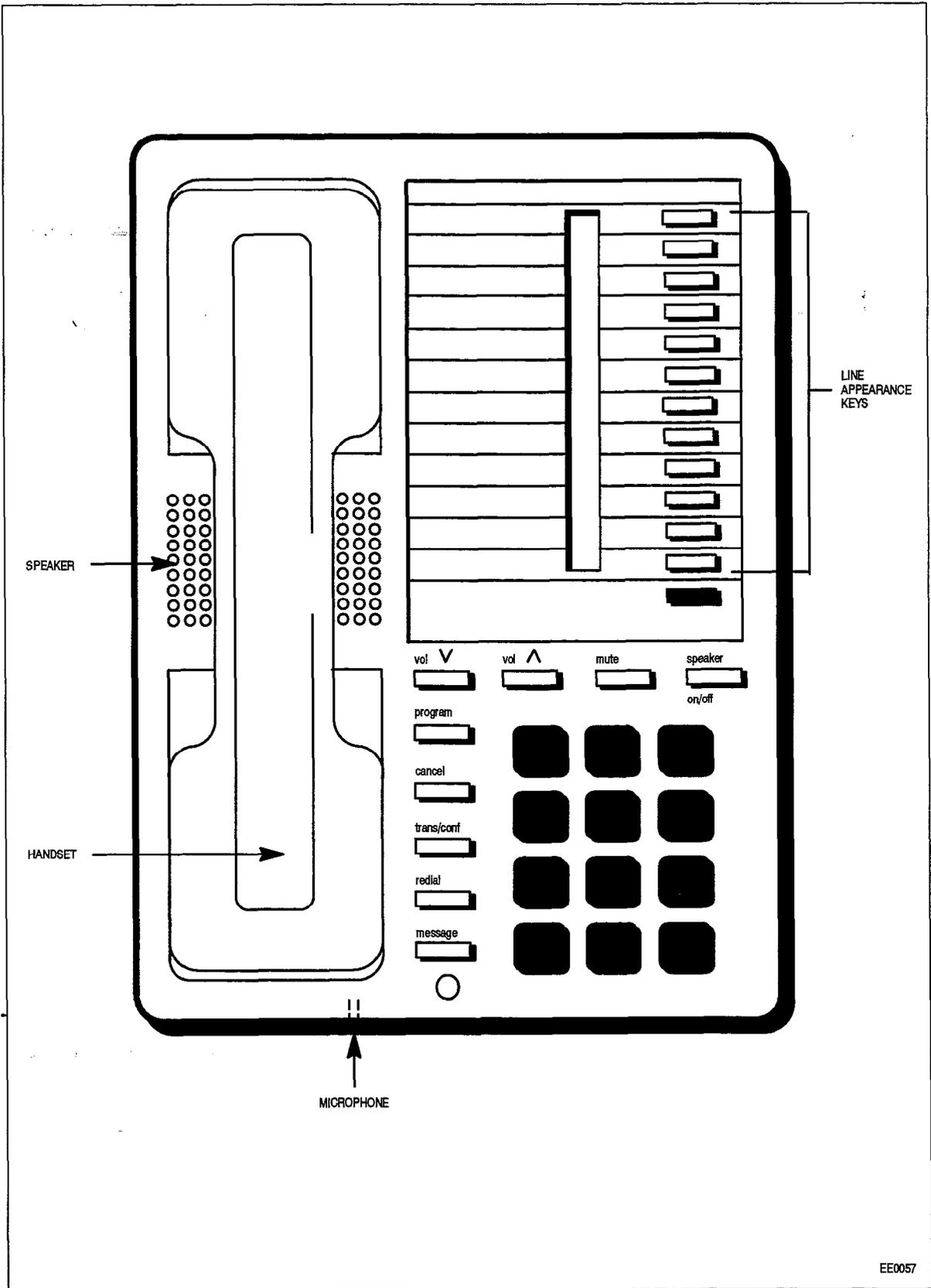


Figure 3-14 SUPERSET 3 DN General View

**SUPERSET 4 DN Telephone**

The following table outlines the most likely items to cause malfunction.

<b>Table 3-20 SUPERSET 4 DN Troubleshooting Summary</b>	
<b>Step</b>	<b>Possible Malfunction Source</b>
1.	Faulty connections between the <i>SUPERSET</i> telephone and the cross-connect field.
2.	Faulty connections between the cross-connect field and the <i>SX-200 DIGITAL</i> system.
3.	Faulty CDE programming; likely forms: <ul style="list-style-type: none"> <li>• COS Define</li> <li>• Stations / <i>SUPERSET</i> Telephones</li> <li>• Device Interconnection Table</li> <li>• System Configuration</li> </ul>
4.	Set requires reset – disconnect, reconnect line cord.
5.	Faulty <i>SUPERSET</i> telephone set or handset/cord assembly.
6.	Digital Line Card requires reinitialization (reseat card).
7.	Bay Control Card / Main Control Card requires reset (power down bay or press <i>SYSTEM RESET</i> on MCC).
8.	Faulty Digital Line Card.
9.	Faulty backplane cable connections.
10.	Faulty switching matrices – refer to 'Supplementary Peripheral Equipment Procedures'.
11.	Problem with DTMF Receivers (not enough for peak traffic load).

**Notes:** 1. Useful maintenance commands: SHOW STATUS, TEST, SHOW ALARMS, SHOW ERRORS  
DIGITAL\_SETS – see Practice 9109-096-351-NA, RS-232 Maintenance Terminal.

2. Loop length limit is: 3300 ft with 26 AWG wire (twisted pair – with no bridge taps).

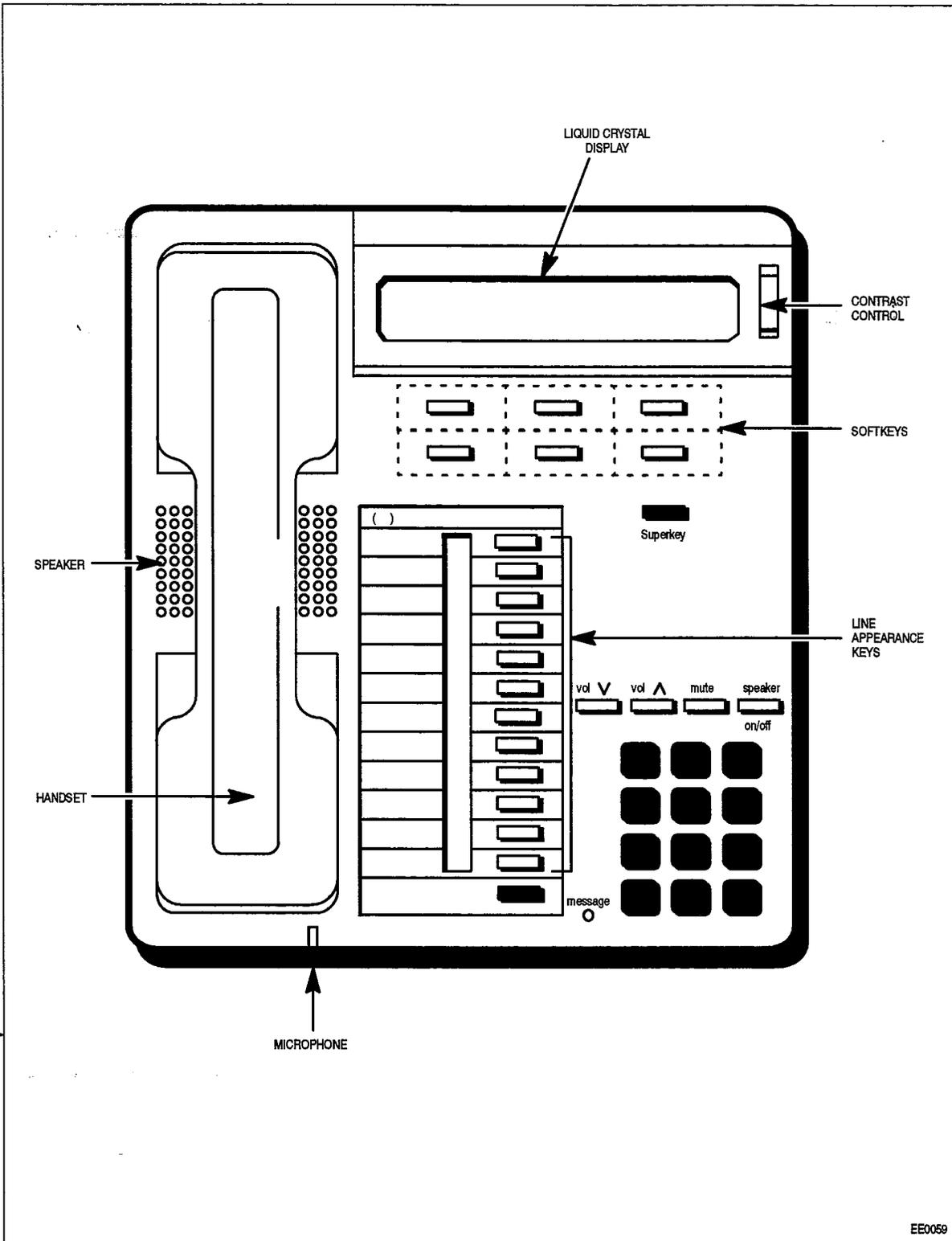


Figure 3-15 SUPERSET 4 DN General View

**SUPERSET 401 Telephone**

The following table outlines, in descending order, the most likely items to cause malfunction.

<b>Table 3-21 SUPERSET 401 Procedures</b>	
<b>Item</b>	<b>Possible Malfunction Source</b>
1.	Faulty connections between the set and the Main Distribution Frame.
2.	Faulty connections between the Main Distribution Frame and the system.
3.	Faulty CDE programming; likely forms: <ul style="list-style-type: none"> <li>• COS Define</li> <li>• Stations / <i>SUPERSET</i> Telephones</li> <li>• Device Interconnection Table</li> <li>• System Configuration</li> </ul>
4.	Set requires reset – disconnect, reconnect line cord.
5.	Faulty <i>SUPERSET</i> telephone set or handset/cord assembly.
6.	Digital Line Card requires reinitialization (reseat card).
7.	Bay Control Card / Main Control Card requires reset (power down bay or press <i>SYSTEM RESET</i> on MCC).
8.	Faulty Digital Line Card.
9.	Faulty backplane cable connections.
10.	Faulty switching matrices – refer to 'Supplementary Peripheral Equipment Procedures'.
11.	Problem with DTMF Receivers (not enough for peak traffic load).

**Notes:** 1. Useful maintenance commands: SHOW STATUS, TEST, SHOW ALARMS, SHOW ERRORS  
DIGITAL\_SETS – see Practice 9109-096-351-NA, RS-232 Maintenance Terminal.

2. A synchronization or communication error with the telephone is indicated by the rapid flashing of the Message Lamp.

3. Loop length limit is: 3300 ft/1000 m with 24 or 26 AWG wire (twisted pair – with or without bridge taps).

4. Refer to Practices 9109-096-126-NA, Peripheral Devices, and 9109-096-105-NA, Features and Services, for details of features and options.

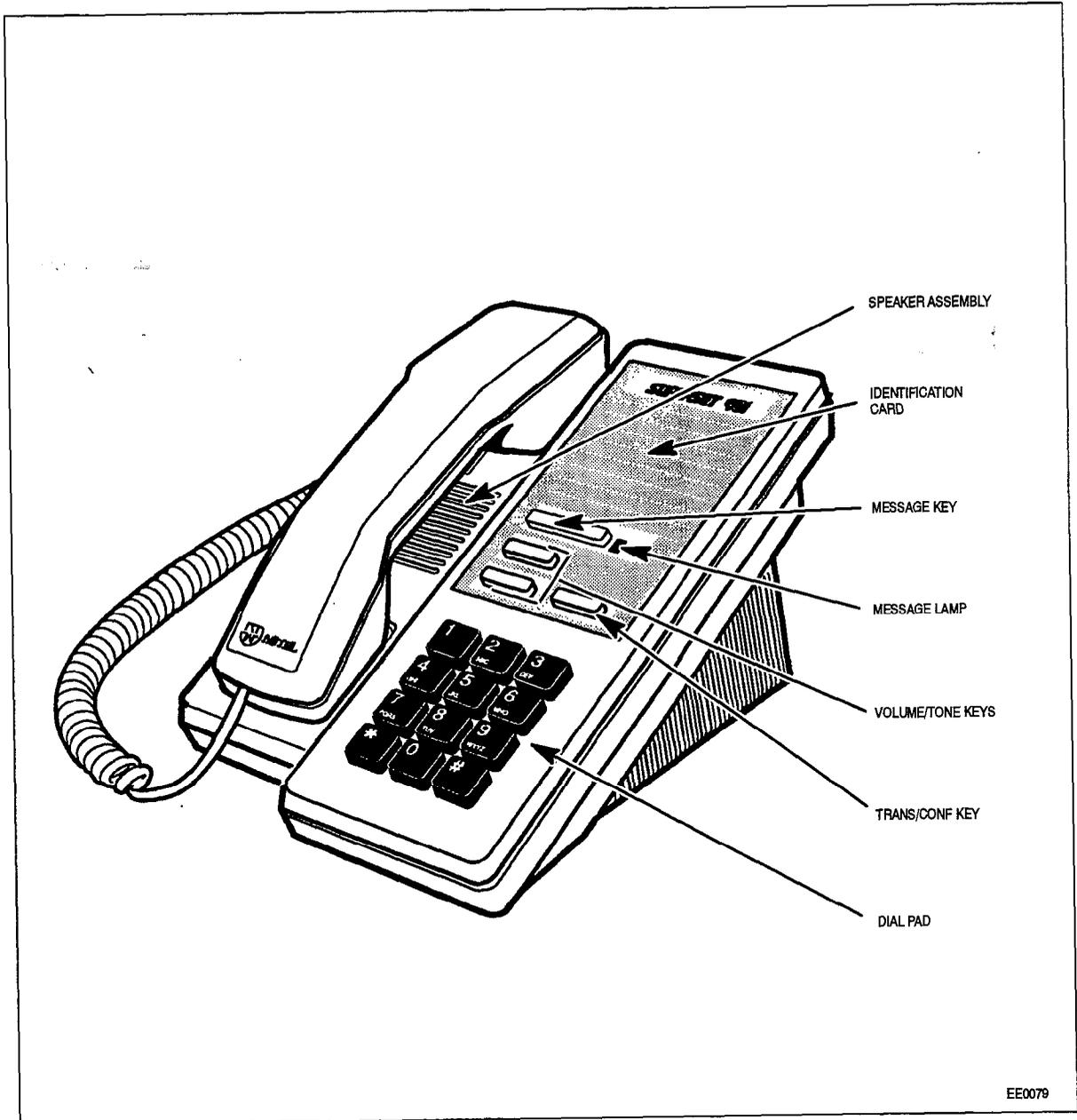


Figure 3-16 SUPERSET 401 General View

**SUPERSET 410 Telephone**

The following table outlines in descending order, the most likely items to cause malfunction.

<b>Table 3-22 SUPERSET 410 Procedures</b>	
<b>Item</b>	<b>Possible Malfunction Source</b>
1.	Faulty connections between the set and the Main Distribution Frame.
2.	Faulty connections between the Main Distribution Frame and the system.
3.	Faulty CDE programming; likely forms: <ul style="list-style-type: none"> <li>• COS Define</li> <li>• Stations / SUPERSET Telephones</li> <li>• Device Interconnection Table</li> <li>• System Configuration</li> </ul>
4.	Set requires reset – disconnect, reconnect line cord.
5.	Faulty SUPERSET telephone set or handset/cord assembly.
6.	Digital Line Card requires reinitialization (reseat card).
7.	Bay Control Card / Main Control Card requires reset (power down bay or press <i>SYSTEM RESET</i> on MCC).
8.	Faulty Digital Line Card.
9.	Faulty backplane cable connections.
10.	Faulty switching matrices – refer to 'Supplementary Peripheral Equipment Procedures'.
11.	Problem with DTMF Receivers (not enough for peak traffic load).

- Notes:**
1. Useful maintenance commands: SHOW STATUS, TEST, SHOW ALARMS, SHOW ERRORS  
DIGITAL\_SETS – see Practice 9109-096-351-NA, RS-232 Maintenance Terminal.
  2. A synchronization or communication error with the telephone is indicated by the rapid flashing of the Message Lamp.
  3. Loop length limit is: 3300 ft/1000 m with 24 or 26 AWG wire (twisted pair – with or without bridge taps).
  4. Refer to Practices 9109-096-126-NA, Peripheral Devices, and 9109-096-105-NA, Features and Services, for details of features and options.

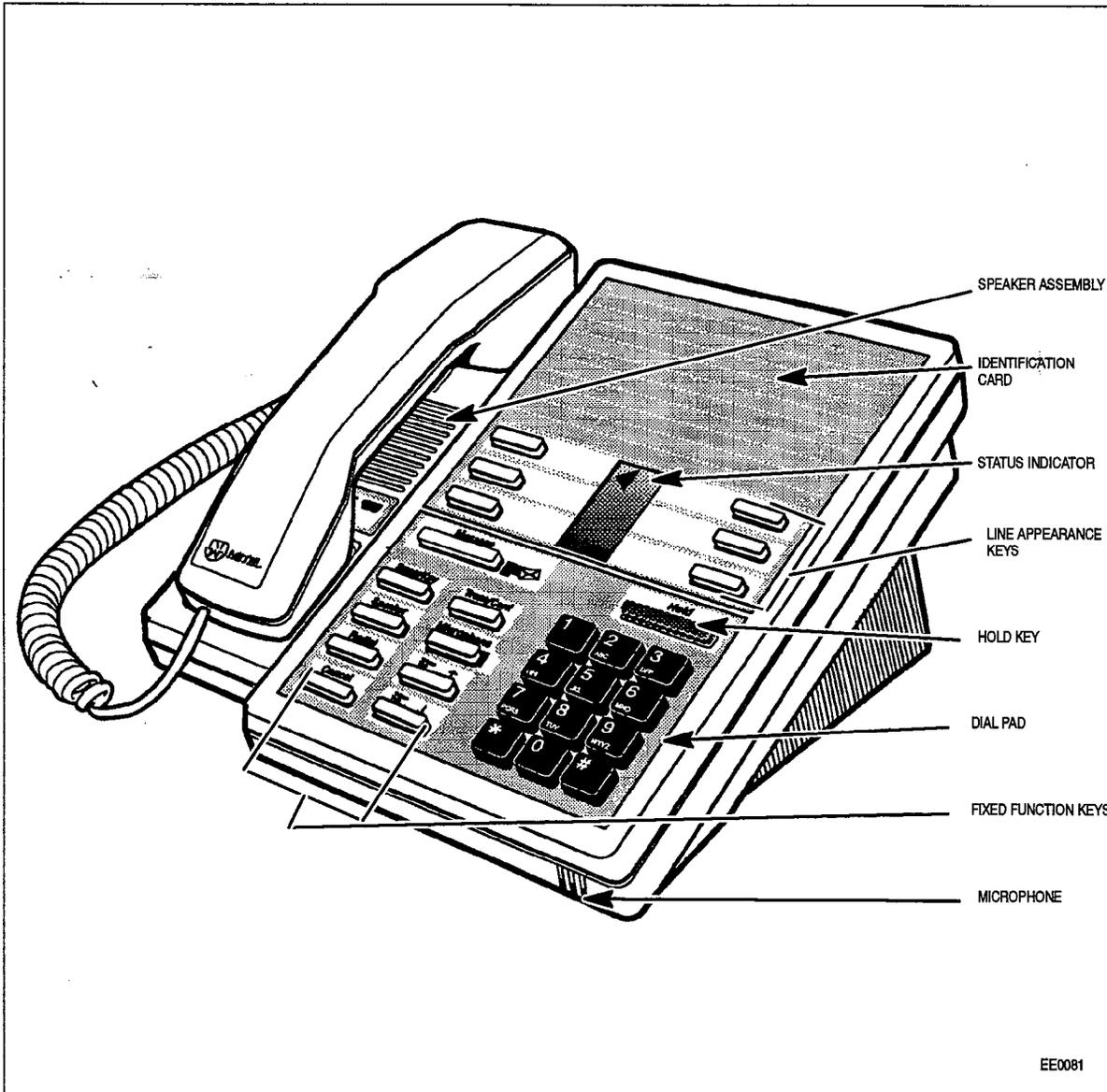


Figure 3-17 SUPERSET 410 General View

**SUPERSET 420 Telephone**

The following table outlines in descending order, the most likely items to cause malfunction.

<b>Table 3-23 SUPERSET 420 Procedures</b>	
<b>Item</b>	<b>Possible Malfunction Source</b>
1.	Faulty connections between the set and the Main Distribution Frame.
2.	Faulty connections between the Main Distribution Frame and the system.
3.	Faulty CDE programming; likely forms: <ul style="list-style-type: none"> <li>• COS Define</li> <li>• Stations / SUPERSET Telephones</li> <li>• Device Interconnection Table</li> <li>• System Configuration</li> </ul>
4.	Set requires reset – disconnect, reconnect line cord.
5.	Faulty SUPERSET telephone set or handset/cord assembly.
6.	Digital Line Card requires reinitialization (reseat card).
7.	Bay Control Card / Main Control Card requires reset (power down bay or press <i>SYSTEM RESET</i> on MCC).
8.	Faulty Digital Line Card.
9.	Faulty backplane cable connections.
10.	Faulty switching matrices – refer to 'Supplementary Peripheral Equipment Procedures'.
11.	Problem with DTMF Receivers (not enough for peak traffic load).

**Notes:** 1. Useful maintenance commands: SHOW STATUS, TEST, SHOW ALARMS, SHOW ERRORS  
DIGITAL\_SETS – see Practice 9109-096-351-NA, RS-232 Maintenance Terminal.

2. The set's LCD display will indicate synchronization problems, "NO SYNCHRONIZATION", and communication problems, "NO COMMUNICATION".

3. Loop length limit is: 3300 ft/1000 m with 24 or 26 AWG wire (twisted pair – with or without bridge taps).

4. Refer to Practices 9125-060-126-NA, Peripheral Devices, and 9125-060-105-NA, Features and Services, for details of features and options.

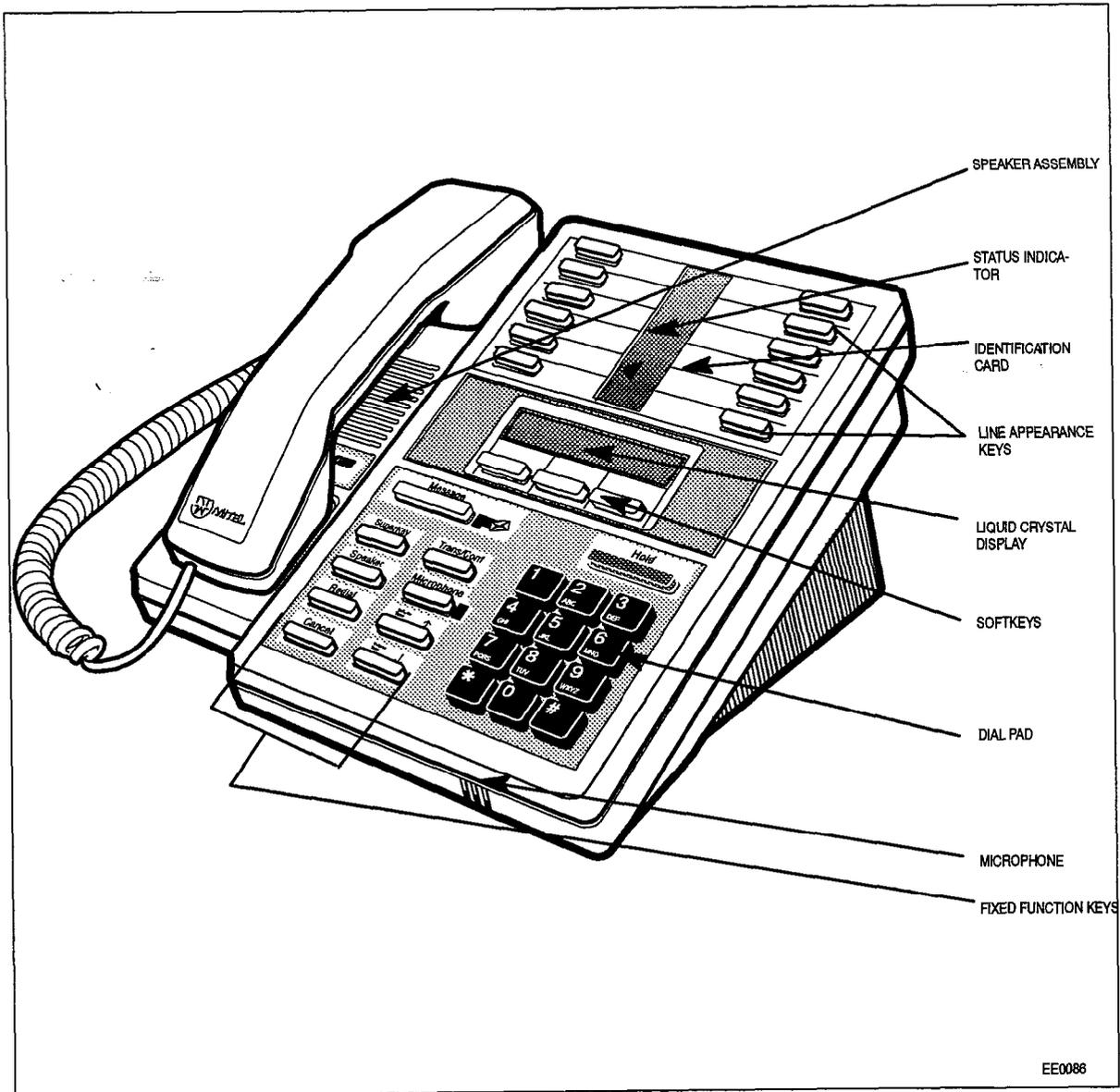


Figure 3-18 SUPERSET 420 General View

**SUPERSET 430 Telephone**

The following table outlines in descending order, the most likely items to cause malfunction.

**Table 3-24 SUPERSET 430 Procedures**

Item	Possible Malfunction Source
1.	Faulty connections between the set and the Main Distribution Frame.
2.	Faulty connections between the Main Distribution Frame and the system.
3.	Faulty CDE programming; likely forms: <ul style="list-style-type: none"> <li>• COS Define</li> <li>• Stations / SUPERSET Telephones</li> <li>• Device Interconnection Table</li> <li>• System Configuration</li> </ul>
4.	Set requires reset – disconnect, reconnect line cord.
5.	Faulty SUPERSET telephone set or handset/cord assembly.
6.	Digital Line Card requires reinitialization (reseat card).
7.	Bay Control Card / Main Control Card requires reset (power down bay or press <i>SYSTEM RESET</i> on MCC).
8.	Faulty Digital Line Card.
9.	Faulty backplane cable connections.
10.	Faulty switching matrices – refer to 'Supplementary Peripheral Equipment Procedures'.
11.	Problem with DTMF Receivers (not enough for peak traffic load).

**Notes:** 1. Useful maintenance commands: SHOW STATUS, TEST, SHOW ALARMS, SHOW ERRORS  
DIGITAL\_SETS – see Practice 9109-096-351-NA, RS-232 Maintenance Terminal.

2. The set's LCD display will indicate synchronization problems, "NO SYNCHRONIZATION", and communication problems, "NO COMMUNICATION".

3. Loop length limit is: 3300 ft/1000 m with 24 or 26 AWG wire (twisted pair – with or without bridge taps).

4. Refer to Practices 9109-096-126-NA, Peripheral Devices, and 9109-096-105-NA, Features and Services, for details of features and options.

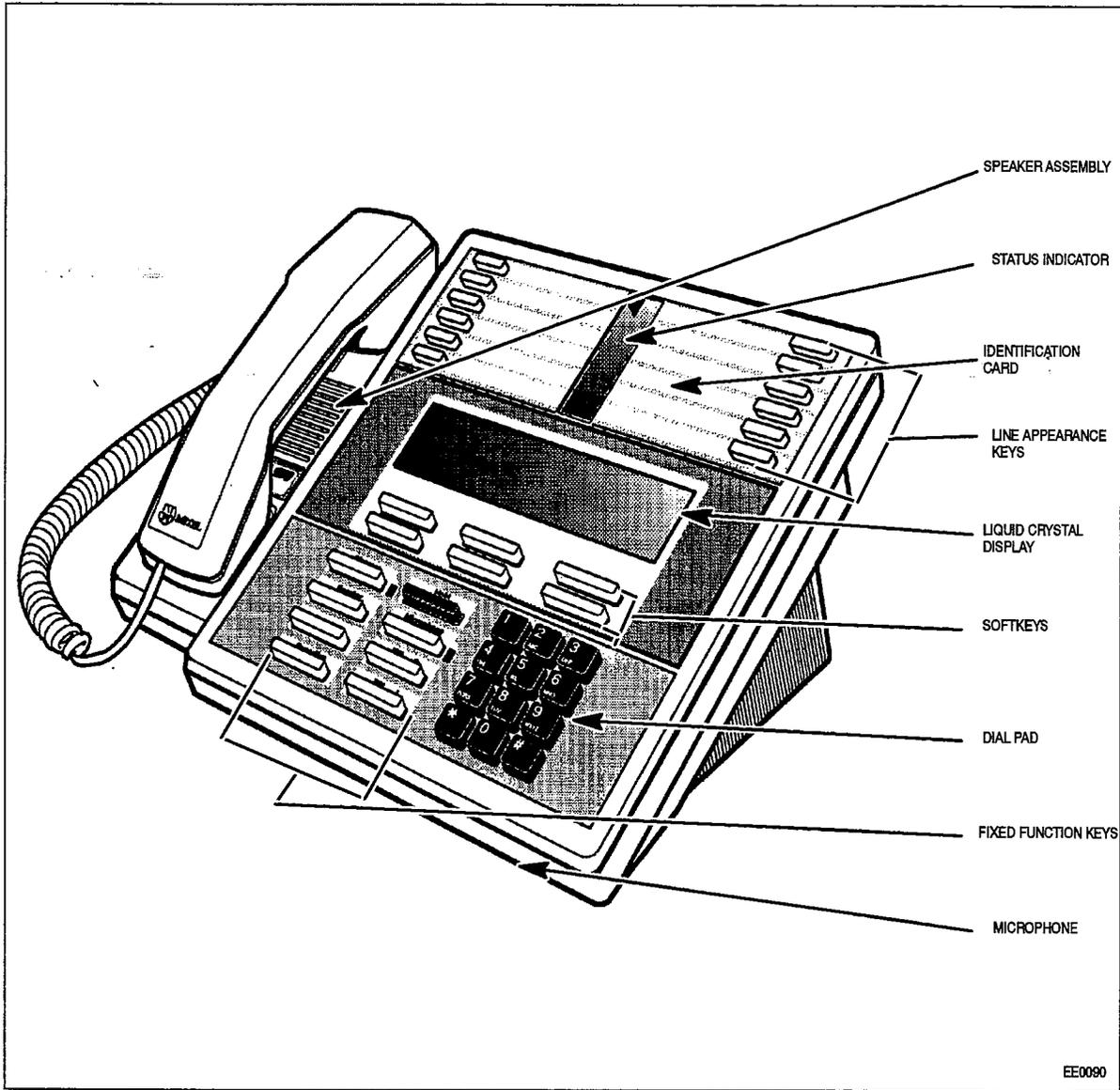


Figure 3-19 SUPERSET 430 General View

**SUPERSET DSS Module**

The following table outlines the most likely items to cause malfunction.

**Table 3-25 SUPERSET DSS Module Troubleshooting Summary**

Step	Possible Malfunction Source
1.	Faulty connections between the DSS Module and the cross-connect field.
2.	Faulty connections between the cross-connect field and the system.
3.	Faulty connections between the associated device ( <i>SUPERSET</i> telephone, attendant console) and the system. (If applicable.) See Figure 3-20.
4.	Faulty CDE programming; likely forms: <ul style="list-style-type: none"> <li>• COS Define</li> <li>• Stations / <i>SUPERSET</i> Telephones</li> <li>• Device Interconnection Table</li> <li>• System Configuration</li> </ul>
5.	DSS Module requires reset – disconnect / reconnect line cord.
6.	Associated device requires reset (if applicable) – disconnect / reconnect line cord.
7.	DSS Module's Digital Line Card requires reinitialization – reseal card.
8.	Associated device's interface card requires reinitialization (if applicable) – reseal card.
9.	Bay Control Card / Main Control Card requires reset (power down bay or press <i>SYSTEM RESET</i> on MCC).
10.	Faulty DSS Module.
11.	Faulty associated device (if applicable).
12.	Faulty Digital Line Card.
13.	Faulty associated device interface (if applicable) – see Figure 3-20.
14.	Faulty backplane cable connections.
15.	Faulty peripheral switch or circuit switch – refer to 'Supplementary Peripheral Equipment Procedures'.

**Notes:** 1. Useful maintenance commands: SHOW STATUS, TEST, SHOW ALARMS, SHOW ERRORS DIGITAL\_SETS, SHOW ERRORS DATASETS – see Practice 9109-096-351-NA, RS-232 Maintenance Terminal.

2. Loop length limit is: 3300 ft with 24 or 26 AWG wire (twisted pair – with no bridge taps).

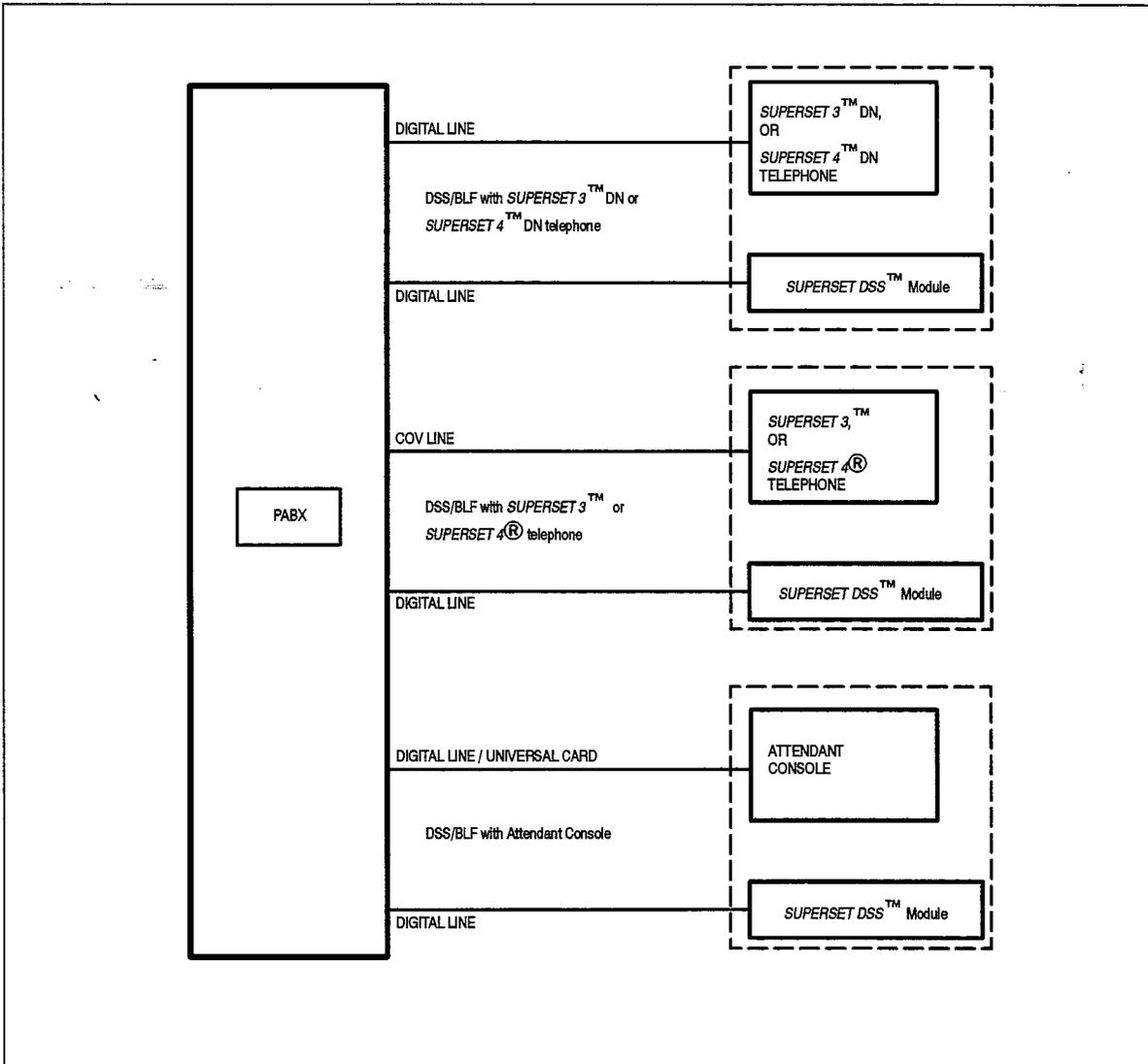


Figure 3-20 SUPERSET DSS Module Configurations

**DATASET 1103 / DATASET 2103 (DTE Mode)**

The following table outlines the most likely items to cause malfunction. Note that this table applies to stand-alone DATASET 1103 and DATASET 2103 units interfaced to DTE devices. See Table 3-36 for the DATASET 1101 Cartridge unit. For applications involving modems (DCE devices), refer to "DATASET 1100 / DATASET 2100 – DCE Mode".

**Table 3-26 DATASET 1103 / DATASET 2103 – DTE Mode**

Step	Possible Malfunction Source
1.	Faulty connections between the data station and the cross-connect field.
2.	Faulty connections between the cross-connect field and the <i>SX-200</i> DIGITAL system.
3.	Faulty connections between the DATASET and the connecting device(s) (terminal, telephone).
4.	Faulty CDE programming; likely forms: <ul style="list-style-type: none"> <li>• COS Define</li> <li>• Stations / <i>SUPERSET</i> Telephones</li> <li>• Data Circuit Descriptor</li> <li>• Data Assignment</li> <li>• DTE Profile</li> <li>• Device Interconnection Table</li> <li>• System Configuration</li> </ul>
5.	Incorrect DATASET switch settings (DATASET 2103 only) – see Table 3-27 through Table 3-32.
6.	Faulty far end (if applicable).
7.	Faulty external equipment (terminal, telephone set).
8.	DATASET requires reset – disconnect, reconnect power cord. See Table 3-33 / Table 3-34.
9.	Bay Control Card / Main Control Card requires reset (power down bay or press <i>SYSTEM RESET</i> on MCC).
10.	Faulty DATASET unit, or power cord assembly (or no AC power).
11.	Digital Line Card requires reinitialization (reseat card).
12.	Faulty Digital Line Card.
13.	Faulty backplane cable connections.
14.	Faulty switching matrices – refer to 'Supplementary Peripheral Equipment Procedures'.

**Notes:** 1. Useful maintenance commands: SHOW STATUS, TEST, SHOW ALARMS, SHOW ERRORS DATASETS – see Practice 9109-096-351-NA, RS-232 Maintenance Commands.

2. See Table 3-41 for proper device indicator states.

3. Loop length limit is: 3300 ft with 24 or 26 AWG wire (twisted pair – with no bridge taps).

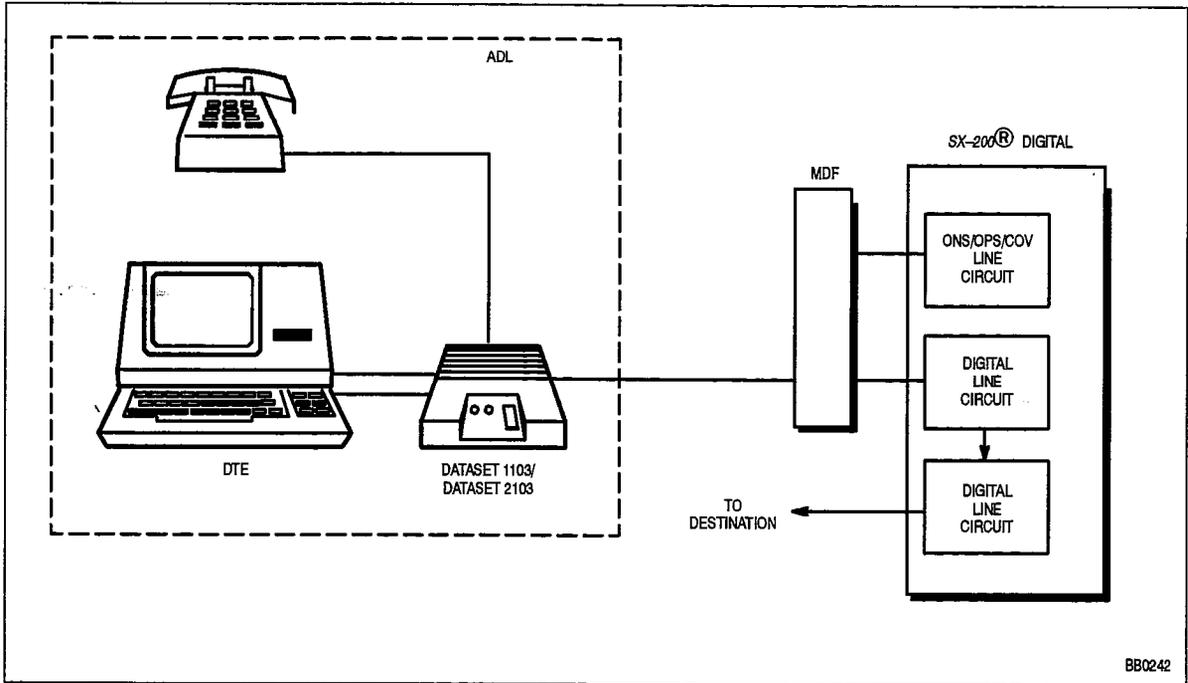


Figure 3-21 DATASET 1103/2103 Stand-alone DTE Configuration (ADL)

Table 3-27 DATASET 2100 Switch Settings (Mode Selection)

Switch No.	Position	Meaning
1	Down UP	Set – PBX operation Hunt – Back to back mode
2	Up Down	Synchronous Operation Asynchronous Operation

**Note:** The DATASET should be in the SET mode when connected to the SX-200 DIGITAL system.

**Table 3-28 DATASET 2100 Switch Settings  
(Asynchronous Flow Control)**

Asynchronous Flow Control Type	Switch No.	
	3	4
Flow control disabled	Down	Down
XON/XOFF flow control	Down	Up
CTS flow control	Up	Down
Flow control disabled	Up	Up

**Table 3-29 DATASET 2100 Switch Settings (Async Speed)**

Asynchronous Speed	Switch No.			
	5	6	7	8
Autobaud	Down	Down	Down	Down
110	Up	Down	Down	Down
150	Down	Up	Down	Down
200	Up	Up	Down	Down
300	Down	Down	Up	Down
600	Up	Down	Up	Down
1200	Down	Up	Up	Down
2400	Up	Up	Up	Down
4800	Down	Down	Down	Up
9600	Up	Down	Down	Up
19200	Down	Up	Down	Up

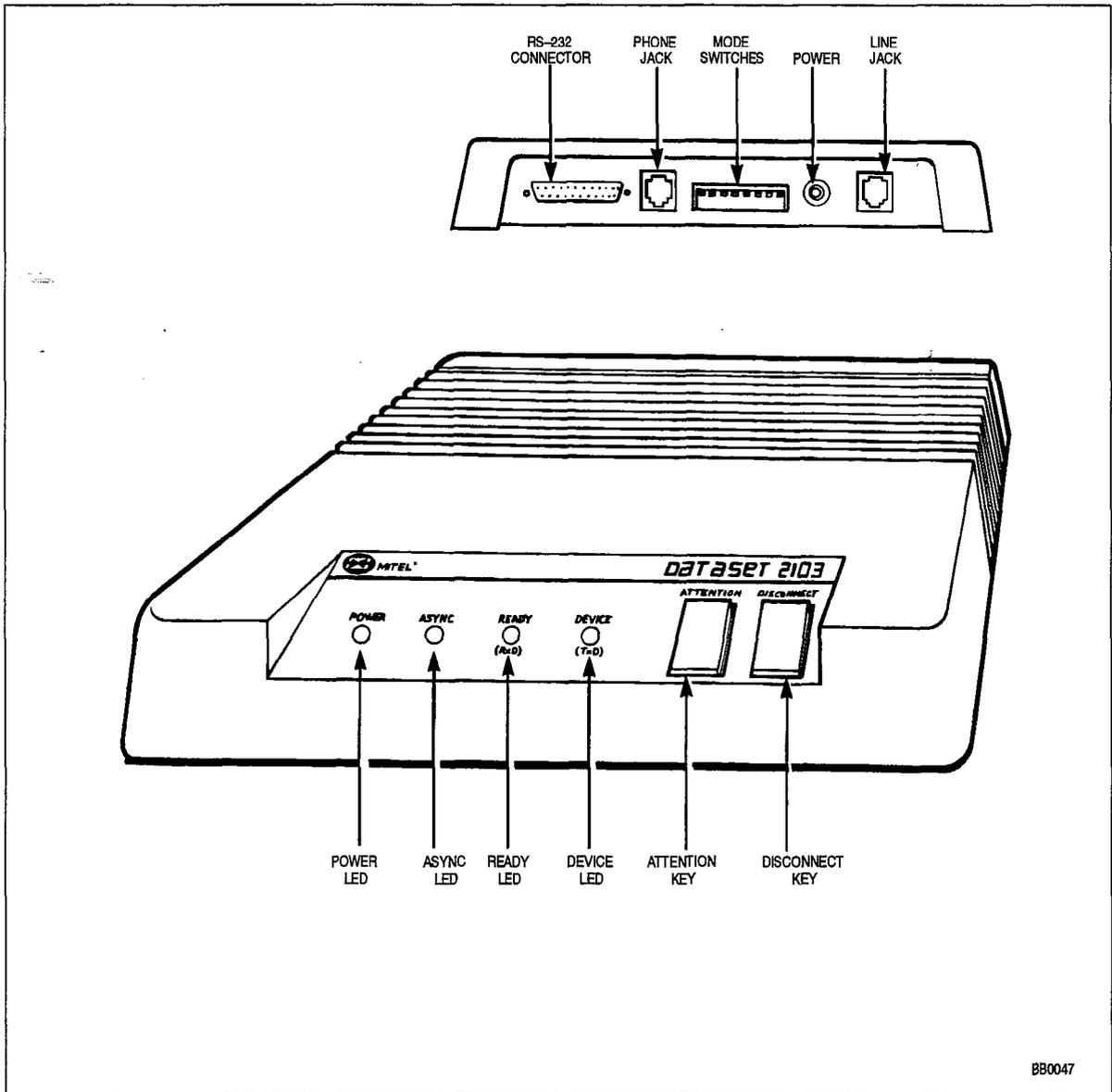
**Table 3-30 DATASET 2100 Switch Settings  
(Sync Operating Mode Selection)**

Switch No.	Position	Meaning
5	Down Up	Transparent mode X.31 mode

Table 3-31 DATASET 2100 Switch Settings (Synchronous Clock Source)		
Asynchronous Clock Source	Switch No.	
	3	4
Internal clock	Down	Down
System clock	Down	Up
Tx external clock	Up	Down
Tx and Rx external clock	Up	Up

Table 3-32 DATASET 2100 Switch Settings (Sync Speed)			
Synchronous Speed	Switch No.		
	6	7	8
1200	Down	Down	Down
2400	Up	Down	Down
4800	Down	Up	Down
9600	Up	Up	Down
19200	x	x	Up

Note: "x" indicates "don't care".



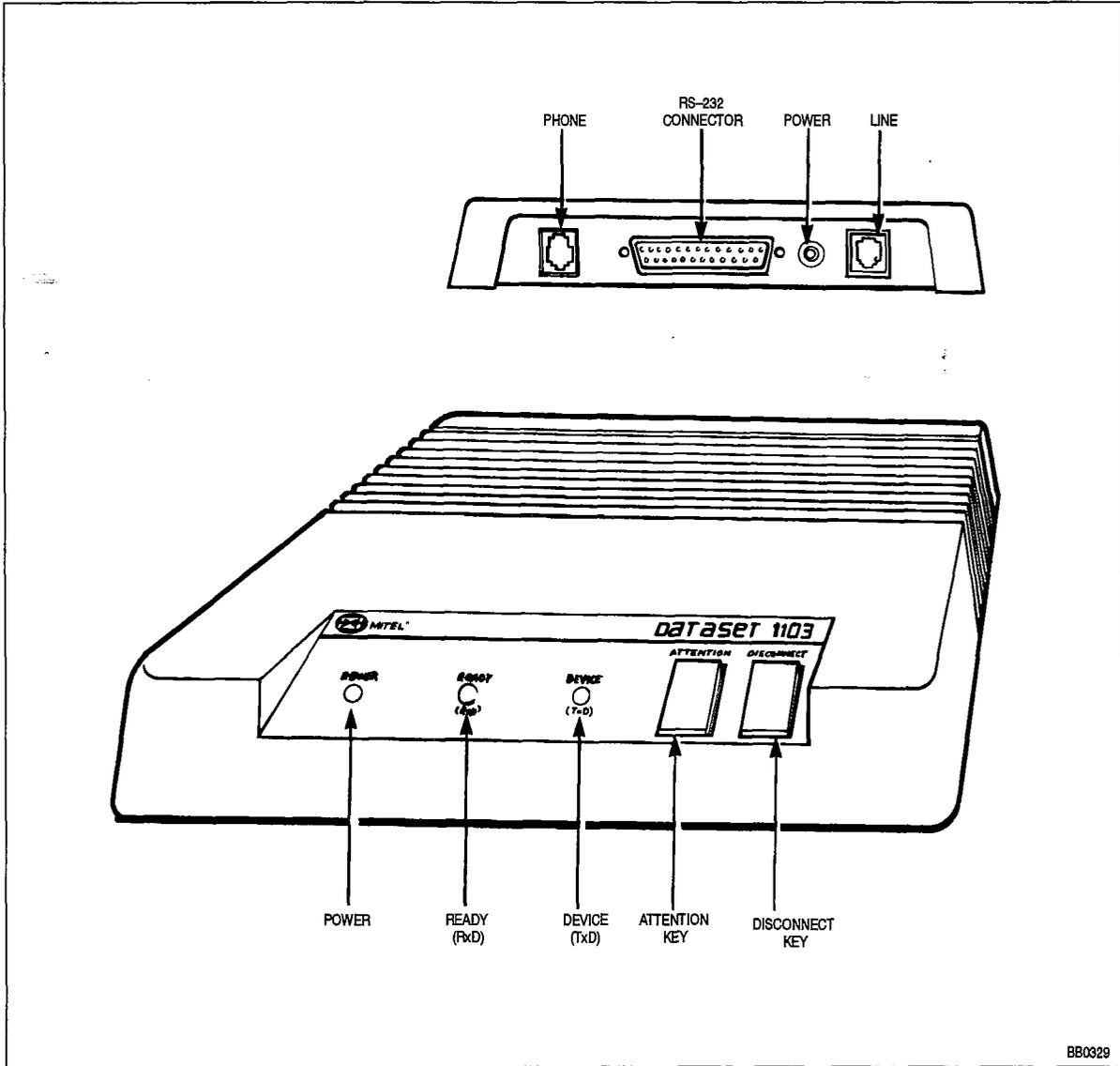
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Figure 3-22 DATASET 2103 Indicators and Connectors

**Table 3-33 DATASET 2103 LED Indicators**

Indicator	Meaning
DEVICE	ON – Indicates that the attached device is connected to the Dataset, and is supplying DSR or DTR on pin 21 of the RS-232 connector.
	FLASHING – Indicates that the Dataset is transmitting data
	OFF – Indicates that the device is not supplying DTR or DSR, or is not connected.
READY	ON – Indicates that the Dataset is involved in an active call.
	FLASHING – Indicates that the Dataset is receiving data.
	OFF – Indicates that the Dataset (and the line card) are in the idle state.
ASYNC	ON – Indicates that the Dataset is operating in asynchronous mode.
	OFF – Indicates that the Dataset is operating in synchronous mode.
	FLASHING – Indicates that the Dataset is in an illegal connection with a DATASET 2100 in sync mode, or that the Dataset is in sync with something other than a DATASET 1100 or DATASET 2100.
POWER	ON – Indicates that the Dataset has power, and is in sync with the corresponding Digital Line card.
	FLASHING – Indicates that the Dataset has power, but is not in sync with the corresponding Digital Line card.
	OFF – Indicates that the Dataset is not receiving power from the 9 Vac plug-in transformer.

**Note:** See Figure 3-22.



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Figure 3-23 DATASET 1103 Indicators and Connectors

**Table 3-34 DATASET 1103 Indicators**

Indicator	Meaning
DEVICE	ON – Indicates that the attached device is connected to the Dataset unit, and is supplying DSR or DTR on pin 21 of the RS-232 connector.
	FLASHING – Indicates that the Dataset is transmitting data.
	OFF – Indicates that the device is not supplying DTR or DSR, or is not connected.
READY	ON – Indicates that the Dataset is involved in an active call.
	FLASHING – Indicates that the Dataset is receiving data.
	OFF – Indicates that the Dataset (and the line card) are in the idle state.
POWER	ON – Indicates that the Dataset has power, and is in sync with the corresponding Digital Line card.
	FLASHING – Indicates that the Dataset has power, but is not in sync with the corresponding Digital Line card.
	OFF – Indicates that the Dataset is not receiving power from the 9 Vac plug-in transformer.

**Note:** See Figure 3-23.

**DATASET 1103 / 2103 (DCE Mode)**

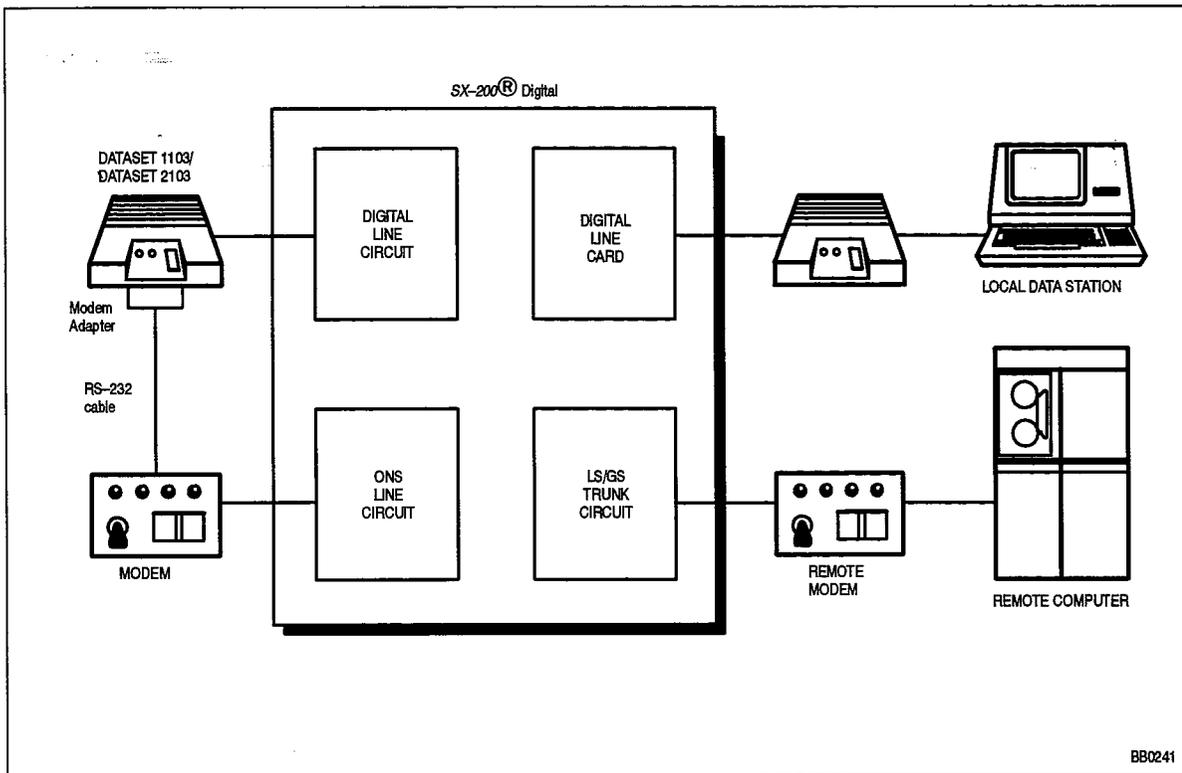
The following table outlines the most likely items to cause malfunction. Note that this table applies to stand-alone DATASET 1103 and DATASET 2103 units interfaced to CDE devices. See Table 3-36 for the DATASET 1101 Cartridge unit. For applications involving DTE devices, refer to "DATASET 1103 / DATASET 2103 - DTE Mode". For modem pool troubleshooting, refer to Table 5-12.

**Table 3-35 DATASET 1103 / DATASET 2103 - DCE Mode**

Step	Possible Malfunction Source
1.	Faulty connections between the data station and the cross-connect field.
2.	Faulty connections between the cross-connect field and the <i>SX-200</i> DIGITAL system.
3.	Faulty connections between the DATASET and the connecting device(s) (modem).
4.	Faulty CDE programming; likely forms: <ul style="list-style-type: none"> <li>• COS Define</li> <li>• Stations / <i>SUPERSET</i> Telephones</li> <li>• Data Circuit Descriptor</li> <li>• Data Assignment</li> <li>• DTE Profile</li> <li>• Modem Assignment</li> <li>• Device Interconnection Table</li> <li>• System Configuration</li> </ul>
5.	Incorrect DATASET switch settings (DATASET 2103 only) - see Table 3-27 through Table 3-32.
6.	Faulty far end (if applicable).
7.	Incorrect modem switch settings or modem software set-up characteristics (if applicable).
8.	Modem requires reset - refer to manufacturer's instructions.
9.	Faulty external equipment (modem).
10.	DATASET requires reset - disconnect, reconnect power cord. See Table 3-33 / Table 3-34.
11.	Bay Control Card / Main Control Card requires reset (power down bay or press <i>SYSTEM RESET</i> on MCC).
12.	Faulty DATASET unit or power cord assembly (or no AC power).
13.	Digital Line Card requires reinitialization (reseat card).
14.	Faulty Digital Line Card.
15.	Faulty backplane cable connections.
16.	Faulty switching matrices - refer to 'Supplementary Peripheral Equipment Procedures'.

## Troubleshooting

- Notes:**
1. Useful maintenance commands: SHOW STATUS, TEST, SHOW ALARMS, SHOW ERRORS DATASETS – see Practice 9109-096-351-NA, RS-232 Maintenance Terminal.
  2. See Table 3-41 for proper device indicator states.
  3. Loop length limit is: 3300 ft with 24 or 26 AWG wire (twisted pair – with no bridge taps).



**Figure 3-24 DATASET 1103 / DATASET 2103 Modem Configuration**

**DATASET 1101**

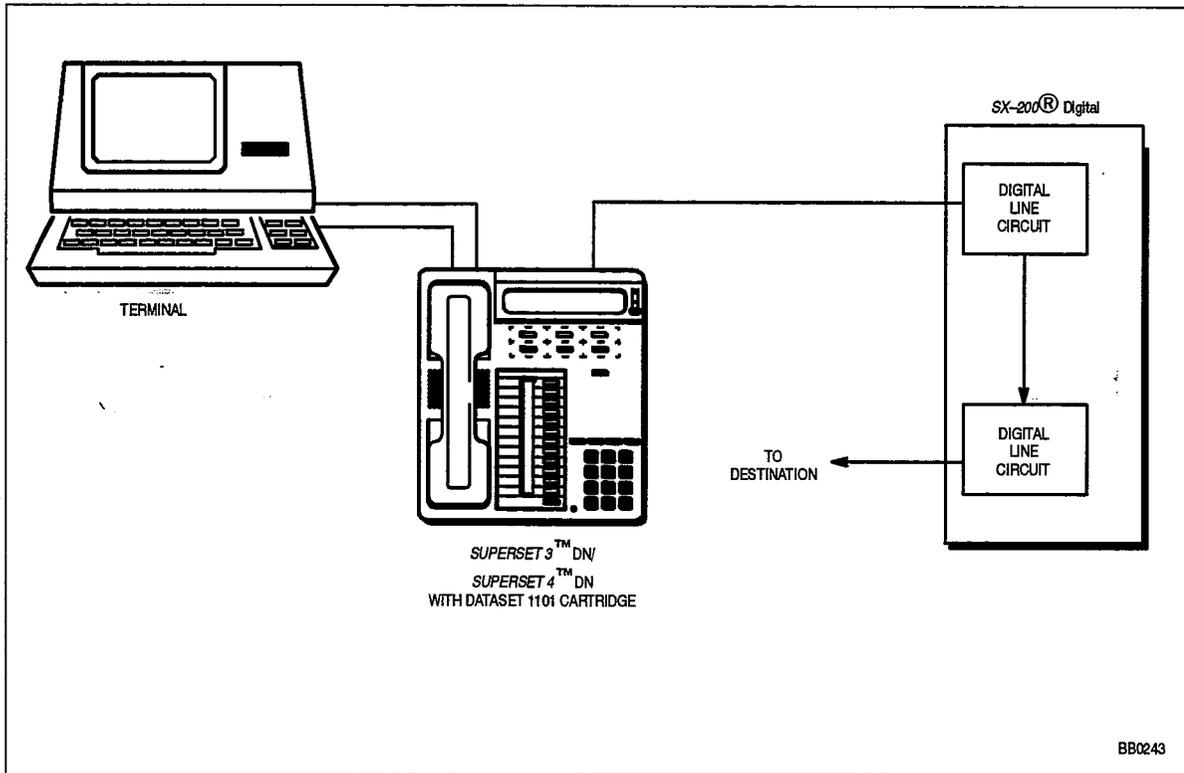
The following table outlines the most likely items to cause malfunction. Note that this table applies to the DATASET 1101 Cartridge unit installed in either a *SUPERSET 3DN* or *SUPERSET 4 DN* telephone set.

<b>Table 3-36 DATASET 1101 Cartridge Unit</b>	
<b>Step</b>	<b>Possible Malfunction Source</b>
1.	Faulty connections between the data station and the cross-connect field.
2.	Faulty connections between the cross-connect field and the <i>SX-200</i> DIGITAL system.
3.	Faulty connections between the <i>DATASET/SUPERSET</i> and the connecting device (terminal). See Figure 3-25.
4.	Faulty CDE programming; likely forms: <ul style="list-style-type: none"> <li>• COS Define</li> <li>• Stations / <i>SUPERSET</i> Telephones</li> <li>• Data Circuit Descriptor</li> <li>• Data Assignment</li> <li>• DTE Profile</li> <li>• Modem Assignment</li> <li>• Device Interconnection Table</li> <li>• System Configuration</li> </ul>
5.	Faulty far end (if applicable).
6.	Faulty external equipment (terminal).
7.	<i>DATASET/SUPERSET</i> requires reset – disconnect, reconnect <i>SUPERSET</i> telephone line cord. See Table 3-37.
8.	Bay Control Card / Main Control Card requires reset (power down bay or press <i>SYSTEM RESET</i> on MCC).
9.	Faulty <i>DATASET</i> Cartridge unit or power cord (or no AC power).
10.	Faulty <i>SUPERSET</i> telephone.
11.	Digital Line Card requires reinitialization (reseat card).
12.	Faulty Digital Line Card.
13.	Faulty backplane cable connections.
14.	Faulty switching matrices – refer to 'Supplementary Peripheral Equipment Procedures'.

**Notes:** 1. Useful maintenance commands: SHOW STATUS, TEST, SHOW ALARMS, SHOW ERRORS DIGITAL\_SETS, SHOW ERRORS DATASETS – see Practice 9109-096-351-NA, RS-232 Maintenance Terminal.

2. See Table 3-41 for proper device indicator states.

3. Loop length limit is: 3300 ft with 24 or 26 AWG wire (twisted pair – with no bridge taps).



**Figure 3-25 DATASET 1101/SUPERSET 4 DN Configuration**

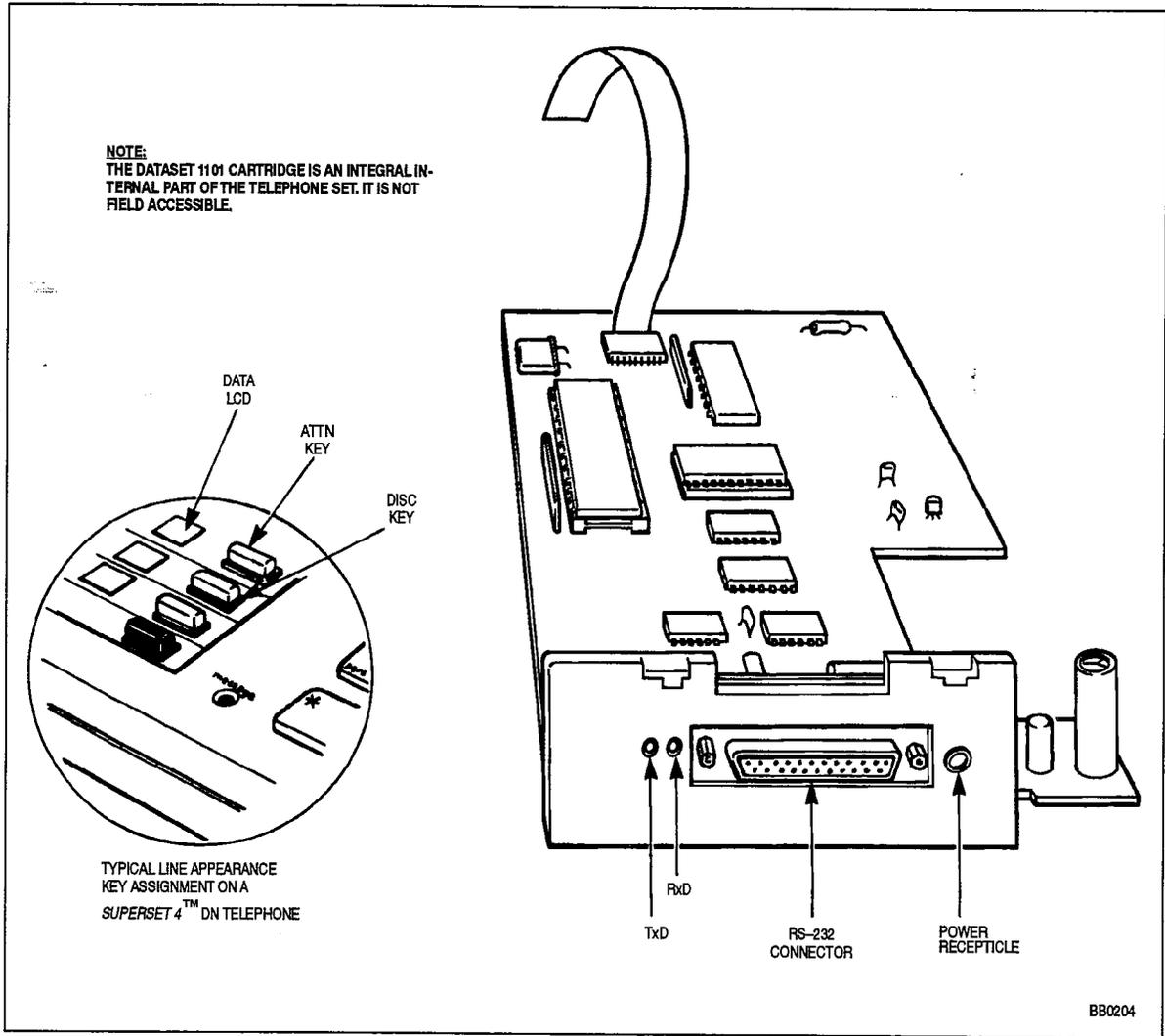


Figure 3-26 DATASET 1101 Indicators and Connectors

**Table 3-37 DATASET 1101 LEDs**

Indicator	Meaning
ATTN (note 1)	<p>ON – Indicates that the attached device is connected to the Dataset, and is supplying DSR or DTR on pin 21 of the RS-232 connector.</p> <p>OFF – Indicates that the device is not supplying DTR or DSR, or is not connected.</p>
DISC (note 1)	<p>ON – Indicates that the Dataset is involved in an active call.</p> <p>OFF – Indicates that the Dataset (and the line card) are in the idle state.</p>
TxD (note 2)	<p>ON – Indicates that the attached device is connected to the Dataset unit, and is supplying DTR on pin 21 of the RS-232 connector.</p> <p>FLASHING – Indicates that the cartridge is transmitting data.</p> <p>OFF – Indicates that the attached device is not supplying DTR, or is not connected.</p>
RxD (note 2)	<p>ON – Indicates that the Dataset is involved in an active call.</p> <p>FLASHING – Indicates that the cartridge is receiving data.</p> <p>OFF – Indicates that the Dataset (and the line card) are in the active state.</p>

- Notes:**
1. These indicators are located on the host *SUPERSET* telephone. Line Appearance keys are programmed as ATTENTION and DISCONNECT Feature Keys. Refer to 'Feature Keys' in Practice 9109-096-105-NA, Features Description.
  2. These indicators are located at the rear of host *SUPERSET* telephone.
  3. See Figure 3-26 and Figure 3-14 / Figure 3-15.
  4. The DATASET 1101 is powered by an external 9 Vac plug-in transformer, not by the set itself. Ensure this external power is properly connected to the DATASET before attempting to operate the data port (disconnect/reconnect the power connection to re-initialize the DATASET).

**DATASET 1102 / DATASET 2102**

The following table outlines the most likely items to cause malfunction. Note that this table applies to the DATASET 1102 and DATASET 2102 cards interfaced to modems. For applications involving stand-alone Datasets with modems, refer to Table 3-35.

**Table 3-38 DATASET 1102 / DATASET 2102 Troubleshooting Summary**

Step	Possible Malfunction Source
1.	Faulty connections between the DATACABINET 9000 and the cross-connect field.
2.	Faulty connections between the cross-connect field and the <i>SX-200</i> DIGITAL system.
3.	Faulty connections between the modem and the Modem Interconnect Panel. See Figure 3-25.
4.	Faulty connections between the Dataset card and the Modem Interconnect Panel.
5.	Faulty connections between the Dataset card and the modem (must have a modem adapter). See Figure 3-32.
6.	Faulty CDE programming; likely forms: <ul style="list-style-type: none"> <li>• COS Define</li> <li>• Stations / <i>SUPERSET</i> Telephones</li> <li>• Data Circuit Descriptor</li> <li>• Data Assignment</li> <li>• DTE Profile</li> <li>• Modem Assignment</li> <li>• Device Interconnection Table</li> <li>• System Configuration</li> </ul>
7.	Faulty far end (if applicable).
8.	Incorrect modem switch settings or modem software set-up characteristics (if applicable).
9.	Modem requires reset – refer to manufacturer's instructions.
10.	Incorrect DATASET switch settings (DATASET 2102 only) – see Table 3-27 through Table 3-32, and Figure 3-27.
11.	DATASET card requires reset – reseal card.
12.	Digital Line card requires reinitialization (reseal card).
13.	Faulty modem.
14.	Bay Control Card / Main Control Card requires reset (power down bay or press <i>SYSTEM RESET</i> on MCC).
15.	Faulty DATASET card.
16.	Faulty Digital Line card.
17.	Faulty backplane cable connections.

**Table 3-38 DATASET 1102 / DATASET 2102 Troubleshooting Summary  
(continued)**

Step	Possible Malfunction Source
18.	Faulty Modem Interconnect Panel.
19.	Faulty DATASHELF 9100 assembly – see <i>DATA CABINET 9000</i> procedures.
20.	Faulty switching matrices – refer to 'Supplementary Peripheral Equipment Procedures'.

- Notes:**
1. Useful maintenance commands: SHOW STATUS, TEST, SHOW ALARMS, SHOW ERRORS DATASETS – see Practice 9109-096-351-NA, RS-232 Maintenance Commands.
  2. Refer to the modem manufacturer's instructions for information on correct switch settings and its RS-232 connector pin-out.
  3. Some modems are configured to go off-hook during a manual analog loopback test. Refer to the manufacturer's instructions for further information.
  4. The RS-232 connection between the modem and the Dataset must be controlled totally by the system/ Dataset. No modem which controls any part of the RS-232 connection may be used. The modem must also be able to be placed into originate mode when the Dataset asserts DTR (RS-232 pin 20), or when the Dataset shorts MI and MIC (pins 2 and 5) of the modem's PHONE jack. Note that many "smart modems" do not allow this; therefore, the use of "dumb modems" is recommended.
  5. A synchronous Dataset may not be used with an asynchronous modem, and vice-versa.
  6. See Table 3-41 for proper device indicator states.
  7. Loop length limit is: 3300 ft with 24 or 26 AWG wire (twisted pair – with no bridge taps).

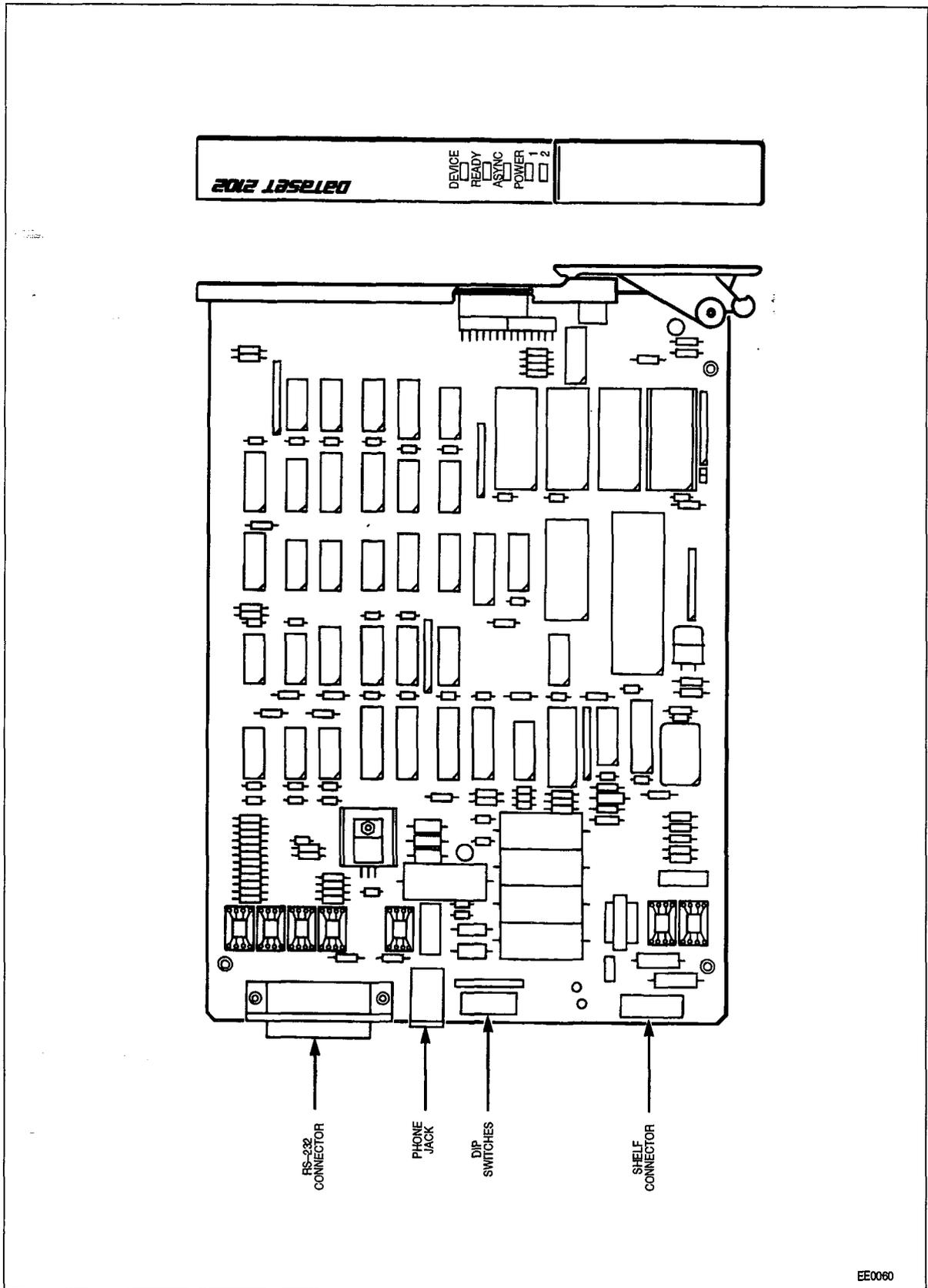


Figure 3-27 DATASET 2102 Card Connectors and Indicators

**Table 3-39 DATASET 2102 LED Indicators**

Indicator	Meaning
DEVICE	ON – Indicates that the attached device is connected to the Dataset card, and is supplying DSR or DTR on pin 21 of the RS-232 connector.
	FLASHING – Indicates that the card is transmitting data.
	OFF – Indicates that the device is not turned on, supplying DTR or DSR, or is not connected.
READY	ON – Indicates that the Dataset card is involved in an active call.
	FLASHING – Indicates that the card is receiving data.
	OFF – Indicates that the Dataset card (and the line card) are in the idle state.
ASYNC	ON – Indicates that the card is operating in asynchronous mode.
	OFF – Indicates that the card is operating in synchronous mode.
	FLASHING – Indicates that the card is in an illegal connection with a DATASET 2100 in sync mode, or that the card is in sync with something other than a DATASET 1100 or DATASET 2100.
POWER 1	ON – Indicates that the 2 on-board fuses are functional.
	OFF – Indicates that one or both of the 2 on-board fuses has blown.
POWER 2	ON – Indicates that the card has power, and is in sync with the corresponding Digital Line card.
	FLASHING – Indicates that the card has power, is not in sync with the corresponding Digital Line card.
	OFF – Indicates that the card is not receiving power from the shelf backplane.

**Note:** See Figure 3-27.

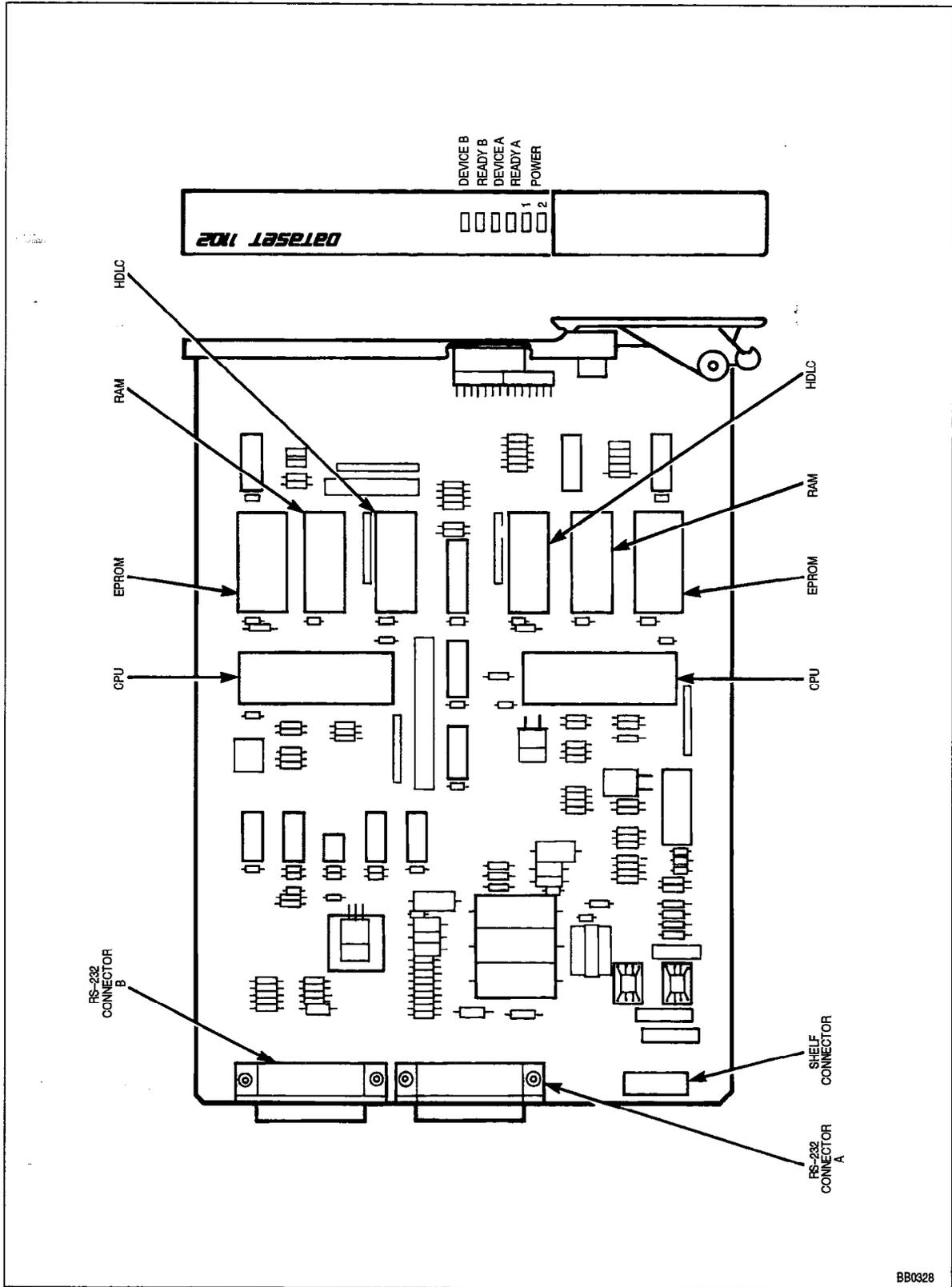


Figure 3-28 DATASET 1102 Card Connectors and Indicators

**Table 3-40 DATASET 1102 LED Indicators**

Indicator	Meaning
DEVICE 1	<p>ON – Indicates that the attached device is connected to the Dataset card, and is supplying DSR or DTR on pin 21 of the RS-232 connector.</p> <p>FLASHING – Indicates that the card is transmitting data.</p> <p>OFF – Indicates that the device is not turned on, supplying DTR or DSR, or is not connected.</p>
READY 1	<p>ON – Indicates that the Dataset card is involved in an active call.</p> <p>FLASHING – Indicates that the card is receiving data.</p> <p>OFF – Indicates that the Dataset card (and the line card) are in the idle state.</p>
DEVICE 2	Same as for DEVICE 1.
READY 2	Same as for READY 1.
POWER 1	<p>ON – Indicates that the 2 on-board fuses are functional.</p> <p>OFF – Indicates that one of the 2 on-board fuses has blown.</p>
POWER 2	<p>ON – Indicates that the card has power, and is in sync with the corresponding Digital Line card.</p> <p>FLASHING – Indicates that the card has power, is not in sync with the corresponding Digital Line card.</p> <p>OFF – Indicates that the card is not receiving power from the shelf backplane.</p>

**Note:** See Figure 3-28.

Table 3-41 Data Switching Device Status Indicators

Device	Indicator	Idle State	Connected State
Terminal Dataset	DEVICE	on	on
	READY	off	on
	ASYNC	—	—
	POWER 1	on	on
	POWER 2	on	on
Terminal Digital Line circuit	card LED	off	on
Modem Element Dataset	DEVICE	off	on
	SYSTEM	off	on
	ASYNC	—	—
	POWER 1	on	on
	POWER 2	on	on
Modem Element Digital Line circuit	card LED	off	on
Modem Element Digital Line circuit	card LED	off	on
Modem Element ONS Line circuit modem	card LED	off	on
	DTR LED	off	on
	carrier LED	off	on
	DSR LED	off	on
	speed LED	off	on

- Notes:**
1. The terminal Dataset DEVICE LED will be on only if the terminal is powered up, and is supplying DTR to the Dataset.
  2. POWER 1 and POWER 2 indicators apply only to rack-mounted Datasets.
  3. ASYNC indicators apply only to DATASET 2100 units, and have no effect on idle and connected states.

**Milink Data Module**

Table 3-42 outlines in descending order, the most likely items to cause malfunction.

<b>Table 3-42 MILink Data Module Procedures</b>	
<b>Item</b>	<b>Possible Malfunction Source</b>
1.	Faulty connections between the data module and the Main Distribution Frame.
2.	Faulty connections between the Main Distribution Frame and the system.
3.	Faulty connections between the data module and the connecting device (terminal, telephone set).
4.	Faulty CDE programming; likely forms: <ul style="list-style-type: none"> <li>• COS Define</li> <li>• Stations / SUPERSET Telephones</li> <li>• Data Circuit Descriptor</li> <li>• Data Assignment</li> <li>• DTE Profile</li> <li>• Device Interconnection Table</li> <li>• System Configuration</li> </ul>
5.	Faulty far end.
6.	Faulty external equipment (terminal or the SUPERSET 410, SUPERSET 420 or SUPERSET 430 telephone).
7.	DATASET requires reset – disconnect, reconnect power cord. See Table 3-43.
8.	Digital Line Card requires reinitialization (reseat card).
9.	Bay Control Card / Main Control Card requires reset (power down bay or press SYSTEM RESET on MCC).
10.	Faulty DATASET unit, or power cord assembly (or no AC power).
11.	Faulty Digital Line Card.
12.	Faulty backplane cable connections.
13.	Faulty switching matrices – refer to 'Supplementary Peripheral Equipment Procedures'.

**Notes:** 1. Useful maintenance commands: SHOW STATUS, TEST, SHOW ALARMS, SHOW ERRORS  
DATASETS – see Practice 9109-096-351-NA, RS-232 Maintenance Commands.

2. To ensure the most thorough testing, the "Dataset Auditing" and "Attached Device Loopback" entries in the Dataset Circuit Descriptor Assignment form must be enabled (see Practice 9109-096-210-NA, Customer Data Entry, for further details).

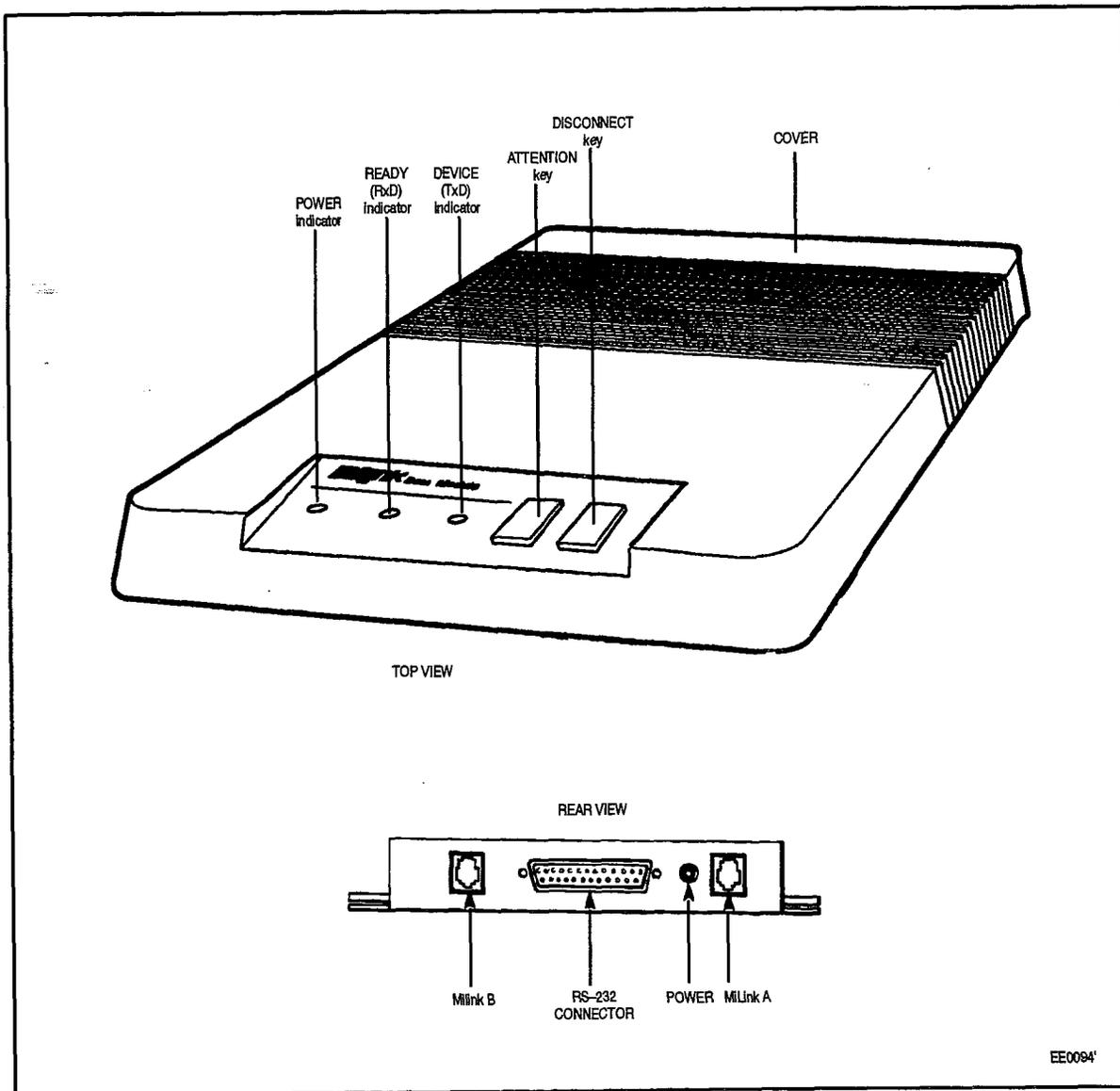


Figure 3-29 MiLink Data Module, Indicators and Connectors

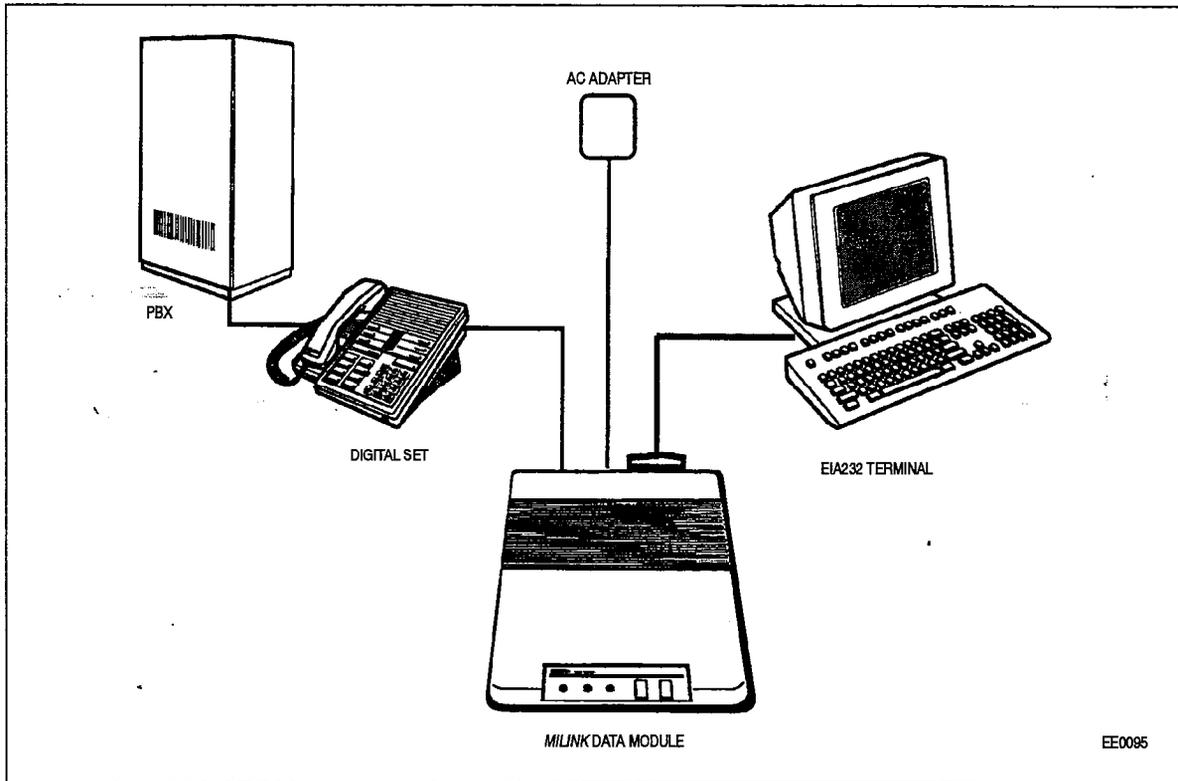


Figure 3-30 *MiLink* Data Module Configuration

Table 3-43 *MiLink* Data Module LEDs

Indicator	Meaning
DEVICE (TxD)	ON – Indicates that the attached device is connected to the data module, and is supplying DSR or DTR on pin 21 of the RS-232 connector.
	OFF – Indicates that the device is not supplying DTR or DSR, or is not connected.
	FLASHING – Indicates that the data module is transmitting data.
READY (RxD)	ON – Indicates that the data module is involved in an active call.
	OFF – Indicates that the data module (and the line card) are in the idle state.
	FLASHING – Indicates that the data module is receiving data.
POWER	ON – Indicates that the data module has power, and is in sync with the line circuit.
	OFF – Indicates that the data module is not receiving power.
	FLASHING – Indicates that the data module has power, but is not in sync with the line circuit.

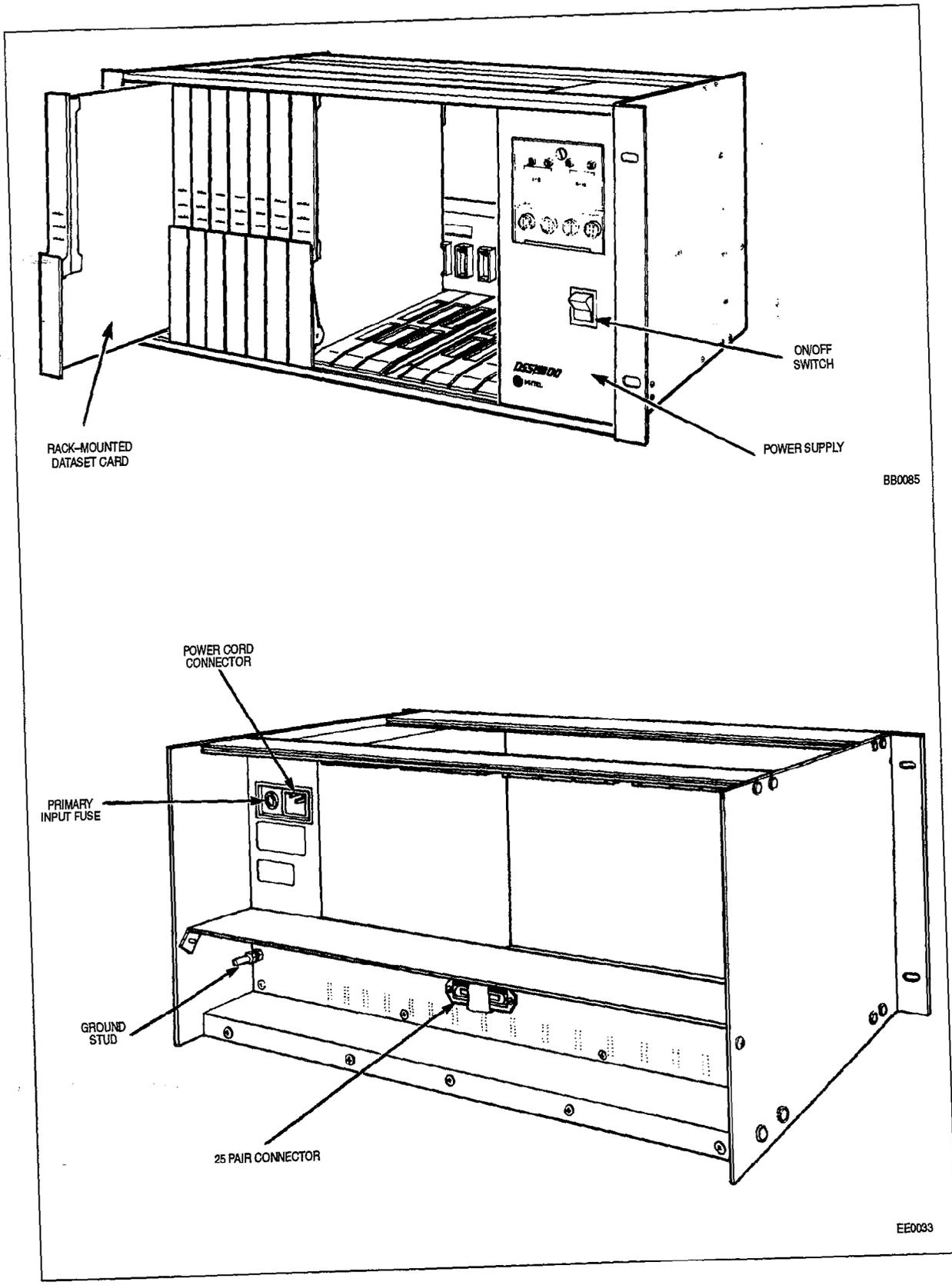


Figure 3-31 DATASHELF 9100

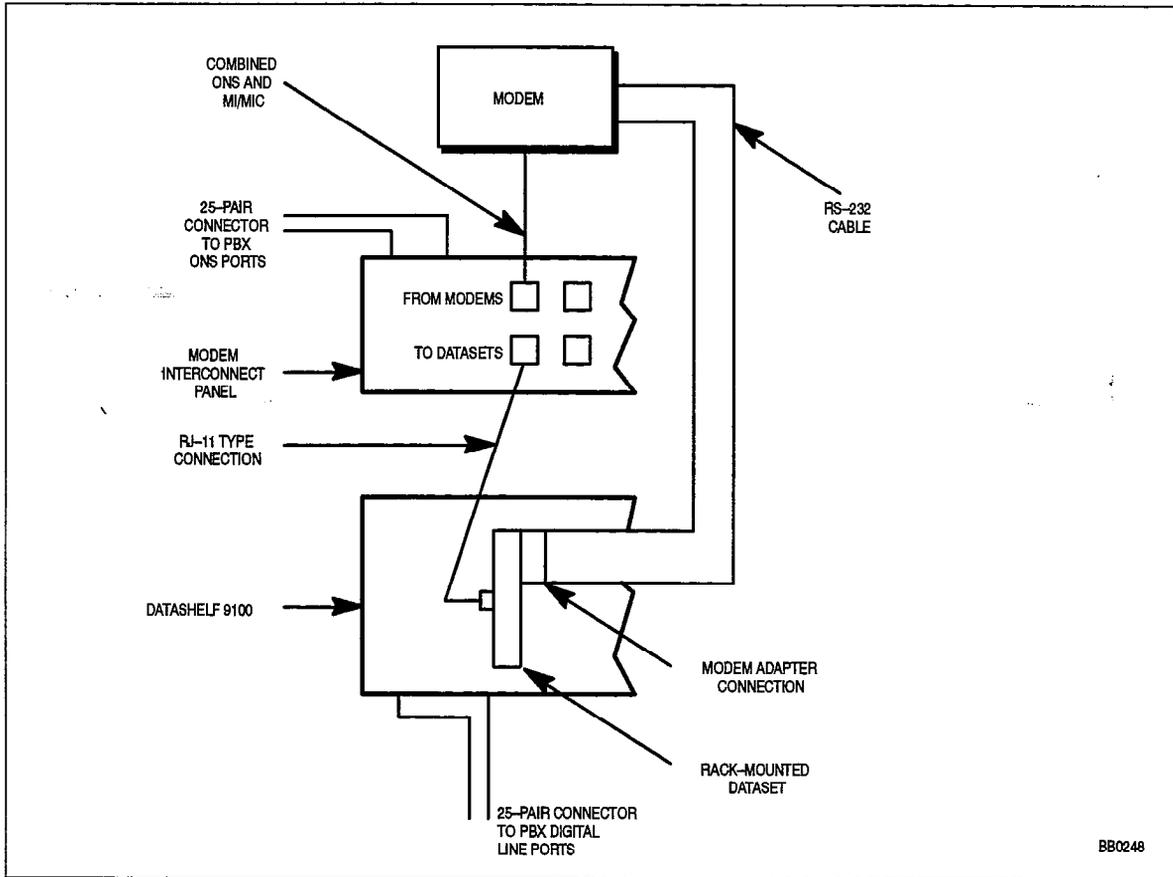


Figure 3-32 Connections at Modem Interconnect Panel

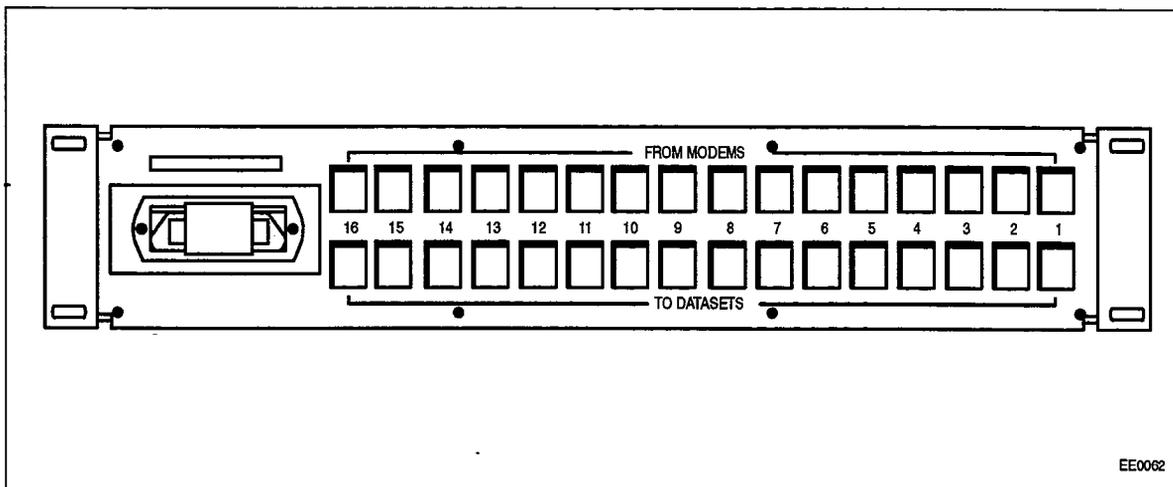


Figure 3-33 Modem Interconnect Panel

**DATA CABINET 9000**

The DATA CABINET 9000 houses the Modem Interconnect Panel and the DATASHELF 9100. This section covers all three of these units. The following table outlines the most likely items to cause malfunction.

**Table 3-44 DATA CABINET 9000 Troubleshooting Summary**

Step	Possible Malfunction Source
1.	Faulty connections between the DATA CABINET 9000 and the cross-connect field.
2.	Faulty connections between the cross-connect field and the <i>SX-200</i> DIGITAL system.
3.	Blown primary input fuse on the DATASHELF 9100 unit (see Figure 3-31).
4.	Blown front panel fuse(s) on the DATASHELF 9100 unit.
5.	Faulty connections between the modems and the Modem Interconnect Panel. See Figure 3-32.
6.	Faulty connections between the Dataset cards and the Modem Interconnect Panel.
7.	Faulty connections between the Dataset cards and the modems (must have modem adapters).
8.	Faulty connections between the Data cabinet PDU and the Distribution Panel. See Figure 3-35.
9.	Faulty connections between the Distribution Panel and the Datashef.
10.	Faulty CDE programming; likely forms: <ul style="list-style-type: none"> <li>• COS Define</li> <li>• Stations / <i>SUPERSET</i> Telephones</li> <li>• Data Circuit Descriptor &amp; Data Assignment</li> <li>• DTE Profile</li> <li>• Modem Assignment</li> <li>• Device Interconnection Table</li> <li>• System Configuration</li> </ul>
11.	Incorrect modem switch settings or modem software set-up characteristics (if applicable).
12.	Incorrect Dataset switch settings.
13.	Faulty Dataset card(s) or modem(s).
14.	Faulty Digital Line card(s).
15.	Faulty Modem Interconnect Panel.
16.	Faulty DATASHELF 9100 unit(s).
17.	Faulty fan unit.
18.	Faulty Data cabinet PDU and/or Distribution Panel.
19.	Faulty <i>SX-200 Digital</i> backplane cable connections.
20.	Faulty switching matrices – refer to 'Supplementary Peripheral Equipment Procedures'.

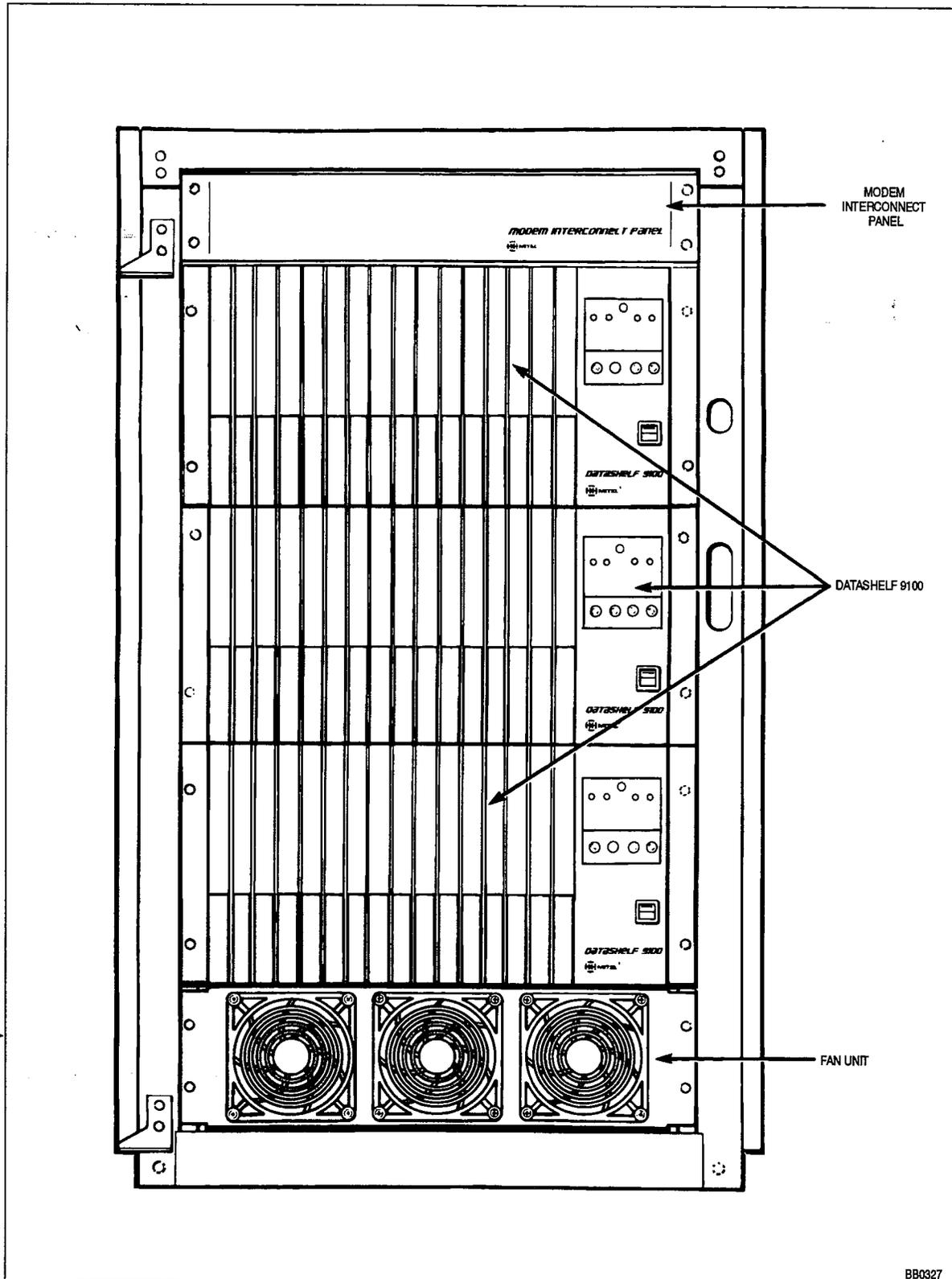


Figure 3-34 DATACABINET 9000 – Front View (Typical Installation)

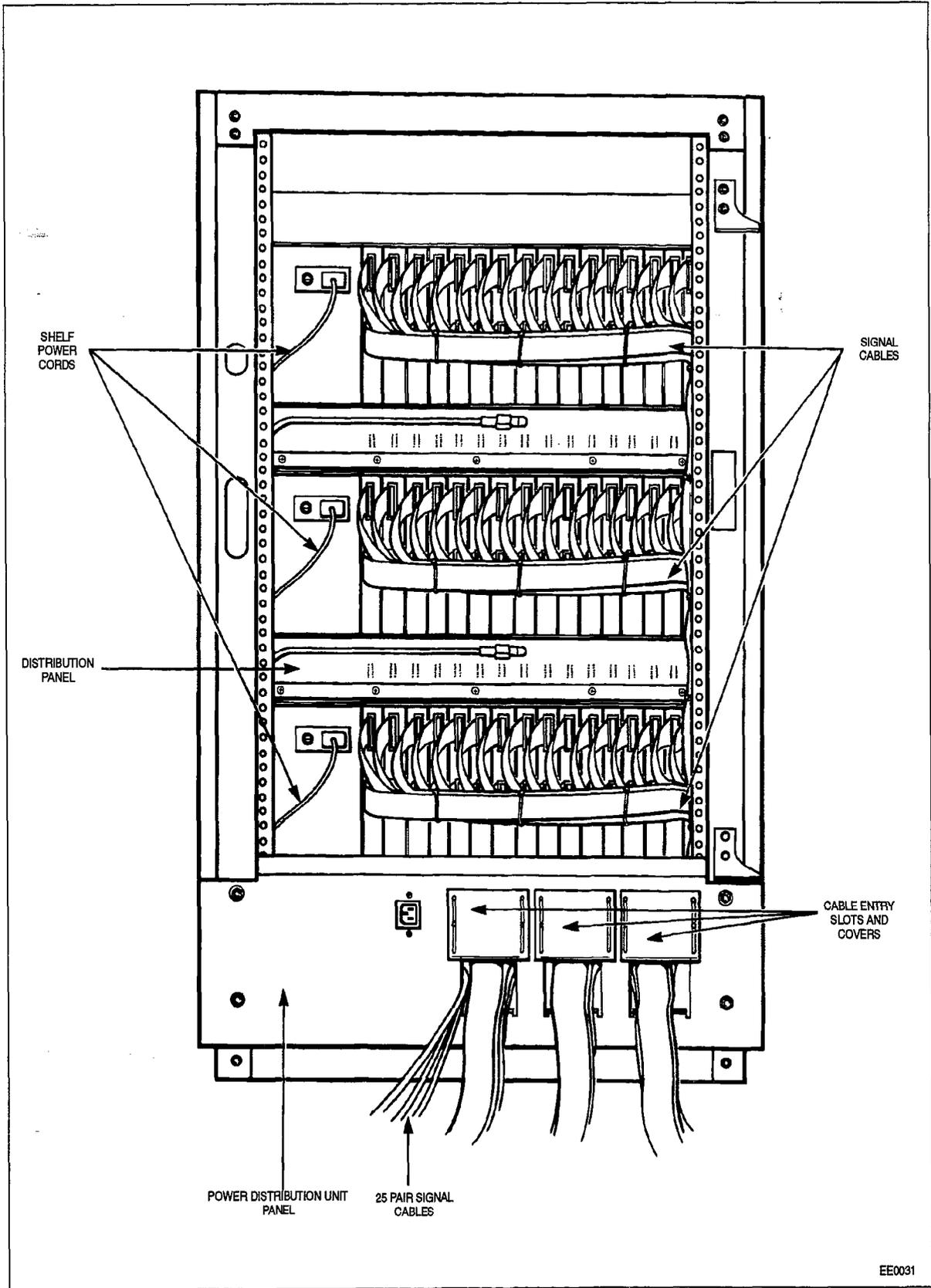


Figure 3-35 DATACABINET 9000 Rear View (Typical Installation)

### Supplementary Peripheral Equipment Procedures

The purpose of this section is to determine the cause of peripheral card/device failures which were not solved using their corresponding troubleshooting summaries. It is assumed, at this point in the troubleshooting process, that the cause of failure is not due to peripheral interface card / peripheral device failure, but rather failure of some part of the switching matrix. The following table outlines the most likely items to cause malfunction.

**Table 3-45 Supplementary Peripheral Equipment Troubleshooting Summary**

Step	Possible Malfunction Source
1.	Faulty Digital Interface card (if applicable).
2.	Faulty Peripheral Control card (if applicable).
3.	Faulty Scanner card (if applicable).
4.	Faulty intercabinet / interbay connections – Analog Bay: – check for faulty connections between analog and digital bays – verify connection between digital bay backplane (J17A for Bay 3, or J17B for Bay 4) and the analog bay Digital Interface card (J2). – verify connection between analog bays 4 and 5. 336 Port Bay: – check for faulty connections between digital bays – verify connection between the control backplane (J17A for Bay 3, or J17B for Bay 4) and the bay backplane (J17A). 672 Port Bay: – check for faulty connections between digital bays – verify connection between Bay 0 (J40C) and Bay 3 (J17A) – verify connection between Bay 0 (J40B) and Bay 2 (J17A) – verify connection between Bay 0 (J42A) and Bay 5 (J17A) – verify connection between Bay 0 (J42C) and Bay 7 (J17A) – verify connection between Bay 0 (J42B) and Bay 6 (J17A). FD System: – Check for faulty connections between the control and peripheral nodes – verify the Optical Fiber cable Tx & Rx connections between the Control Node (Bay 0) and the Peripheral Nodes (Bay 1 to Bay 7) – Bay 0's FIM Tx connects to the Peripheral Bay's FIM Rx (FIM LED's are on) – Bay 0's FIM Rx connects to the Peripheral Bay's FIM Tx (FIM LED's are on)
5.	Faulty Bay Control card (if applicable).
6.	Faulty Peripheral FIM Carrier Module (if applicable).
7.	Faulty Quad FIM Carrier (if applicable).
8.	Faulty Fiber Interface Module (FIM) (if applicable).
9.	Faulty Optical Fiber Cable (if applicable).
10.	Faulty DX Module / Switch Matrix card / Switch Matrix Module (as applicable).
11.	Faulty Control Resource Card (if applicable).
12.	Faulty Main Control card.

**Notes:** 1. Useful maintenance commands: SHOW STATUS, TEST, SHOW ALARMS – see Practice 9109-096-351-NA, RS-232 Maintenance Terminal.

2. Items 1, 2 and 3 apply only to systems with analog peripheral bays.

3. In item 10, DX Module applies to 336, 456 and 480-port systems; Switch Matrix card applies to 672 port systems; Switch Matrix Module applies to FD systems.

## 4.

## SUBSYSTEM TROUBLESHOOTING PROCEDURES

### Main Control Card

4.1 The following paragraphs outline the troubleshooting for the Main Control Card.

#### Configuration

The Main Control Card consists of the following:

- Main Control Card (without modules)
- DX Module
- Switch Matrix Card (672-port system)
- Switch Matrix Module (SX-200 FD system)
- DRAM module
- Decryption module
- EPROM
- T1 Clock Module (optional)

#### Main Control Card Power-Up Tests

The Main Control Card power-up tests are run automatically upon operation of the *SYSTEM RESET* pushbutton located on the Main Control Card front panel. The test results are indicated in code form on the Main Control Card's numeric displays, also located on the Main Control Card front panel.

**Note:** The Main Control Card numeric displays are also used for the troubleshooting of the Floppy Disk Subsystem – refer to the Floppy Disk Subsystem troubleshooting procedures.

#### First-Step Checks

Prior to replacing cards as directed by the Main Control Card troubleshooting procedures, carry out the following checks:

- Reseat the suspect card.
- Check for bent pins at the backplane or module connector, as applicable.

If the above does not clear the fault, proceed to replace the card.

#### Power-Up Sequence

The Main Control Card diagnostic power-up sequence is described in Practice 9109-096-353-NA, General Maintenance Information.

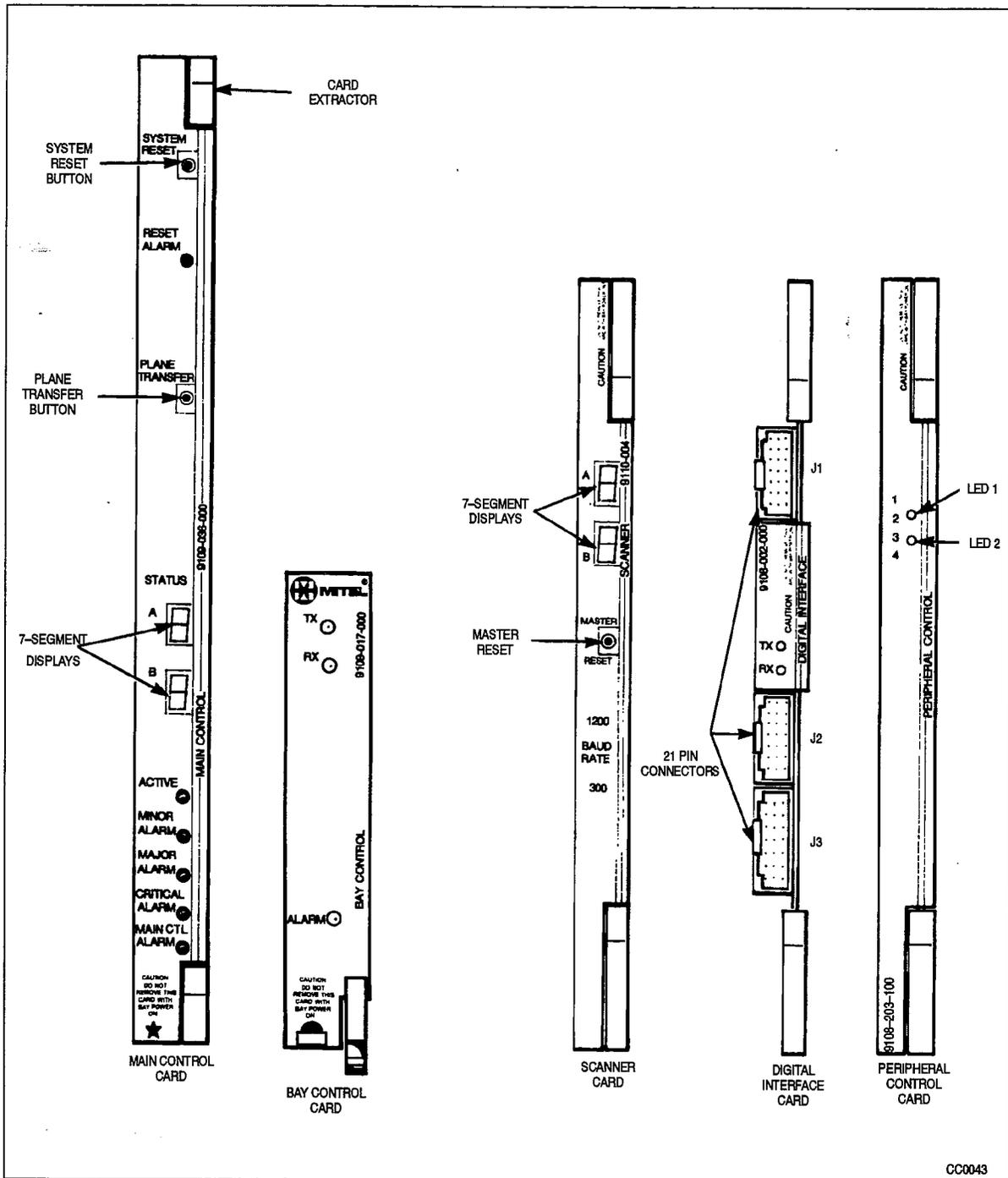
**Troubleshooting Procedures**

Troubleshooting procedures for the Main Control card are covered under "Emergency Troubleshooting Procedures" (Table 9-1). Table 4-1 outlines the most likely causes of Main Control failure for the 336, 456, 480 and 672 port systems and those for the SX-200 FD system's Control Node.

**Table 4-1 Main Control Troubleshooting Summary**

Step	Possible Malfunction Source for 336, 456, 480 & 672-port Systems
1.	Main Control card requires a reset – press <i>SYSTEM RESET</i> pushbutton on the Main Control card front panel. See Figure 4-1.
2.	Failure of initialization / power up tests – check for error codes on the Main Control card numeric displays – see Table 2-2.
3.	Faulty installation of the floppy drive(s) – verify both drives are seated firmly. Also verify the disk drive backplane connections (older systems only) – see Figure 4-10.
4.	Faulty or improperly installed floppy disks. (Disk A in right hand drive; Disk B in left hand drive)
5.	Incorrect flea clip locations on MCC – see Figure 2-1. (if applicable)
6.	Faulty disk drive.
7.	Faulty Bay Power Supply unit – refer to that procedure.
8.	Faulty Main Control card.
9.	Faulty Switch Matrix card / DX Module (as applicable).
10.	Faulty RAM Module.
11.	Faulty backplane cable connections.
Step	Possible Malfunction Source for the SX-200 FD System
1.	Main Control card requires a reset – press <i>SYSTEM RESET</i> pushbutton on the Main Control card front panel. See Figure 4-1.
2.	Failure of initialization / power up tests – check for error codes on the Main Control card numeric displays – see Table 2-2.
3.	Faulty installation of the floppy drive(s) – verify that the cables connecting the disk drives are seated correctly into the back of the drives and the backplane connectors.
4.	Faulty or improperly installed floppy diskettes. (Disk A in top drive, Disk B in bottom drive)
5.	Incorrect flea clip locations on MCC – see Figure 2-1.
6.	Faulty disk drive.
7.	Faulty Control cabinet Power Supply unit – refer to that procedure.
8.	Faulty Main Control card.
9.	Faulty Control Resource Card.
10.	Faulty Switch Matrix Module (if applicable).
11.	Faulty RAM Module.
12.	Faulty Control Cabinet FIM Module.
13.	Faulty FIM(s).
14.	Faulty backplane cable connections.

**Note:** Useful maintenance commands: SHOW STATUS, TEST, SHOW ALARMS – see Practice 9109-096-351-NA, RS-232 Maintenance Terminal.



CC0043

Figure 4-1 Control Cards

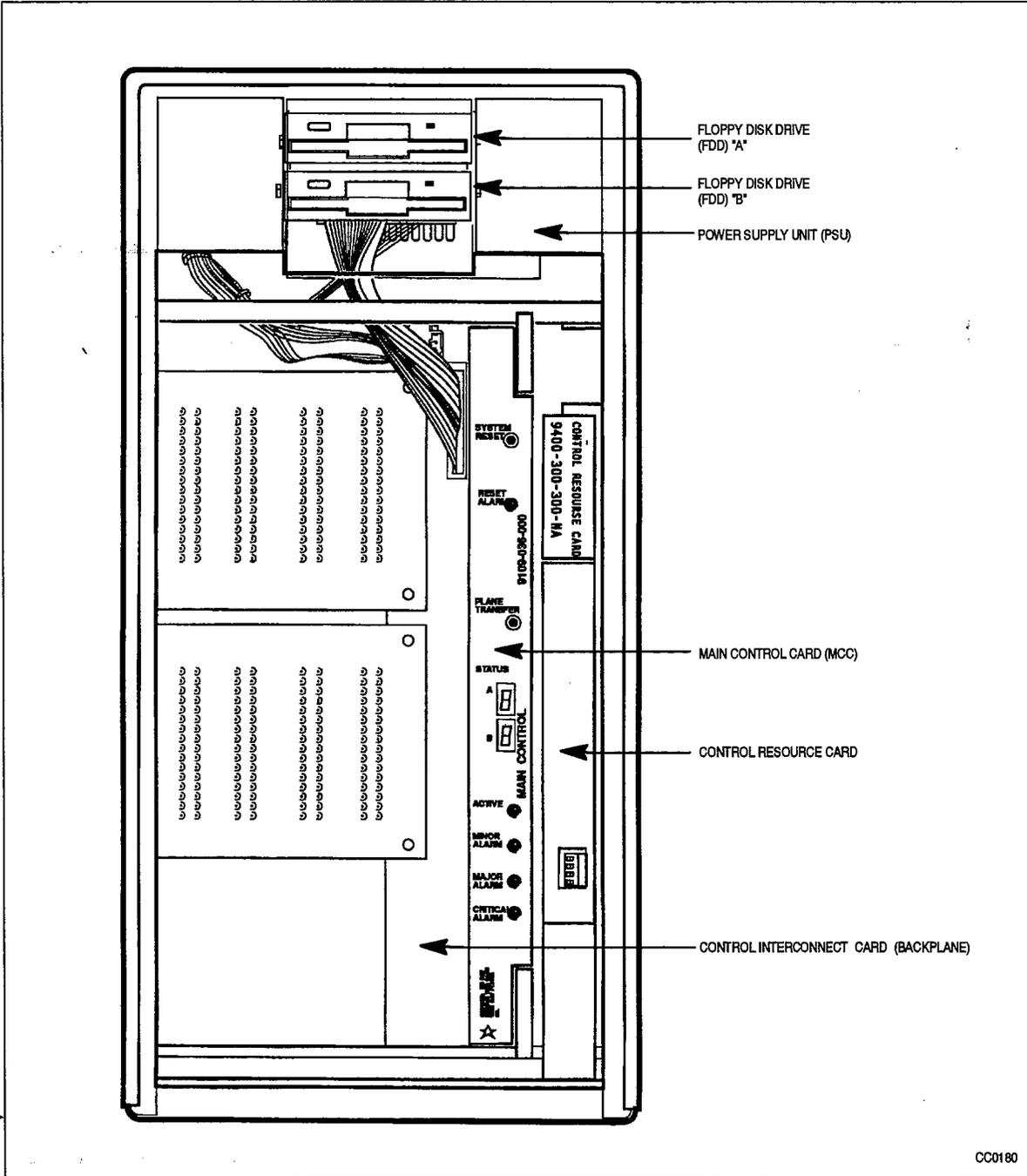


Figure 4-2 SX-200 FD Control Cabinet Front View (front cover removed)

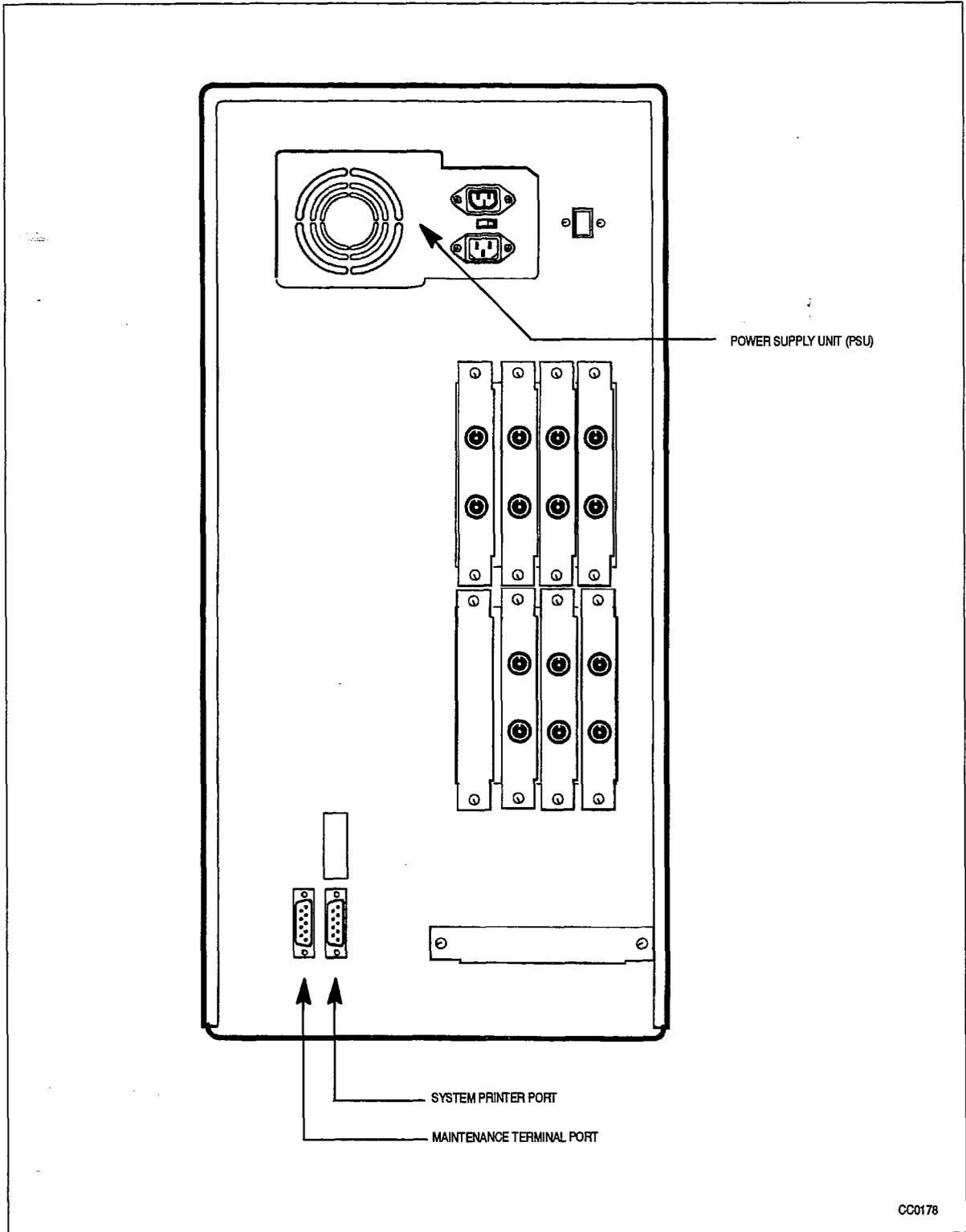


Figure 4-3 SX-200 FD Control Cabinet Rear View

## Digital Bay Control Subsystem

- 4.2 The following paragraphs detail the troubleshooting procedures for the Digital Bay Control subsystem.

### Configuration

The Digital Bay Control subsystem consists of one card – the Bay Control Card (Part No. 9109-017-000).

In the *SX-200* FD system, the Digital Bay Control subsystem consists of one card and two modules – the Bay Control Card as above, the Peripheral FIM Carrier and the Fiber Interface Module (FIM).

### Bay Control Power-Up Tests

The Bay Control card power-up tests are run automatically upon power-up of the associated bay, or a reset of the Main Control Card. Failure of any of the power-up tests will result in the flashing of the Bay Control Card ALARM LED soon after initialization.

### First-Step Checks

Prior to replacing cards as directed by the Digital Bay Control subsystem troubleshooting procedures, carry out the following checks:

- At the Maintenance terminal, SHOW ERRORS and check the DX channel links; also check for HDLC and the Disk Drive errors. Refer to Practice 9109-096-351-NA, RS-232 Maintenance Terminal, and Practice 9109-096-353-NA, General Maintenance Information.
- Ensure the PCM/fiber cable connections are secure between the Peripheral Bay/Node and Control Bay/Node (Bay2/ Bay 0) as appropriate.
- Reseat the suspect card and modules as appropriate.
- Check for bent pins at the backplane or module connector, as applicable.

If the above does not clear the fault, replace the modules and card.

### Power-Up Sequence

The Bay Control Card power-up sequence is described in Practice 9109-096-353-NA, General Maintenance Information. Table 4-2 summarizes the troubleshooting procedures for the Bay Control Card.

### Troubleshooting Procedures

The following table outlines the most likely causes of Bay Control failure.

Table 4-2 Digital Bay Control Troubleshooting Summary

Step	Possible Malfunction Source for 336, 456, 480 & 672-port Systems
1.	Bay Control card requires a reset – power down bay, reseal card, and power up bay.
2.	Note the indicators on the Bay Control card – see Table 4-3.
3.	Faulty or improperly installed PCM backplane connections – refer to practice 9109-096-200-NA, Installation Information, for details.
4.	Incorrect Bay Control card switch settings – read Note 2. See Figure 4-4.
5.	Faulty Bay Power Supply unit – refer to that procedure.
6.	Faulty Bay Control card.
7.	Faulty Main Control card.
8.	Faulty Switch Matrix card (if applicable).
9.	Faulty backplane cable connections.
Step	Possible Malfunction Source for the SX-200 FD System
1.	Bay Control card requires a reset – power down bay, reseal modules and card, and power up bay.
2.	Note the indicators on the Bay Control card (see Table 4-3 and Table 4-4.) and on the Fiber Interface Module (Tx & Rx must be ON to show “in sync”)
3.	Faulty or improperly installed FIM or Fiber Optical cable assembly – refer to practice 9109-096-200-NA, Installation Information, for details.
4.	Incorrect Bay Control card switch settings – read Note 2. See Figure 4-4.
5.	Faulty Bay Power Supply unit – refer to that procedure.
6.	Faulty Bay Control card, Peripheral FIM carrier or FIM
7.	Faulty Main Control card.
8.	Faulty Switch Matrix module.

**Notes:** 1. Useful maintenance commands: SHOW STATUS, TEST, SHOW ALARMS – see Practice 9109-096-351-NA, RS-232 Maintenance Terminal.

2. All of the switches (SW1-1, SW1-2, SW2-1, SW2-2) should be in the closed position.

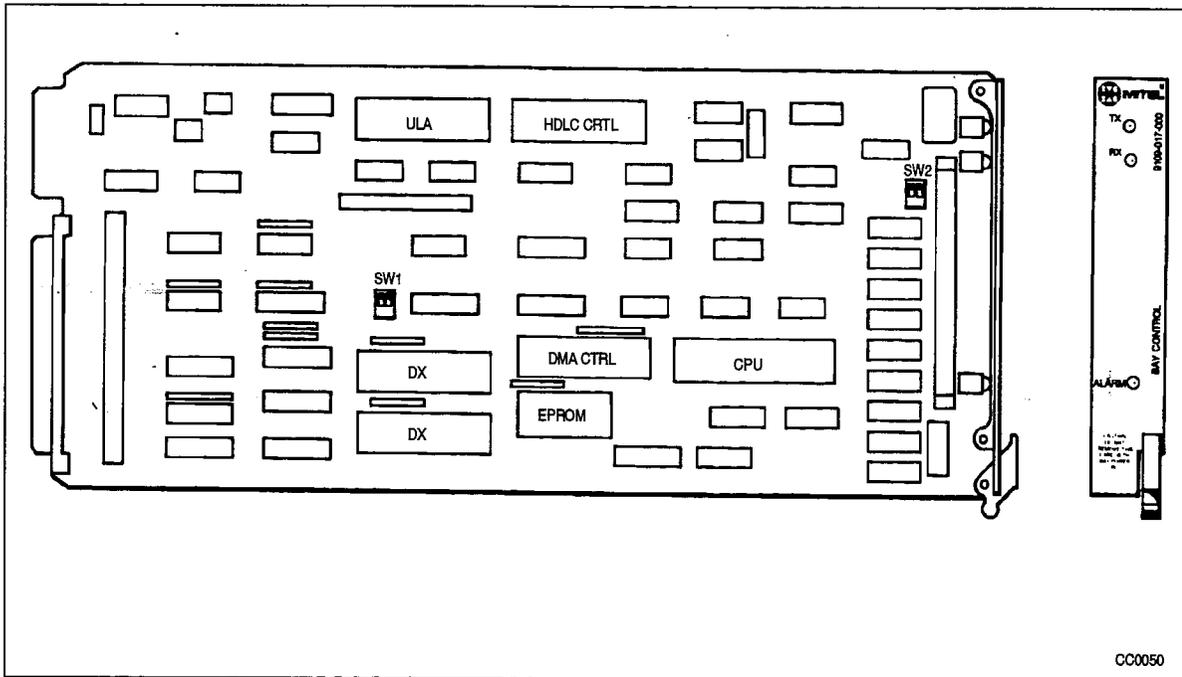


Figure 4-4 Bay Control Card Device Locations

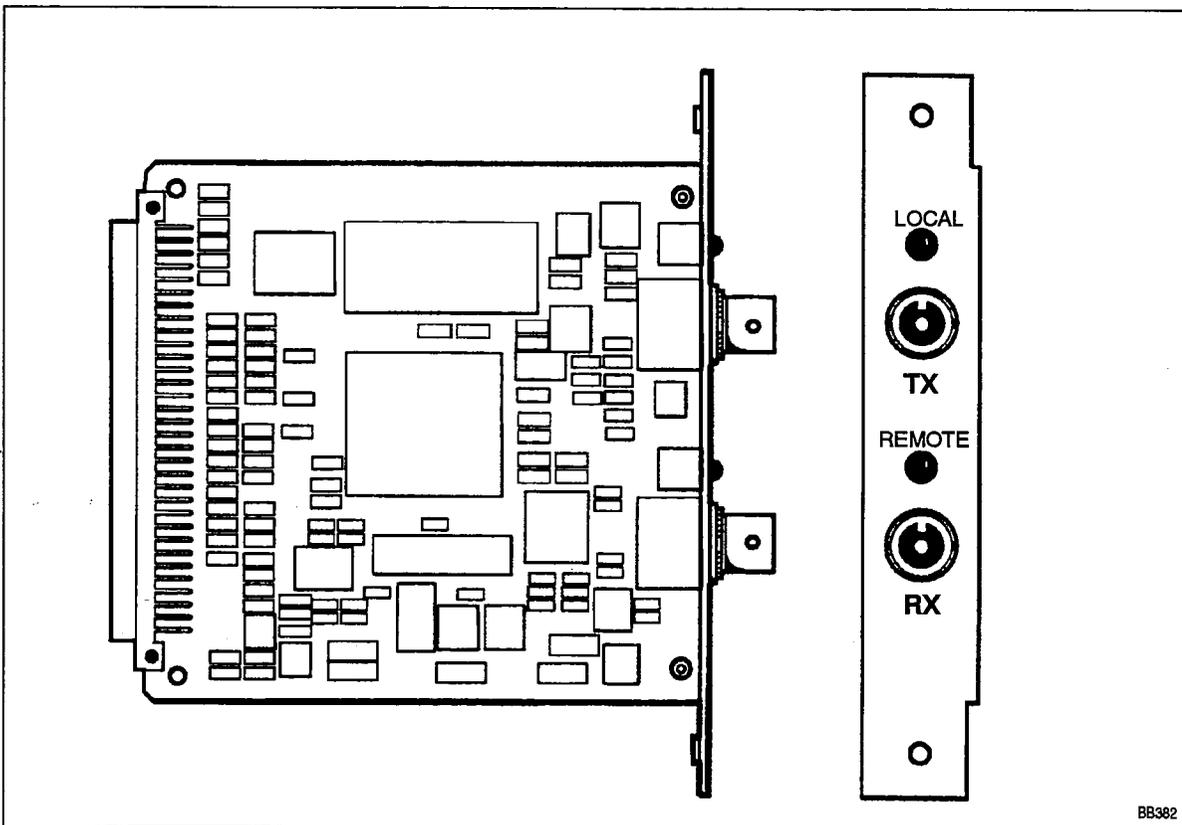


Figure 4-5 Fiber Interface Module

Table 4-3 Bay Control Card Status LEDs

TX LED	RX LED	ALARM LED	Meaning
on	on	on	Bay Control Card is either waiting for, or has lost communication with the Main Control Card. If this state persists for more than a few seconds, there is no communication.
flashing	flashing	on	Bay Control Card is being downloaded by the Main Control Card.
off / flashing	off / flashing	off	Bay Control Card is up and running and communicating to the Main Control Card.
—	—	flashing	There is a failure on the Bay Control Card.

Table 4-4 SX-200 FD FIM Status LEDs

FIM LED	LED STATUS	Meaning
LOCAL	on	Receiver in sync. (normal operation)
	off	No power to FIM
	flashing	Local Receiver not in sync
REMOTE	on	Remote Receiver in sync. (normal operation)
	off	No power to FIM
	flashing	Remote Receiver not in sync

**Notes:** 1. FIM status LEDs are located on the Fiber Interface Modules of the SX-200 FD System. The status indicated applies to the FIMs in both the control and peripheral nodes. If both LEDs are flashing, the problem may lie in the TX or RX path.

2. Flashing LED status on the FIM can be caused by the following conditions:

- unconnected fiber cable.
- improperly connected fiber cable.
- reversed fiber connection (i.e., TX and RX are inverted).
- exceeding maximum allowable cable loss of 10dB (light intensity).
- broken or cracked fiber cable.
- faulty FIM.

## Analog Bay Peripheral Control Subsystem

4.3 The following paragraphs detail the troubleshooting procedures for the Analog Bay Peripheral Control Subsystem.

### Configuration

The Analog Bay Peripheral Control Subsystem consists of the following cards:

Name	Part No.
• Peripheral Control Card (PCC)	9108-203-100
• PCC EPROM	—
• Digital Interface Card (DIC)	9108-002-000
• DIC EPROM	—
• Scanner Card	9110-104-000-NA or 9110-004-000-NA

### Peripheral Control Subsystem Power-Up Tests

The Peripheral Control Subsystem power-up tests are run automatically upon operation of the *MASTER RESET* pushbutton located on the Scanner card front panel. The test results are indicated in code form on the Scanner card's numeric displays, located on the Scanner card front panel. See Figure 4-1.

### First-Step Checks

Prior to replacing cards as directed by the Peripheral Control Subsystem troubleshooting procedures, carry out the following checks:

- Reseat the suspect card.
- Check for bent pins at the backplane or module connector, as applicable.

If the above does not clear the fault, replace the card.

### Power-Up Sequence

The Peripheral Control subsystem power-up sequence is outlined in detail in Practice 9109-096-353-NA, General Maintenance Information.

### Troubleshooting Procedures

The following table outlines the most likely causes of Analog Bay Control failure.

Table 4-5 Analog Bay Control Troubleshooting Summary

Step	Possible Malfunction Source
1.	Bay requires a reset – press <i>MASTER RESET</i> on the Scanner card front panel – see Figure 4-1. Check indicators on the DIC card and refer to Table 4-6.
2.	Cards require reinitialization – power down bay, reseal DIC, PCC and Scanner cards, power up bay.
3.	Faulty or improperly installed PCM connections between the 2 DIC cards (if applicable) – see Figure 4-6. See Note 2.
4.	Faulty or improperly installed PCM connections between the Bay 4 DIC and the control cabinet. See Figure 4-6 and Note 2.
5.	Faulty DIC card(s).
6.	Faulty PCC card.
7.	Faulty Scanner card.
8.	Faulty Main Control.
9.	Faulty backplane cable connections.

**Notes:** 1. Useful maintenance commands: SHOW STATUS, TEST, SHOW ALARMS – see Practice 9109-096-351-NA, RS-232 Maintenance Terminal.

2. Refer to practice 9109-096-200-NA, Installation Information, for details.

Table 4-6 Scanner Card Error Code Summary

Error Code	Likely Cause(s)
(blank)	<ul style="list-style-type: none"> <li>Faulty power system – refer to that procedure.</li> <li>Faulty Scanner card.</li> </ul>
E 2	<ul style="list-style-type: none"> <li>Unseated EPROM chip on PCC card.</li> <li>Faulty DIC card.</li> <li>Faulty PCC card.</li> <li>Faulty Scanner card.</li> <li>Main Control problem – see Table 4-1.</li> </ul>
E 1	<ul style="list-style-type: none"> <li>Faulty PCC card.</li> </ul>
b        b 3    or    4	<ul style="list-style-type: none"> <li>Nothing – this is normal operation.</li> </ul>
0        A A    or    A (see Note)	<ul style="list-style-type: none"> <li>Faulty cabling from DIC card to DIC card, or from DIC card to digital bay backplane.</li> <li>Faulty DIC card.</li> <li>Main Control problem – see Table 4-1.</li> </ul>

**Note:** These indicate problems if they persist – they indicate that the bay(s) are waiting to be loaded by the main control. If the condition persists, a problem is indicated.

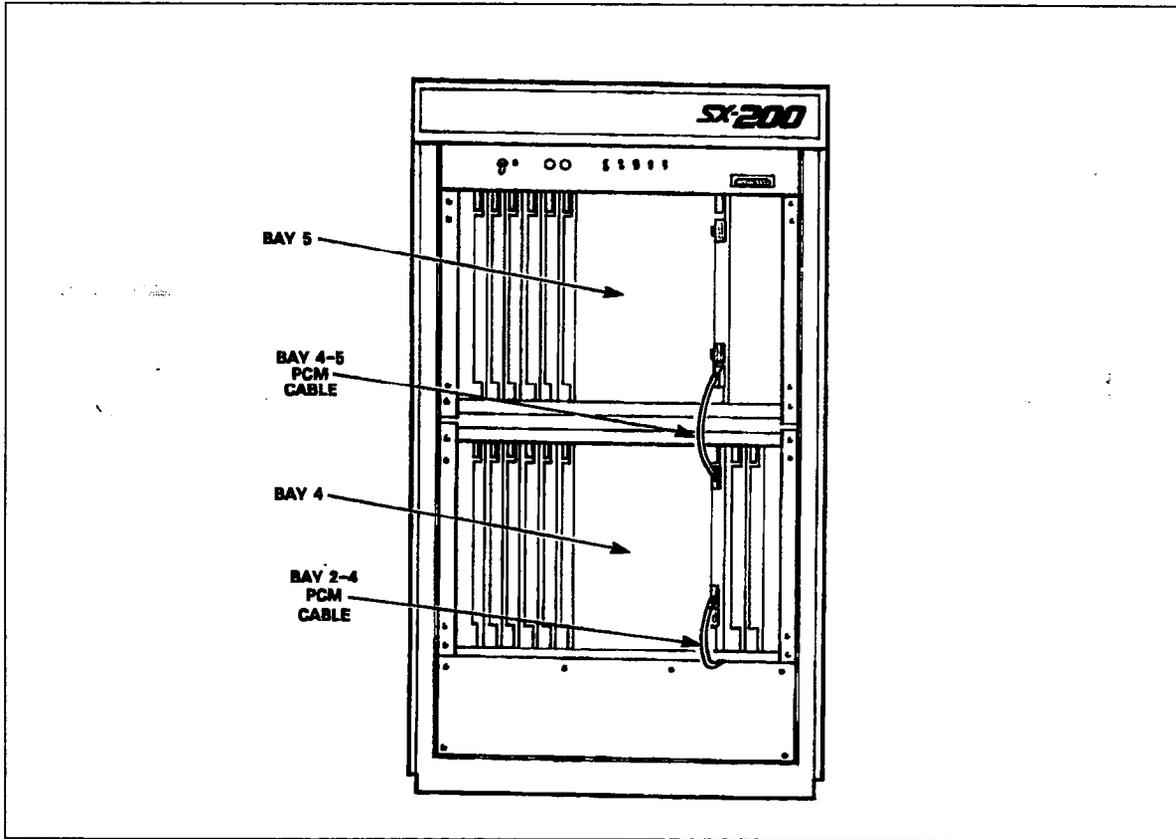


Figure 4-6 Location of PCM Cables

### Floppy Disk Subsystem

4.4 The following paragraphs detail the troubleshooting procedures for the Floppy Disk Subsystem. Chart 4-3 outlines the troubleshooting procedures for the Floppy Disk Subsystem. Note that some troubleshooting of the Floppy Disk Subsystem is done implicitly through the troubleshooting of the Main Control Card. Systems with Generic 1005 are equipped with 3.5" disk drive units.

#### Configuration

The Floppy Disk Subsystem consists of the following components:

Name	Part. No.
• Floppy Disk Drive	9109-024-000-NA (5 1/4" cabled), 9109-124-000-NA (5 1/4" plug-in), or 9400-300-305-NA (3 1/2" plug-in)
• Main Control Card	9109-036-000-NA
• Interconnecting cables	—
• Bay 1 Cable Adapter	9108-037-000-NA (not all systems)
• Bay 2 Cable Adapter	9108-038-000-NA (not all systems)

### Action in Case of Power Loss

In order to prevent corruption of the data on the floppy diskettes, care should be taken to disable system access to the disk drive unit prior to taking it off-line for troubleshooting purposes. Always release the lock-latch before removing power from the unit (**NOTE:** ensure that the system IS NOT accessing the disk when this is done). Always ensure power is applied to the disk drive before inserting the diskette.

### Troubleshooting Procedures

The following table outlines the most likely causes of Floppy Disk Subsystem failure. These apply to both the 5.25" and 3.5" floppy disk drive units.

Step	Possible Malfunction Source
1.	Drive units require resets – power down the control bay (Bay 2 or Bay 0), and power up again. Check for error codes on the Main Control card numeric display – see Table 4-8.
2.	Faulty backplane connections – see Figure 4-10.
3.	Faulty or improperly installed floppy disk.
4.	Faulty / corrupt / obsolete software – reload with correct software.
5.	Faulty power supply unit(s) – refer to Power System Troubleshooting.
6.	Faulty Disk Drive unit.
7.	Faulty Main Control.
8.	Faulty backplane cable connections.

**Note:** Useful maintenance commands: SHOW STATUS, TEST, SHOW ALARMS, SHOW ERRORS DISK – see Practice 9109-096-351-NA, RS-232 Maintenance Terminal.

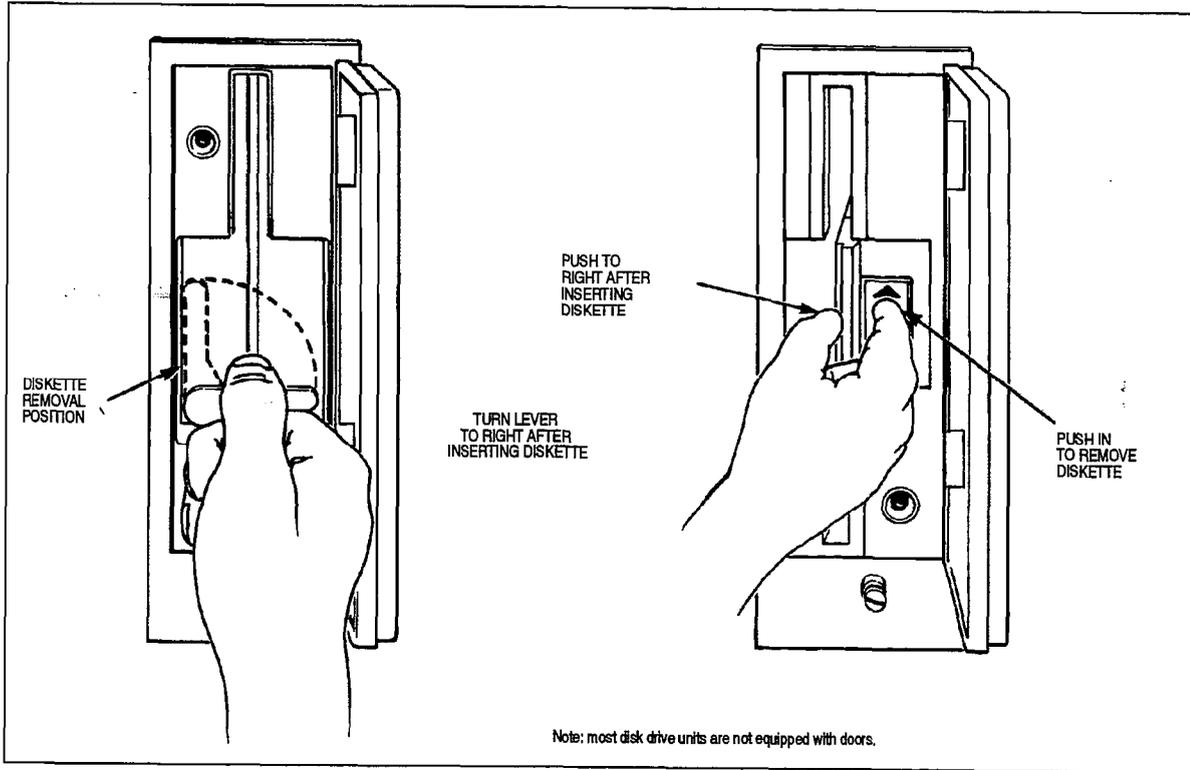


Figure 4-7 5 1/4" Disk Drives (Generic 1001 to Generic 1004)

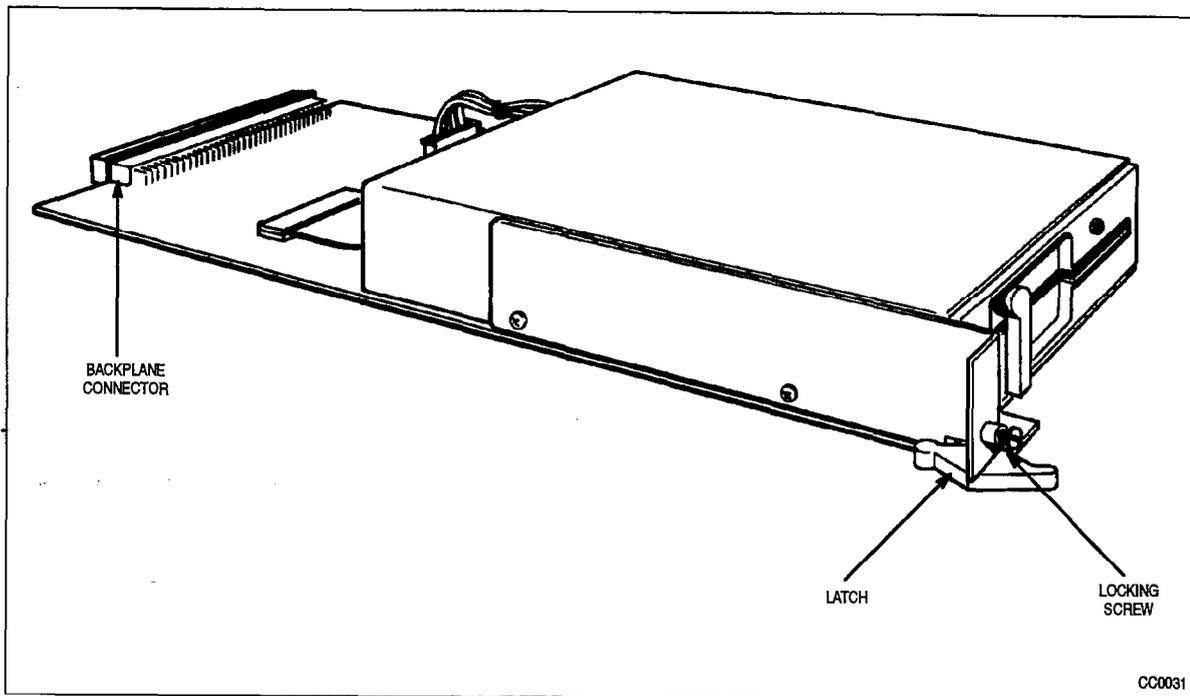


Figure 4-8 5 1/4" Disk Drive, PN 9109-124-000-NA (Generic 1001 to Generic 1004)

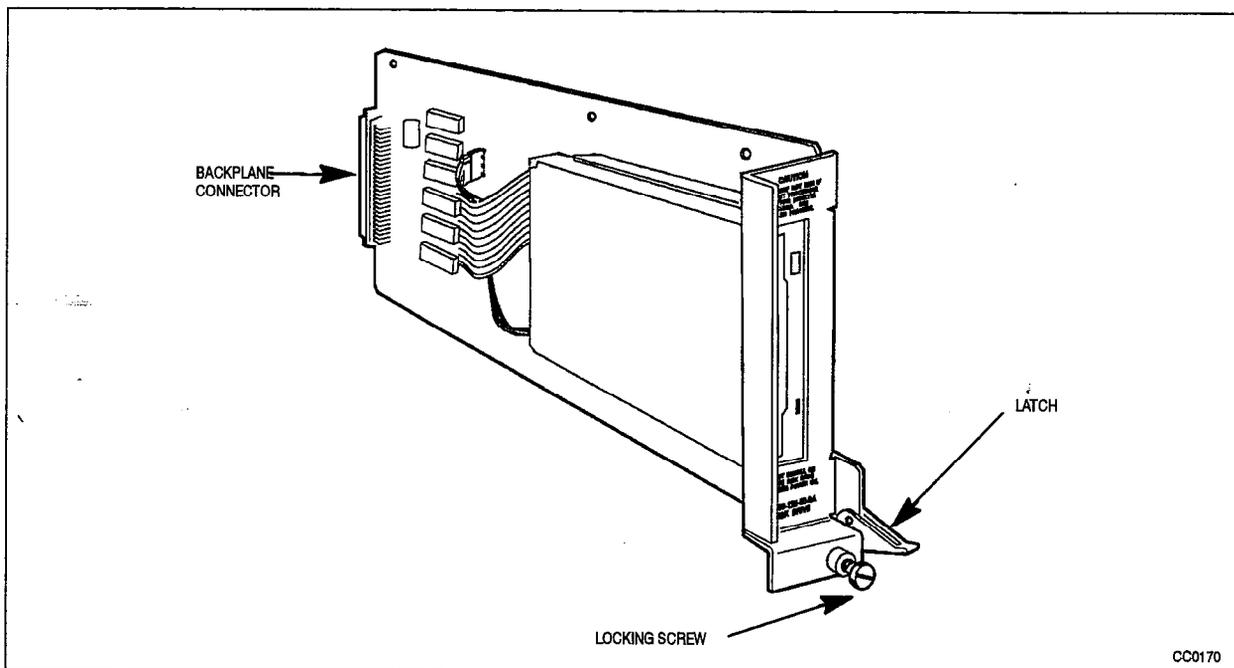


Figure 4-9 3 1/2" Disk Drives, PN9400-300-305-NA (Generic 1005)

Table 4-8 Floppy Disk Drive Error Code Summary

Error Code	Likely Cause(s)
E. 1	• Original system diskette has been replaced, and logs are pending. Either reinsert original diskette, or restart system. See Note 2.
E. 2	• Original system diskette has been replaced. Either reinsert original diskette, or restart system. See Note 2.
E. 3	• Disk drive is empty, and disk updates are pending. Either reinsert original diskette, or restart system. See Note 2.
E. 4	• Disk drive is empty. Either reinsert original diskette, or restart system. See Note 2.
E. 5	• There is an obstruction over the diskette "write notch" (a write-protect sticker) – remove it.
E. 6	• Diskettes A and B don't match (are not of the same load) – insert proper diskettes and restart system.
E. 7	• Restart system. If this persists, assume faulty Main Control – refer to the Main Control procedures.
E. 8	• Decryption Module is missing – install correct module, and restart system. If this persists, assume faulty Main Control – refer to the Main Control procedures.

**Notes:** 1. Please note the difference between the code "E" and the code "E."

2. If system is restarted at this point, the pending logs will be lost.

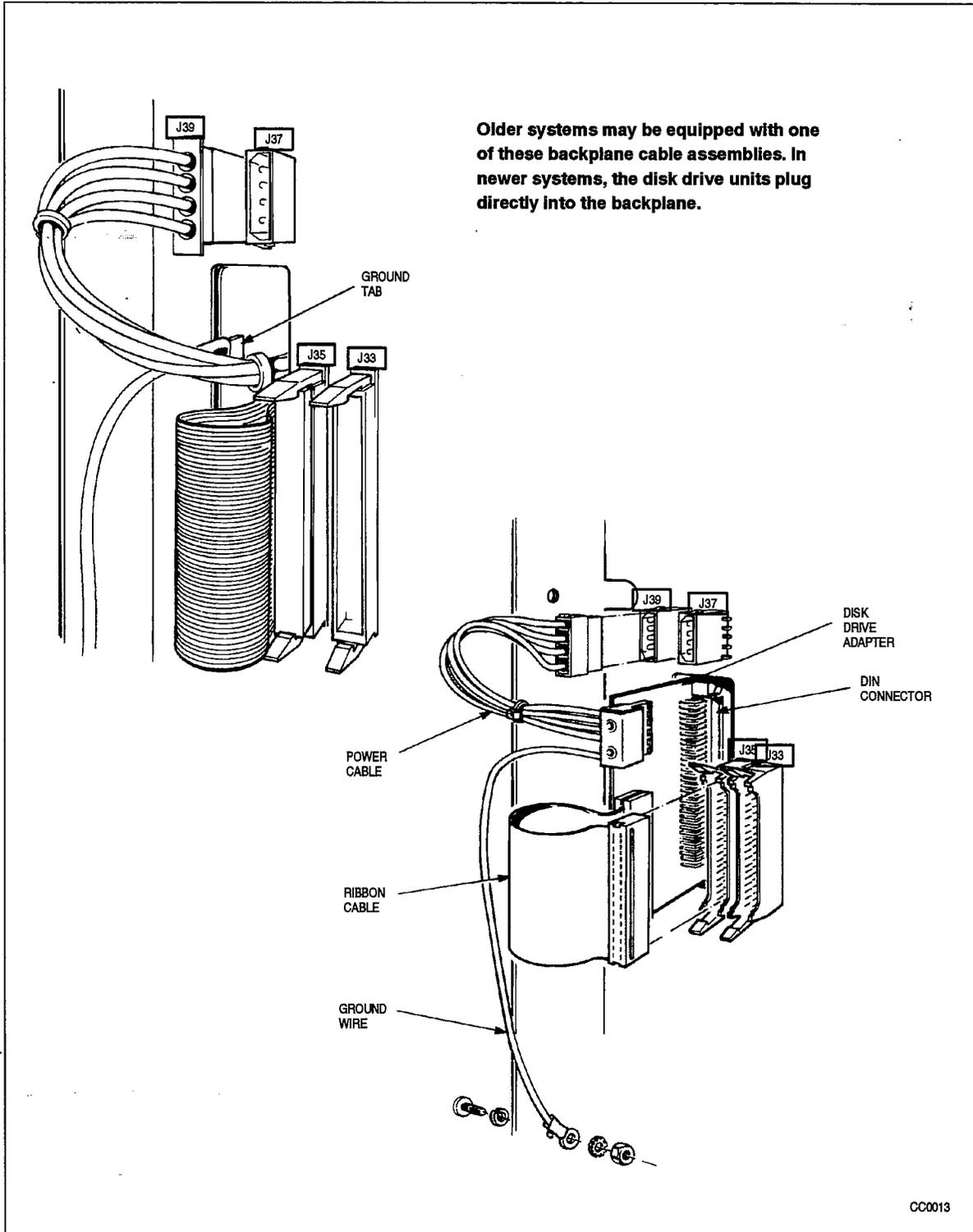


Figure 4-10 Floppy Disk Drive Backplane Connections

## Power Subsystem

- 4.5 The *SX-200* DIGITAL PABX power subsystem consists of one to eight bay power supplies, and optionally one or two rear-door power supplies, depending upon the configuration of the system. The *SX-200* FD Control Node is equipped with PC style power supply assembly. The uninterruptable power supply (UPS) is optional, and is user-supplied. The following table outlines the most likely causes of Bay Power Supply failure

### Bay Power Supply

<b>Table 4-9 Bay Power Supply Troubleshooting Summary</b>	
<b>Step</b>	<b>Possible Malfunction Source</b>
1.	Power supply unit switched off – switch back on.
2.	Faulty connection to AC power source.
3.	Insufficient input voltage. See Note 1.
4.	Faulty connections between the BPS unit and the AC Distribution Panel – see Figure 1-6.
5.	Faulty connection between the AC Distribution Panel and the AC Line Filter unit (mounted on the inside of the rear door). See Note 3.
6.	Faulty cabinet ground connections – see Figure 4-12 / Figure 4-13.
7.	Blown fuse(s) on power supply – see Figure 4-14.
8.	Faulty power supply unit – see indicators on unit (the <i>POWER</i> indicator should be ON). Also see Note 2.
9.	Faulty AC Distribution Panel – verify internal wiring.
10.	Faulty analog bay power supply – refer to Rear Door Power Supply Troubleshooting (if applicable). see Table 4-13
11.	Faulty <i>SX-200</i> FD Control Node power supply (PSU) – refer to <i>SX-200</i> FD Control Node Power Supply Troubleshooting (if applicable). See Table 4-11.
12.	Faulty backplane – check for shorts and/or foreign material.

- Notes:**
1. The Bay Power Supply has low voltage protection – if the input voltage falls below a minimum threshold, the output will shut off. The unit will no longer provide output until the input voltage rises above that threshold.
  2. The proper test point voltages are shown in Table 4-10. Test points are labelled clearly on the backplane.
  3. The AC line filter is installed on the rear door only in older systems. In newer systems, the line filter is located within the AC Distribution Panel.

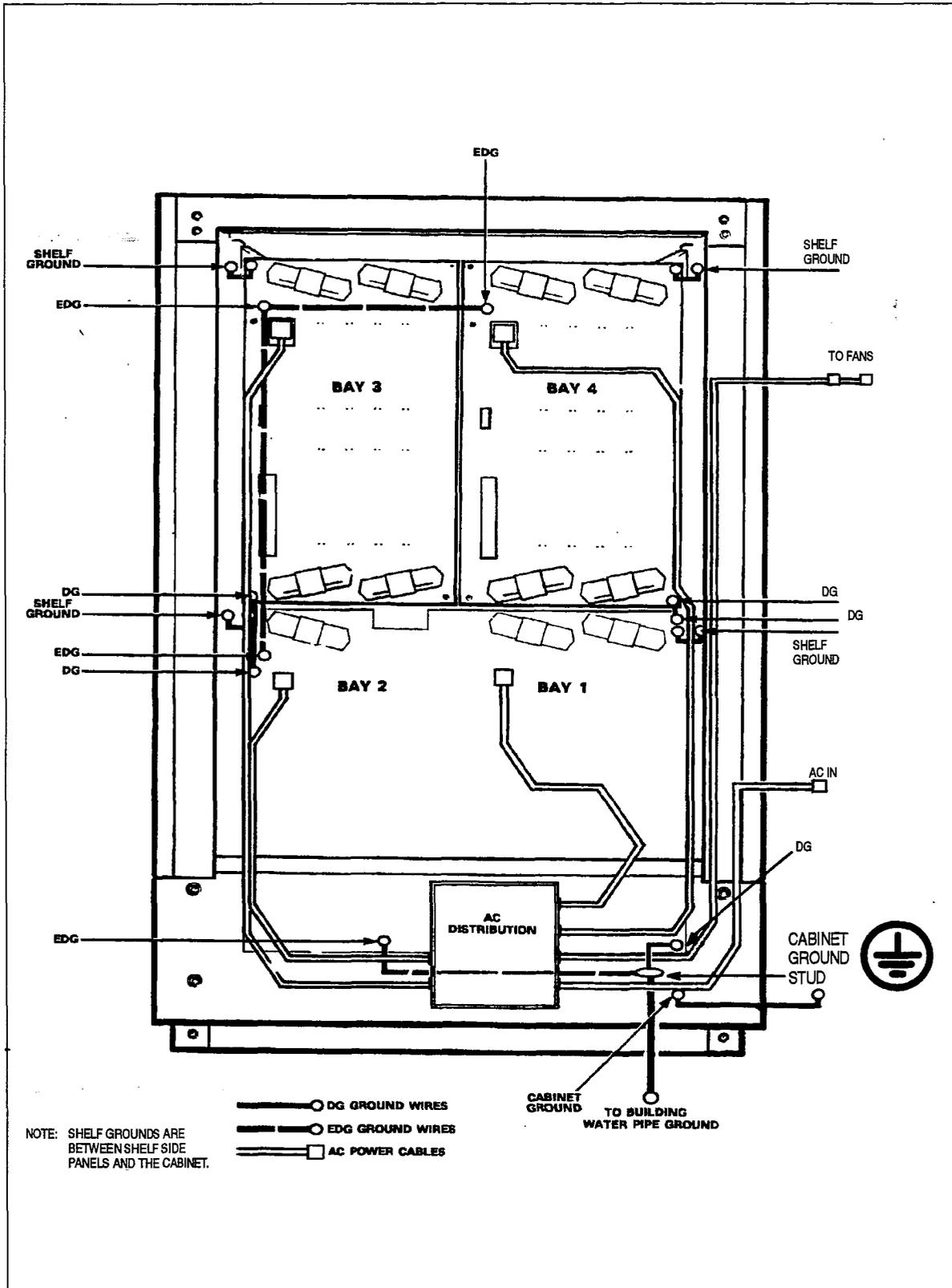
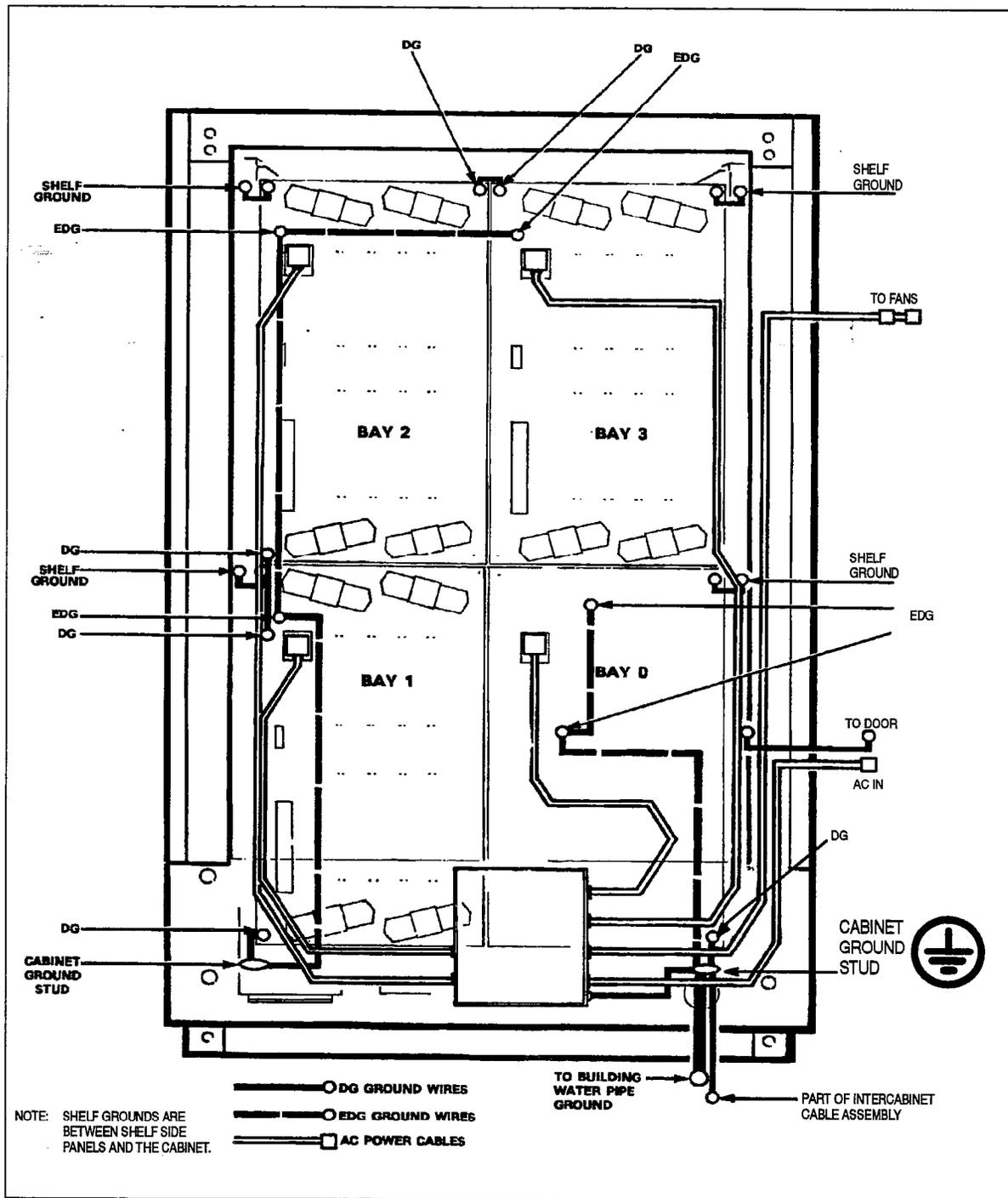
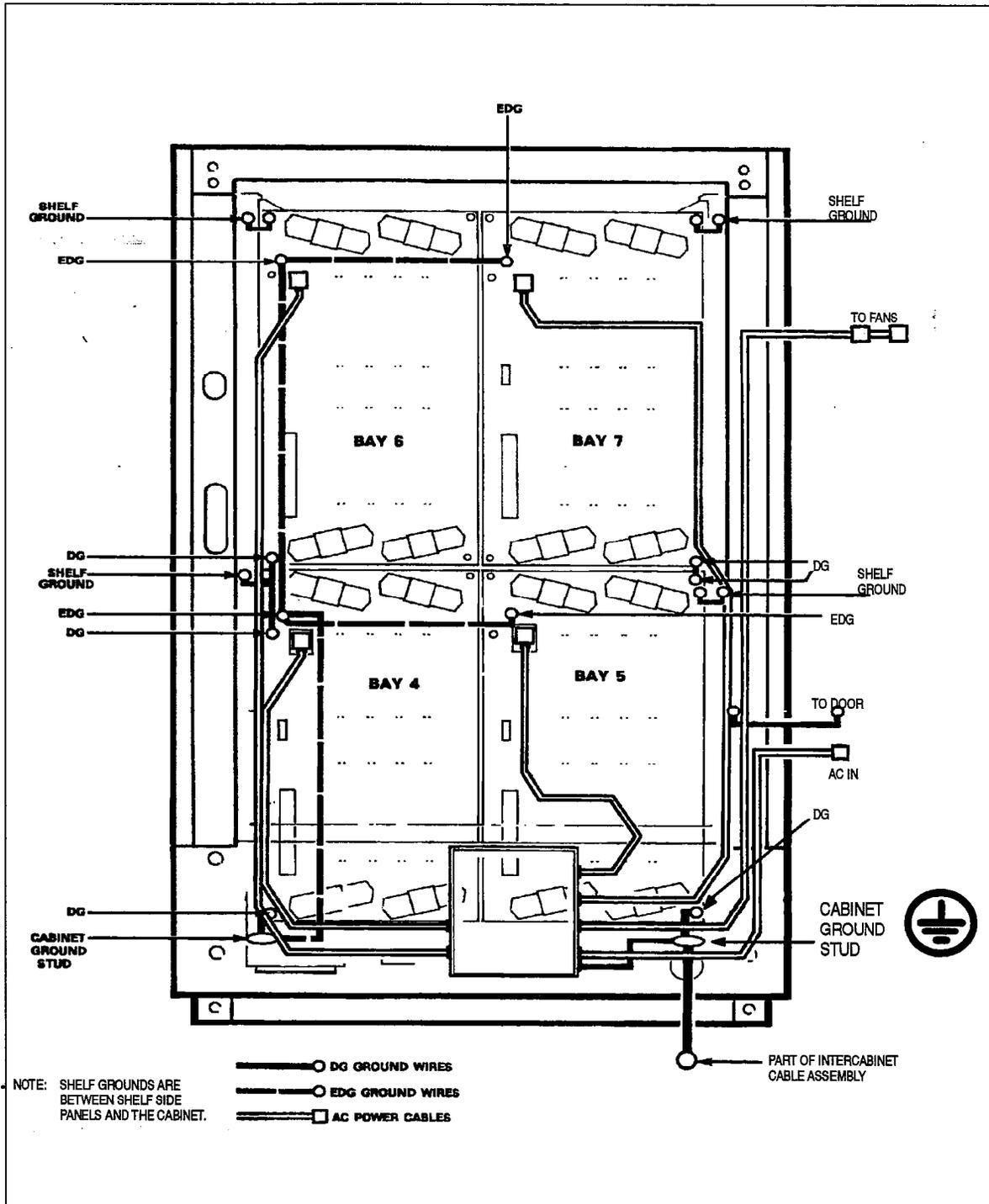


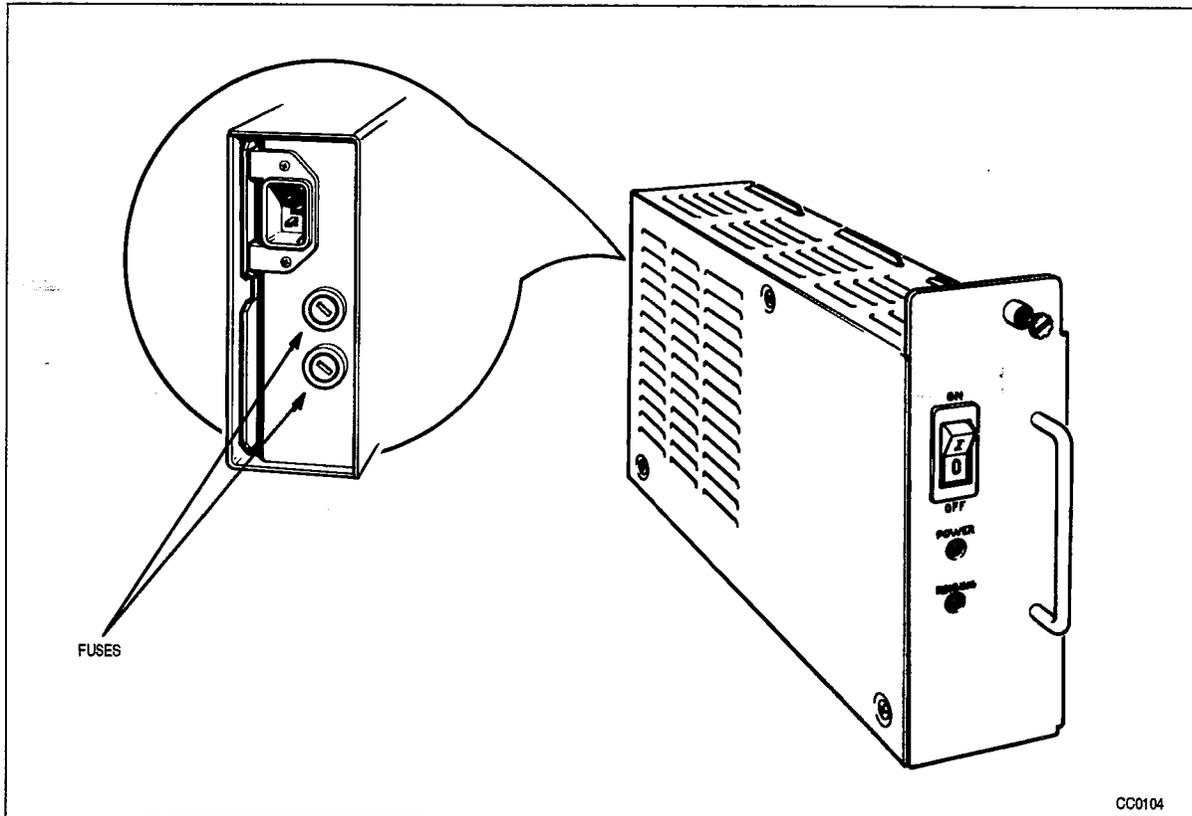
Figure 4-11 336 Port AC Distribution Panel and Ground Connections



**Figure 4-12 672 Port Control Cabinet AC Distribution Panel and Ground Connections**



**Figure 4-13 672 Port Peripheral Cabinet AC Distribution Panel and Ground Connections**



**Figure 4-14 Bay Power Supply and Fuse Locations**

**Table 4-10 Bay Power Supply Test Point Voltages**

Voltage	Minimum	Maximum
+ 5 Vdc	+ 5.07	+ 5.23
+ 12 Vdc	+ 10.8	+ 13.2
- 12 Vdc	- 13.2	- 10.8
- 5 Vdc	- 4.5	- 5.5
- 28 Vdc	- 30.8	- 23.8
- 48 Vdc	- 53.76	- 40.8
90 Vac	63.0	99.0

### SX-200 FD Control Cabinet Power Supply

The Control Cabinet of the SX-200 FD PABX is equipped with a "PC Style" power supply. The following table outlines the most likely causes of Control Cabinet Power Supply failure.

Table 4-11 SX-200 FD Control Node Power Supply Troubleshooting Summary	
Step	Possible Malfunction Source
1.	Power supply unit switched off – switch back on.
2.	Faulty connection to AC power source.
3.	Insufficient input voltage.
4.	Faulty connection between the Power Supply Unit (PSU) and the backplane
5.	Faulty Power Supply unit.
6.	Faulty Control Interconnect Card (backplane), see Figure 4-15
7.	Faulty Quad FIM carrier (QFC).

**Note:** The proper operating voltages are shown in Table 4-12.

Table 4-12 SX-200 FD Control Node Power Supply Voltages					
PSU Connector	Connector Pin	Voltage	Minimum	Maximum	System Connection
PS1 (Note 1)	1	GND	–	–	CIC J6 (Note 2)
	2	spare	–	–	
	3	+ 12 Vdc	10.8	13.2	
	4	– 12 Vdc	– 13.2	– 10.8	
	5 & 6	common	–	–	
PS2	1 & 2	common	–	–	CIC J7 (Note 2)
	3	– 5 Vdc	– 5.5	– 4.5	
	4, 5 & 6	+ 5 Vdc	4.75	5.25	
PC	1	+ 12 Vdc	10.8	13.2	QFC 1 – J7 (for FIM 1-4)
	2 & 3	common	–	–	
	4	+ 5 Vdc	4.75	5.25	
PD	1	+ 5 Vdc	4.75	5.25	J2 Top FDD (Drive A)
	2 & 3	common	–	–	
	4	+ 12Vdc	10.8	13.2	
PA + cable #136060601	1	+ 5 Vdc	4.75	5.25	J2 Bottom FDD (Drive B)
	2 & 3	common	–	–	
	4	+ 12Vdc	10.8	13.2	
PB	1	+ 12 Vdc	10.8	13.2	(optional) QFC 2 – J7 (for FIM 5-7)
	2 & 3	common	–	–	
	4	+ 5 Vdc	4.75	5.25	

**Notes:** 1. The PSU Connector label is the label printed on the PSU connector.

2. CIC = Control Interconnect Card (backplane); QFC = Quad FIM Carrier; (see Figure 4-15)

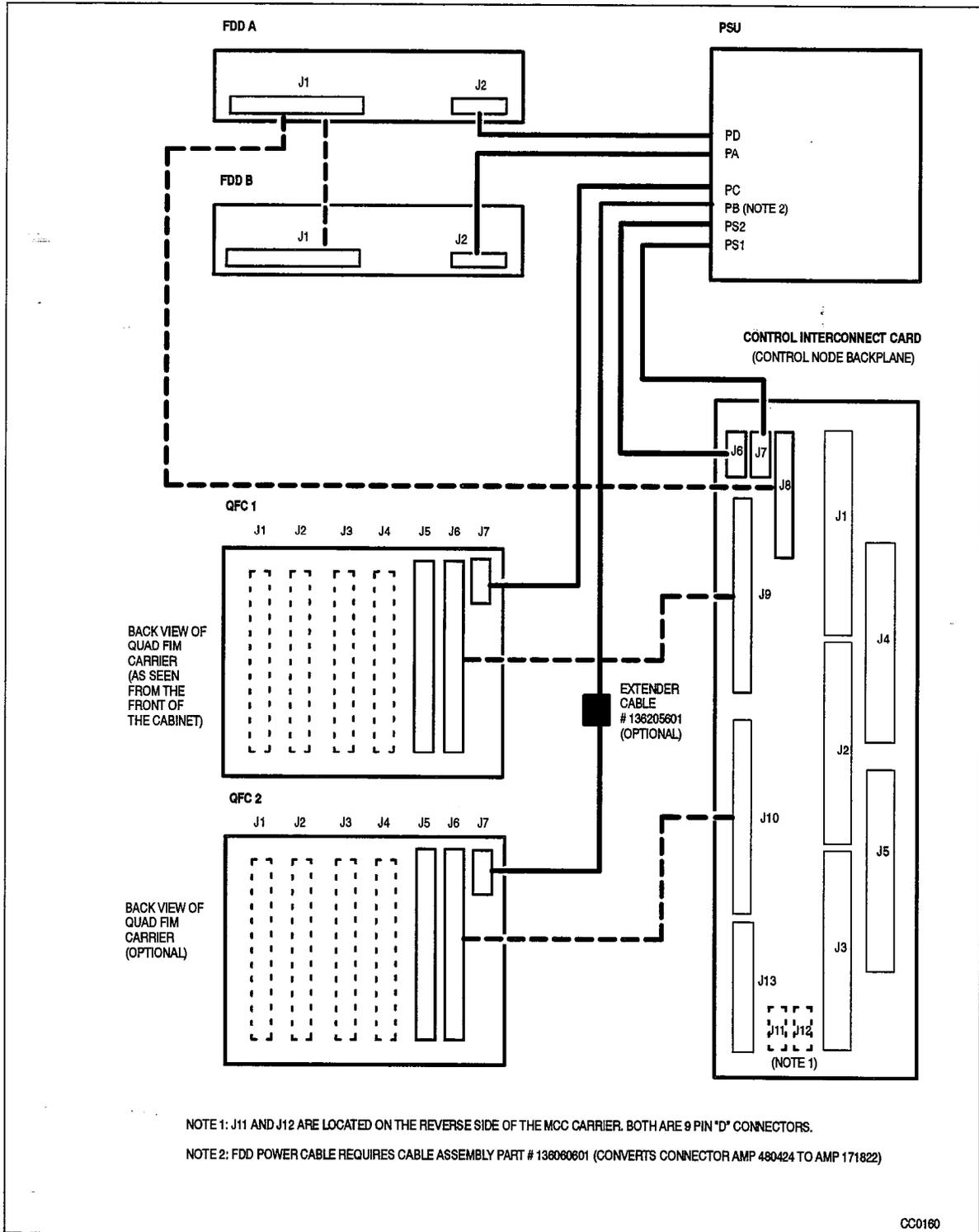


Figure 4-15 Control Node Cable Connections

### Rear Door PowerSupply

The SX-200 DIGITAL PABX can be configured with up to 2 rear-door power supplies, depending upon the configuration of the system (456-port and 480 port systems). The following table outlines the most likely causes of Rear Door Power Supply failure.

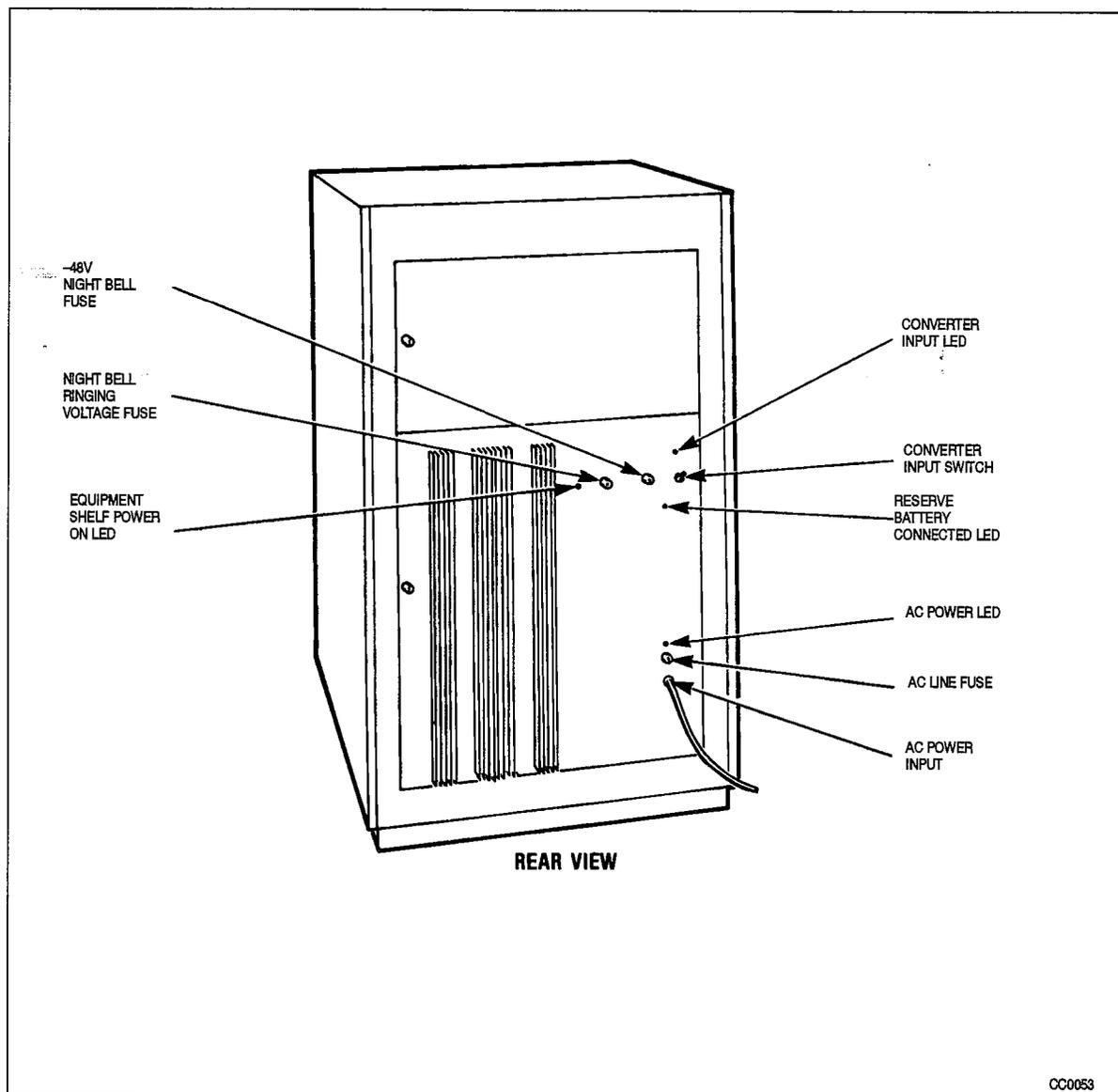
**Table 4-13 Rear Door Power Supply Troubleshooting Summary**

Step	Possible Malfunction Source
1.	Power supply unit switched off – switch back on.
2.	Maintenance panel / top panel switch in OFF position – switch to ON position.
3.	Faulty connection to AC power source.
4.	Insufficient input voltage.
5.	Blown <i>LINE</i> fuse (rear panel of the power supply unit). See Figure 4-16.
6.	Tripped <i>CONVERTER INPUT</i> circuit breaker (also located on the rear panel of the power supply unit).
7.	Faulty connection between the Rear Door Power Supply (harness) and the shelf backplane – see Figure 4-17 and Figure 4-18.
8.	Faulty connections / blown fuse(s) on the Interconnect card – see Note 1.
9.	Faulty cabinet ground connections – see Note 1.
10.	Blown fuse(s) on power supply – see Figure 4-16.
11.	Faulty Interconnect card.
12.	Faulty Rear Door Power Supply unit.
13.	Faulty backplane.

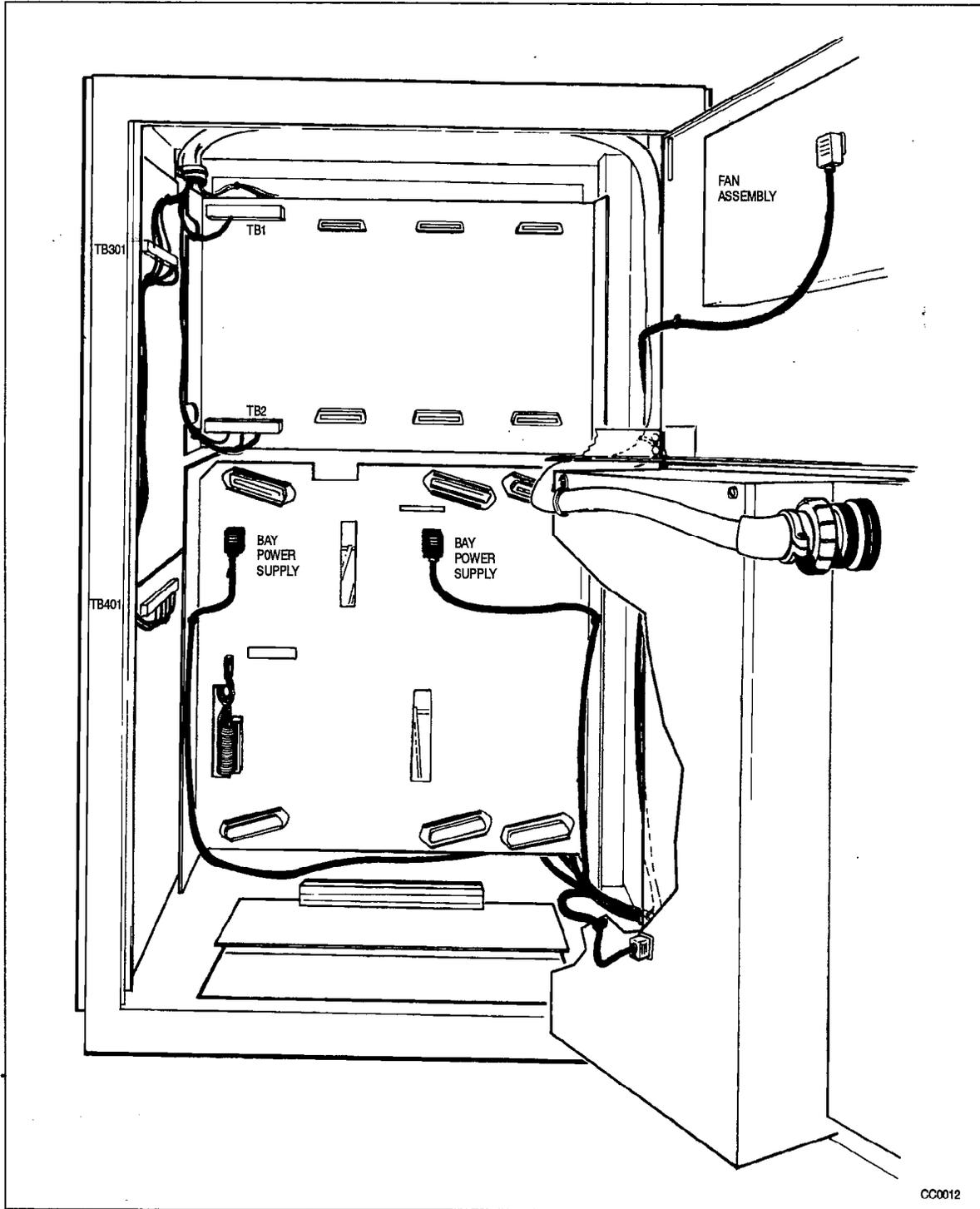
- Notes:** 1. For further information on the rear door power supply and related hardware, refer to the MITL9105/9110 series of documents.  
 2. The proper test point voltages are shown in Table 4-14.

**Table 4-14 Rear Door Power Supply Test Point Voltages**

TB	Pin	Voltage	Minimum	Maximum
1	4	+ 8 Vdc	+ 7.6	+ 8.4
	3	0 Vdc	–	–
	2	– 5 Vdc	– 5.3	– 4.7
	1	– 10 Vdc	– 10.5	– 9.5
2	5	– 48 Vdc	– 52.0	– 45.0
	4	GND or 0 Vdc	–	–
	2	90 Vac	85.0	95.0

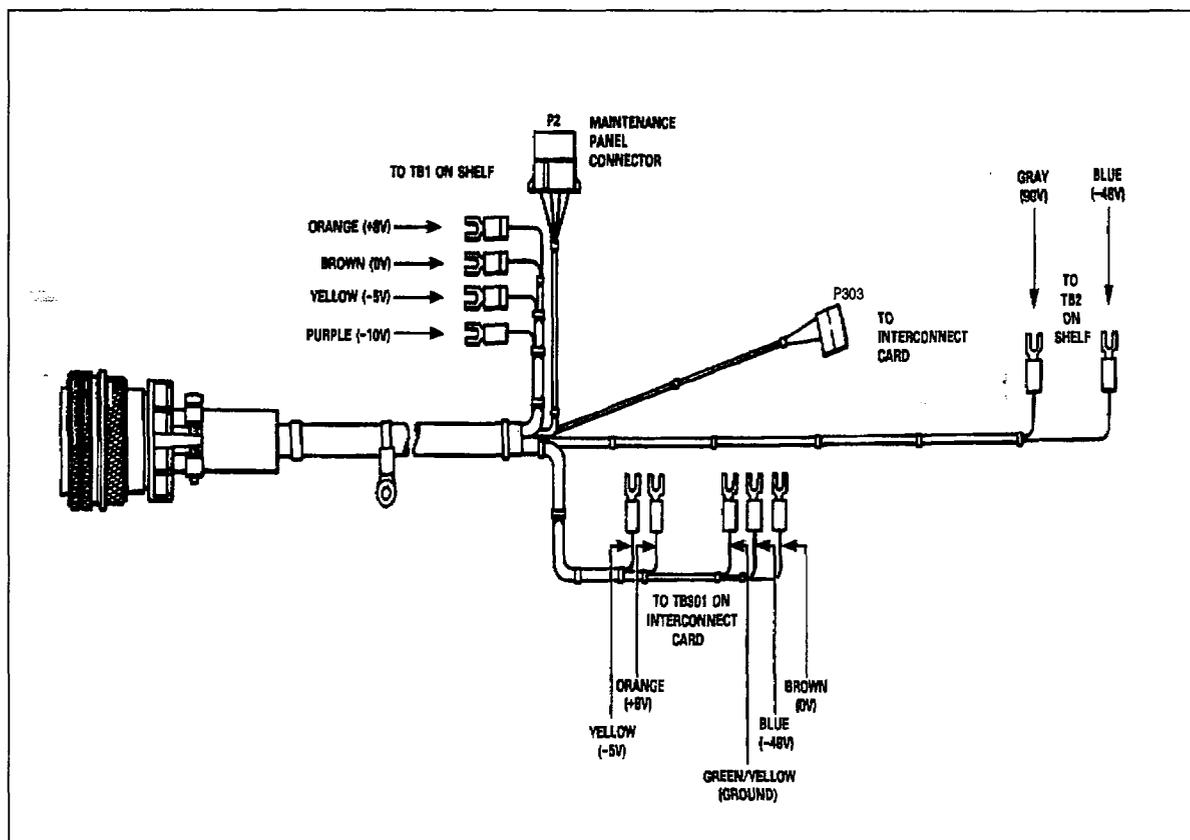


**Figure 4-16 Rear Door Power Supply Indicators, Switches, Fuses**



CC0012

**Figure 4-17 Rear Door Power Supply Connections**



**Figure 4-18 Rear Door Power Supply Power Harness**

### Uninterruptable Power Supply (UPS)

Any UPS may be used with the SX-200 DIGITAL PABX, provided that it meets the requirements specified in Practice 9109-096-180-NA, Engineering Information. Since these are available from a number of suppliers, no troubleshooting procedures for the UPS are provided in this document. Reference should be made to the appropriate manual provided by the manufacturer of the UPS for any self-diagnostic capabilities.

## Troubleshooting

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## 5.

## MISCELLANEOUS TROUBLESHOOTING PROCEDURES

### Maintenance Terminal

5.1 The device used as a Maintenance Terminal must satisfy the following:

- compatibility with RS-232C type interface protocol
- 80 columns
- compatibility with ANSI X3.64-1977 special character set for special graphics.

These procedures deal with the interface only. Reference should be made to the appropriate manual provided by the manufacturer of the terminal for any problems with the terminal itself. The following table outlines the most likely items to cause malfunction.

<b>Table 5-1 Maintenance Terminal Procedures</b>	
<b>Step</b>	<b>Possible Malfunction Source</b>
1.	Keyboard locked – reset terminal.
2.	Blown terminal fuse (if applicable).
3.	Inconsistent communication parameters between terminal and port; default values are: <ul style="list-style-type: none"> <li>• 8 data bits</li> <li>• 1 stop bit</li> <li>• no parity</li> <li>• ASCII character set</li> <li>• Xon/Xoff flow control</li> </ul>
4.	Terminal in LOCAL mode – put into ON LINE mode – see manufacturer's instructions.
5.	Terminal requires reset (or X-ON, or CONTROL-Q if applicable – see manufacturer's instructions).
6.	Faulty connection between the terminal and its power source.
7.	Faulty connection between the terminal's communication port and the SX-200 DIGITAL maintenance panel <i>TERMINAL</i> or <i>LOCAL MAINTENANCE PORT</i> port (see Figure 5-1).
8.	Faulty terminal.
9.	Main Control requires reload – press <i>SYSTEM RESET</i> on the Main Control card front panel.
10.	Faulty Main Control card.
11.	Faulty Maintenance Panel. (see Note 3.)
12.	Faulty Backplane.

**Table 5-1 Maintenance Terminal Procedures  
(continued)**

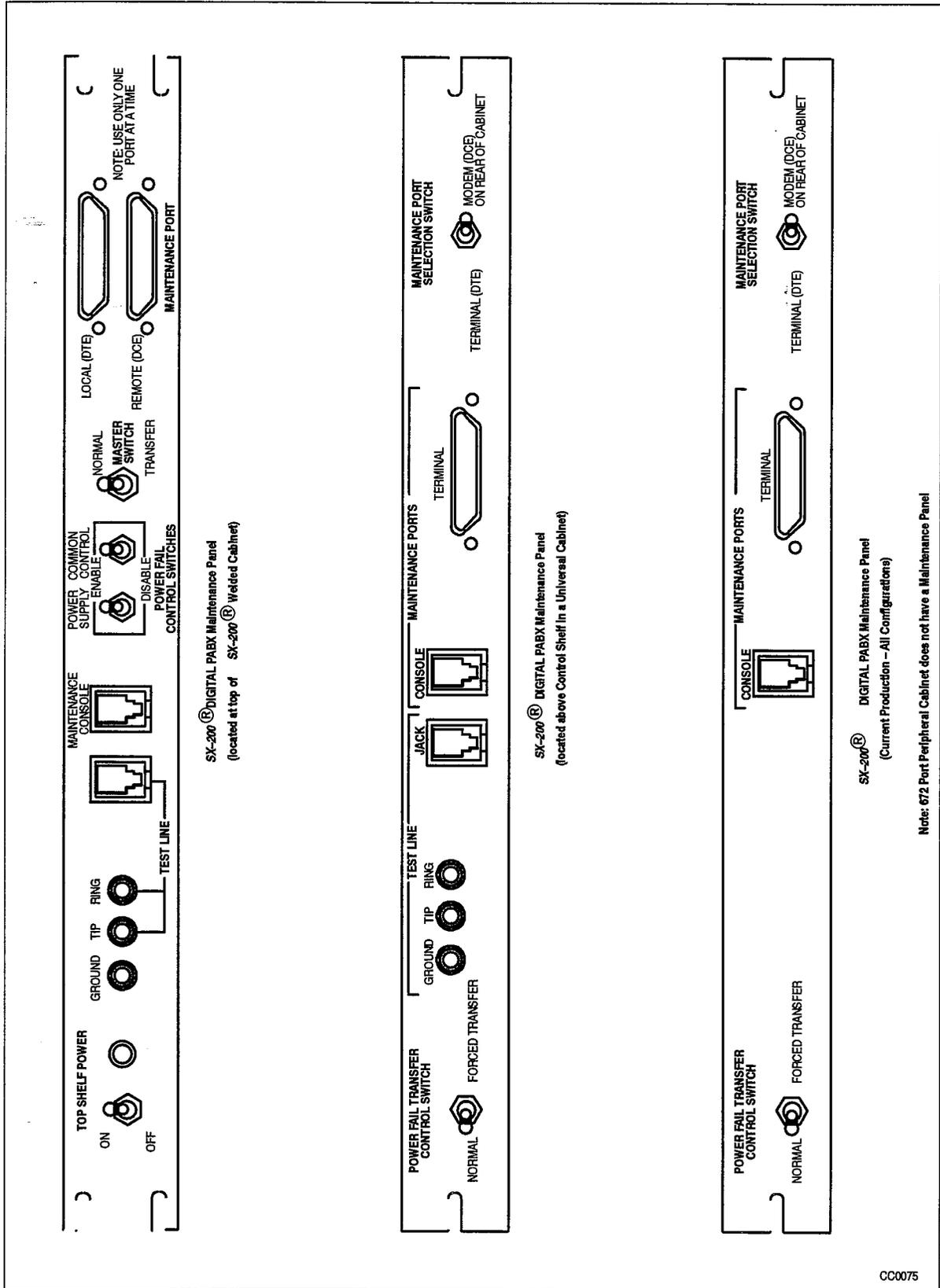
Step	Possible Malfunction Source – SX-200 FD Systems
13.	A terminal is already logged into the CDE or Maintenance application at another location
14.	Control Resource Card switches set incorrectly. see Table 5-2.
15.	Faulty Control Resource Card.
16.	Faulty Control Interconnect Card.

- Notes:**
1. Refer to Practice 9109-096-351-NA, RS-232 Maintenance Terminal, for details on setting communication parameters.
  2. The SX-200 DIGITAL PABX backplane communications port uses RS-232 pins 2, 3, 4, 5 and 7.
  3. The SX-200 FD system does not have a maintenance panel. The maintenance port is accessed at the rear of the Control cabinet (J12) (see Figure 4-2) or can connect to the 9 pin "D" connector on the FIM Carrier module of the Peripheral cabinets (see Figure 5-2).
  4. To connect the terminal's 25 pin RS232 connector to the system's 9 pin mini D connector requires the use of a 9 pin to 25 pin RS232 adapter. This is a standard off-the-shelf part found in most computer supply stores.

**Table 5-2 Control Resource Card Switch Settings**

Switch	Setting	Function
S1	CLOSED	Normal operation; Maintenance port available at Control or Peripheral cabinets
S2	CLOSED	
S1	OPEN	Forced maintenance to Control cabinet; terminal access only at Control cabinet
S2	OPEN	
S1	OPEN	Forced maintenance to Peripheral cabinet; terminal access only at Peripheral cabinets
S2	CLOSED	
S3	-	Switch not used; set to CLOSED
S4	-	Switch not used; set to CLOSED

**Note:** Ensure all the Control Resource Card switches are set to CLOSED for normal operation and access to the maintenance ports.



CC0075

Figure 5-1 SX-200 DIGITAL Maintenance Panel

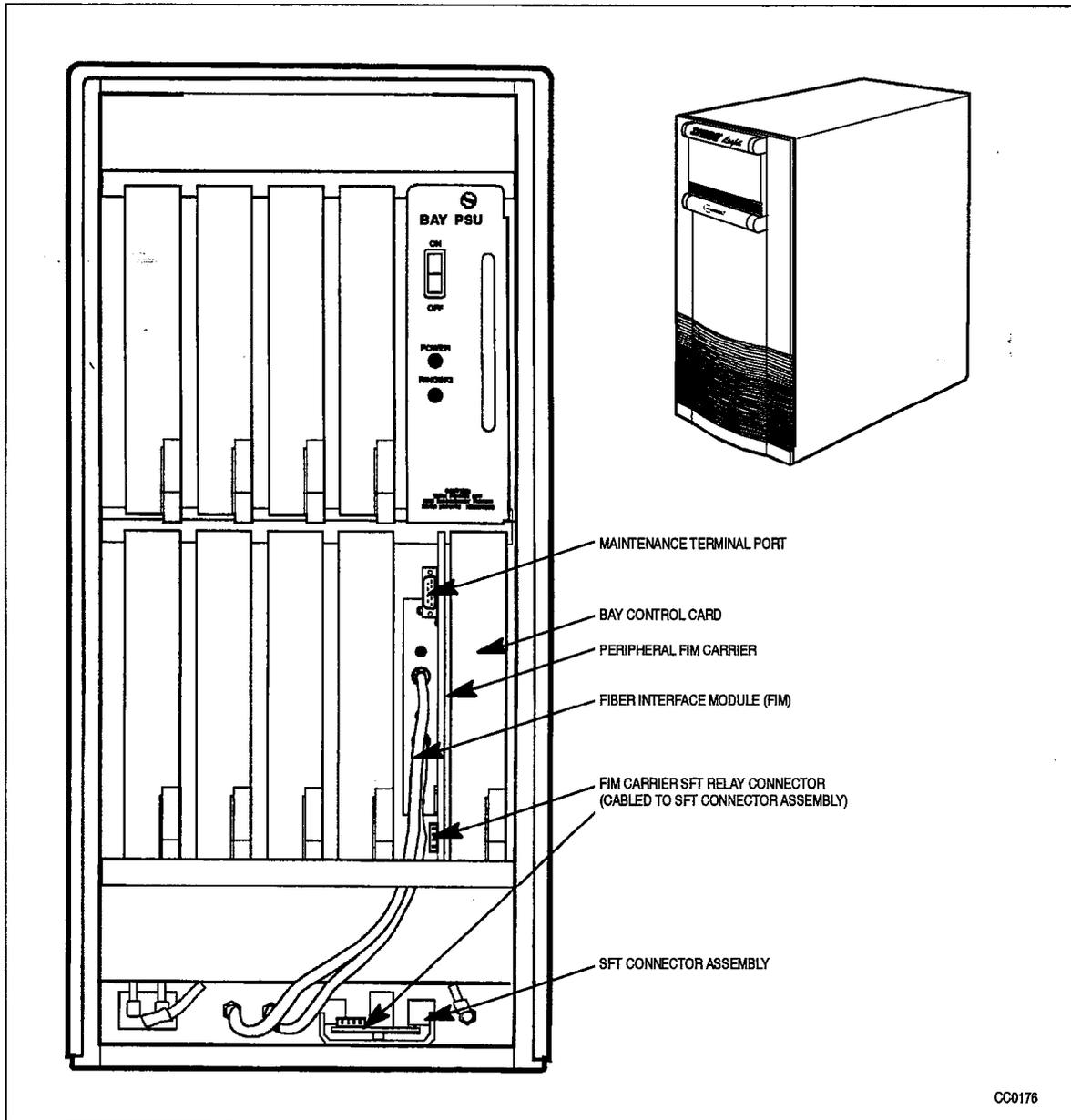


Figure 5-2 SX-200 FD Peripheral Node Front View (front cover removed)

## System Printers

5.2 System printers must satisfy the following:

1. compatibility with RS-232C type interface protocol (and support pins 2, 3, 4, 5, and 7)
2. 80 columns

Printers can be installed with the *SX-200* DIGITAL PABX in 3 different configurations:

1. Connected to backplane *RS-232 PRINTER* port
2. Connected to the *SUPERCONSOLE 1000* console port
3. Connected to a Dataset port.

Printers can be installed with the *SX-200* FD PABX in 3 different configurations:

1. Connected to the Control Cabinet's 9 pin *PRINTER* port (J11)
2. Connected to the *SUPERCONSOLE 1000* console port
3. Connected to a Dataset port.

### Backplane Printer Port

These procedures deal with the interface only. Reference should be made to the appropriate manual provided by the manufacturer of the printer for any problems with the printer itself. The following table outlines the most likely items to cause malfunction.

<b>Table 5-3 Backplane Printer Port Procedures</b>	
<b>Step</b>	<b>Possible Malfunction Source</b>
1.	Blown printer fuse (if applicable).
2.	Inconsistent communication parameters between printer and port; PABX default values are: <ul style="list-style-type: none"> <li>• 8 data bits</li> <li>• 1 stop bit</li> <li>• no parity</li> <li>• ASCII character set</li> <li>• Xon/Xoff flow control</li> <li>• 1200 baud (baud setting may be adjusted in Maintenance from 300 to 9600 baud)</li> </ul>
3.	Faulty connection between the printer and its power source.
4.	Faulty CDE programming: likely form: Directed I/O.
5.	Faulty connection between the printer's communication port and the <i>SX-200</i> DIGITAL backplane <i>RS-232 PRINTER</i> port (see Figure 2-4).
6.	Printer in LOCAL mode – put into ON LINE mode – see manufacturer's instructions.
7.	Printer requires reset (or X-ON, or CONTROL-Q).
8.	Faulty printer.

**Table 5-3 Backplane Printer Port Procedures  
(continued)**

Step	Possible Malfunction Source
9.	Main Control requires reload – press <i>SYSTEM RESET</i> on the Main Control card front panel.
10.	Faulty Main Control card.
11.	Faulty backplane cable connections.

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**Note: Useful maintenance commands:** LOGS PRINT, SUSPEND\_PRTR, RESUME PRTR, SHOW DEVICE, SET SPEED, TEST DEVICE\_TYPE MORE\_KEYS PRINTER\_PLID / PORT – see Practice 9109-096-351-NA, RS-232 Maintenance Terminal.

**SX-200 FD Control Cabinet Printer Port**

These procedures deal with the interface only. Reference should be made to the appropriate manual provided by the manufacturer of the printer for any problems with the printer itself. The following table outlines the most likely items to cause malfunction.

**Table 5-4 SX-200 FD Control Cabinet Printer Port Procedures**

Step	Possible Malfunction Source
1.	Blown printer fuse (if applicable).
2.	Inconsistent communication parameters between printer and port; PABX default values are: <ul style="list-style-type: none"> <li>• 8 data bits</li> <li>• 1 stop bit</li> <li>• no parity</li> <li>• ASCII character set</li> <li>• Xon/Xoff flow control</li> <li>• 1200 baud (baud setting may be adjusted in Maintenance from 300 to 9600 baud)</li> </ul>
3.	Faulty connection between the printer and its power source.
4.	Faulty CDE programming: likely form: Directed I/O.
5.	Faulty connection between the printer's communication port and the SX-200 FD Control Cabinet <i>PRINTER</i> port (J11). (see note 2.)
6.	Printer in LOCAL mode – put into ON LINE mode – see manufacturer's instructions.
7.	Printer requires reset (or X-ON, or CONTROL-Q).
8.	Faulty printer.
9.	Main Control requires reload – press <i>SYSTEM RESET</i> on the Main Control card front panel.
10.	Faulty Main Control card.
11.	Faulty backplane cable connections.

**Notes:** 1. **Useful maintenance commands:** LOGS PRINT, SUSPEND\_PRTR, RESUME PRTR, SHOW DEVICE, SET SPEED, TEST DEVICE\_TYPE MORE\_KEYS PRINTER\_PLID / PORT – see Practice 9109-096-351-NA, RS-232 Maintenance Terminal.

2. To connect the printer's 25 pin RS232 connector to the system's 9 pin mini D connector (see Figure 4-2) requires the use of a 9 pin to 25 pin RS232 adapter. This is a standard off-the-shelf part found in most computer supply stores.

**SUPERCONSOLE 1000 Printer Port**

These procedures deal with the interface only. Reference should be made to the appropriate manual provided by the manufacturer of the printer for any problems with the printer itself. The following table outlines the most likely items to cause malfunction.

**Table 5-5 SUPERCONSOLE 1000 Printer Port Procedures**

Step	Possible Malfunction Source
1.	Blown printer fuse (if applicable).
2.	Inconsistent communication parameters (both the <i>SUPERCONSOLE1000</i> printer port and the printer should have exactly the same parameters – <b>NOTE:</b> 2400 is the maximum baud rate for this port).
3.	Faulty connection between the printer and its power source.
4.	Faulty connection between the printer's communication port and the <i>SUPERCONSOLE 1000</i> port.
5.	Faulty CDE programming: likely forms: <ul style="list-style-type: none"> <li>• Directed IO</li> <li>• Console Assignment</li> <li>• Data Circuit Descriptor</li> <li>• Data Assignment</li> <li>• COS Define</li> <li>• System Configuration</li> </ul>
6.	Printer in LOCAL mode – put into ON LINE mode – see manufacturer's instructions.
7.	Printer requires reset (or X-ON, or CONTROL-Q if applicable – see manufacturer's instructions).
8.	Faulty printer.
9.	Suspect <i>SUPERCONSOLE 1000</i> unit – refer to that procedure.

**Note: Useful maintenance commands:** LOGS PRINT, SUSPEND\_PRTR, RESUME PRTR, SHOW DEVICE, SET SPEED, TEST DEVICE\_TYPE MORE\_KEYS PRINTER\_PLID / PORT – see Practice 9109-096-351-NA, RS-232 Maintenance Terminal.

### Dataset Printer Port

These procedures deal with the interface only. Reference should be made to the appropriate manual provided by the manufacturer of the printer for any problems with the printer itself. The following table outlines the most likely items to cause malfunction.

<b>Table 5-6 Dataset Printer Port Procedures</b>	
<b>Step</b>	<b>Possible Malfunction Source</b>
1.	Blown printer fuse (if applicable).
2.	Inconsistent communication parameters (both the Dataset port and the printer should have exactly the same parameters).
3.	Faulty connection between the printer and its power source.
4.	Faulty connection between the printer's communication port and the Dataset port.
5.	Faulty CDE programming: likely forms: <ul style="list-style-type: none"> <li>• Directed IO</li> <li>• Data Circuit Descriptor (see Note 2.)</li> <li>• Data Assignment</li> <li>• COS Define</li> <li>• System Configuration</li> </ul>
6.	Printer in LOCAL mode – put into ON LINE mode – see manufacturer's instructions.
7.	Printer requires reset (or X-ON, or CONTROL-Q if applicable – see manufacturer's instructions).
8.	Faulty printer.
9.	Faulty Dataset – refer to the applicable procedure.

**Notes:** 1. **Useful maintenance commands:** LOGS PRINT, SUSPEND\_PRTR, RESUME PRTR, SHOW DEVICE, SET SPEED, TEST DEVICE\_TYPE MORE\_KEYS PRINTER\_PLID / PORT, SHOW ERRORS DEVICE\_TYPE DATASETS / CONSOLE – see Practice 9109-096-351-NA, RS-232 Maintenance Terminal.

2. Ensure that the Session Inactivity Timer is set to 0.

## Cabinet Cooling System

5.3 The following table outlines the most likely items to cause fan malfunction.

**Table 5-7 Cabinet Cooling System Troubleshooting Summary**

Step	Possible Malfunction Source
1.	Ambient temperature too high – room temperature must be less than 40° C.
2.	Air inlet vents obstructed – remove obstruction, or move system.
3.	Air filter requires cleaning, or replacement.
4.	Faulty power connection between the AC Distribution panel and the fans.
5.	Problem with power system – refer to that procedure.
6.	Faulty fan(s).

## Power Fail Transfer

5.4 Note that these procedures are intended to deal with failure of the PFT system; not the activation of it. The following tables outlines the most likely items to cause PFT malfunction. Note that on the SX-200 FD system, only a System Fail Transfer (SFT) connector is provided (marked RJ11 connector on peripheral cabinets).

### 6-Circuit PFT Card

The 6-Circuit PFT Card is found in the control cabinet of the 336-port and 672-port systems, as well as in the peripheral cabinet of the 672-port system. Each cabinet supports up to three cards.

**Table 5-8 6-Circuit PFT Card Troubleshooting Summary**

Step	Possible Malfunction Source
1.	Maintenance panel switch set to <i>POWER FAIL TRANSFER</i> – set to <i>NORMAL</i> .
2.	Faulty PFT connections – see Figure 5-5 / Figure 5-6.
3.	Faulty connections at the cross-connect field – see Figure 5-7.
4.	Faulty PFT Card # 6 (if applicable).
5.	Faulty PFT Card # 5 (if applicable).
6.	Faulty PFT Card # 4 (if applicable).
7.	Faulty PFT Card # 3 (if applicable).
8.	Faulty PFT Card # 2 (if applicable).
9.	Faulty PFT Card #1 (top PFT card).
10.	Faulty loop start to ground start conversion module (if installed) – see Figure 5-4.
11.	Faulty power system – refer to that procedure.

**Note:** Items 4 through 6 apply only to 672-port systems.

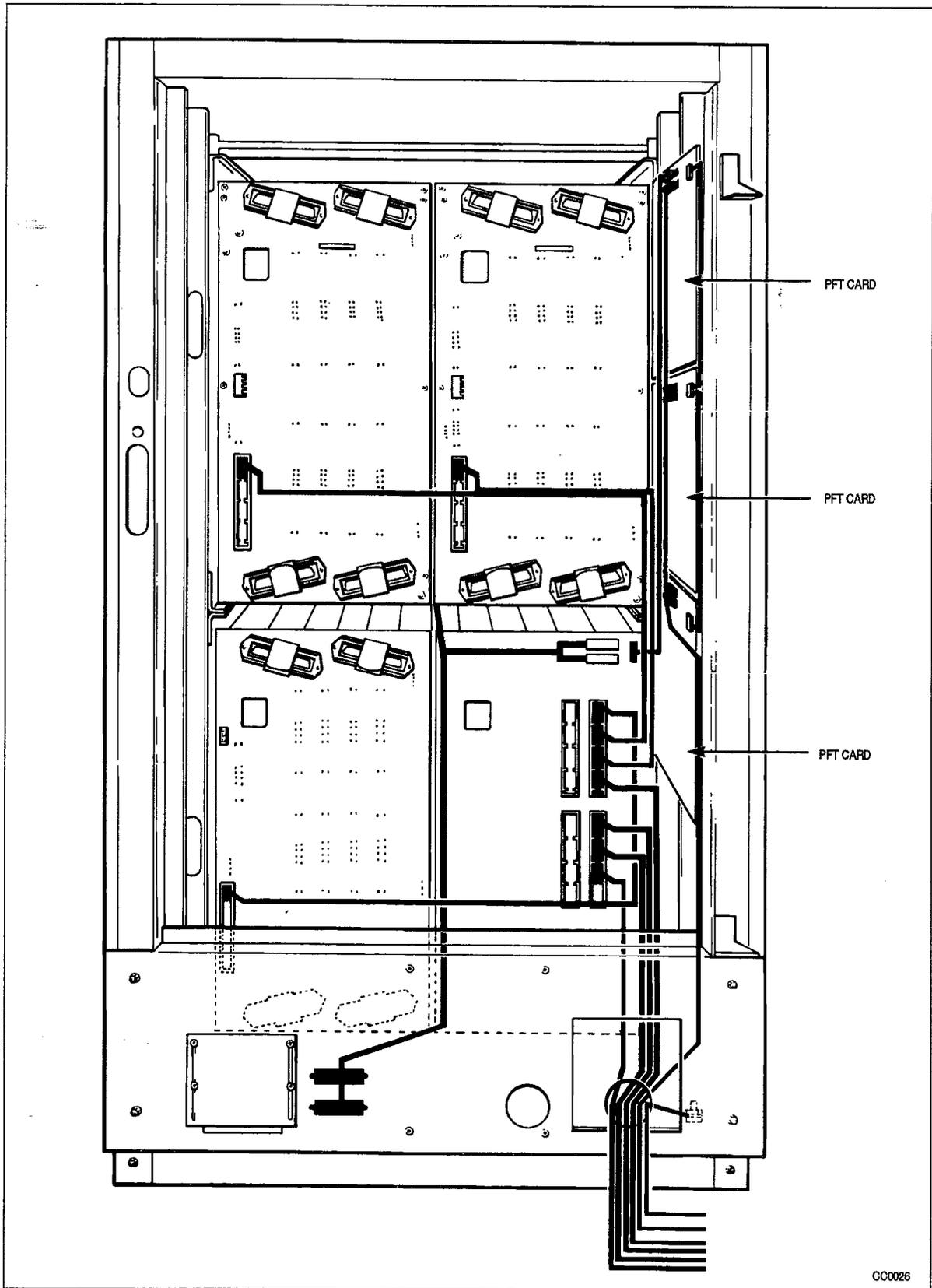


Figure 5-3 PFT Card Locations

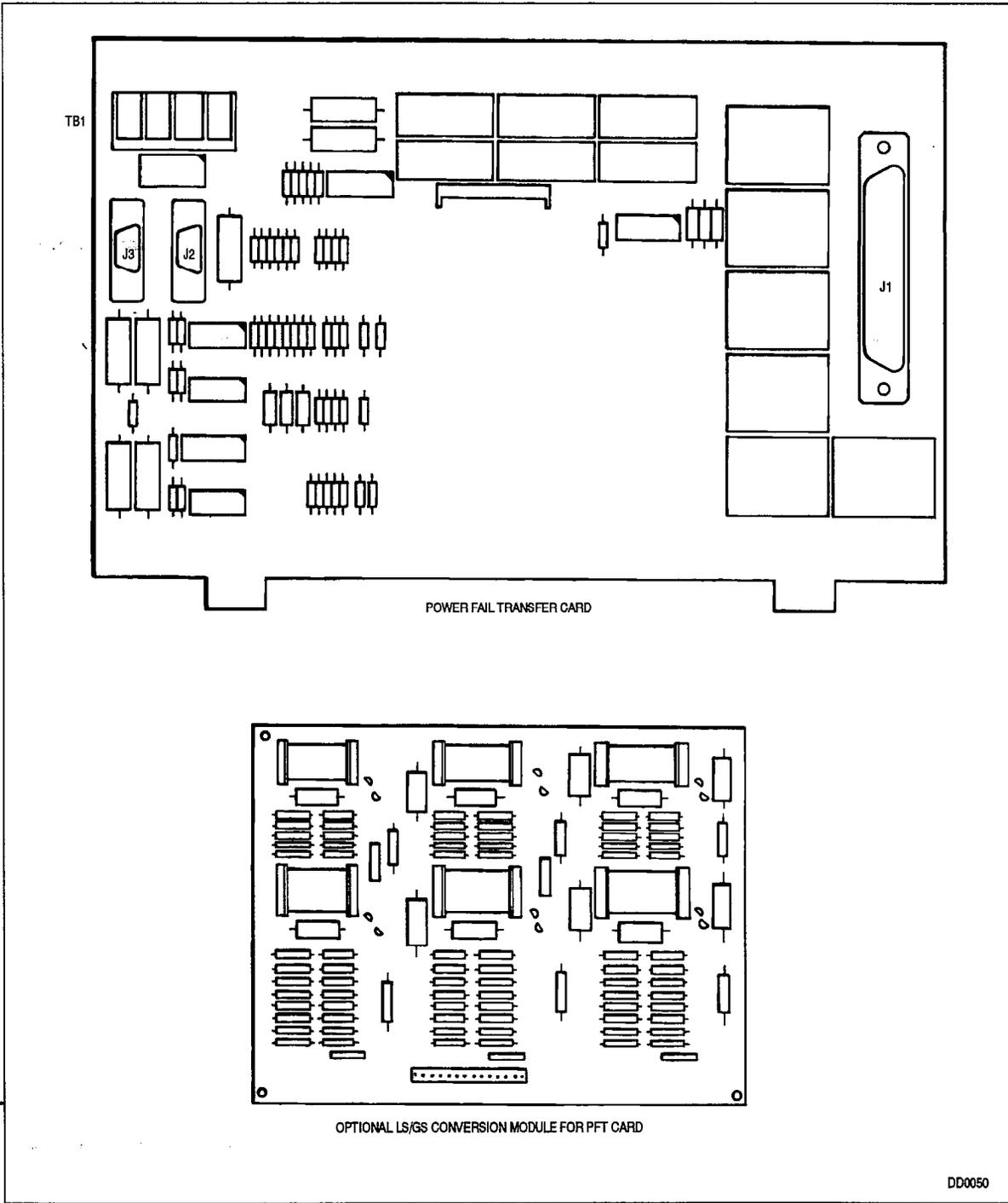


Figure 5-4 6-Circuit Power Fail Transfer Card

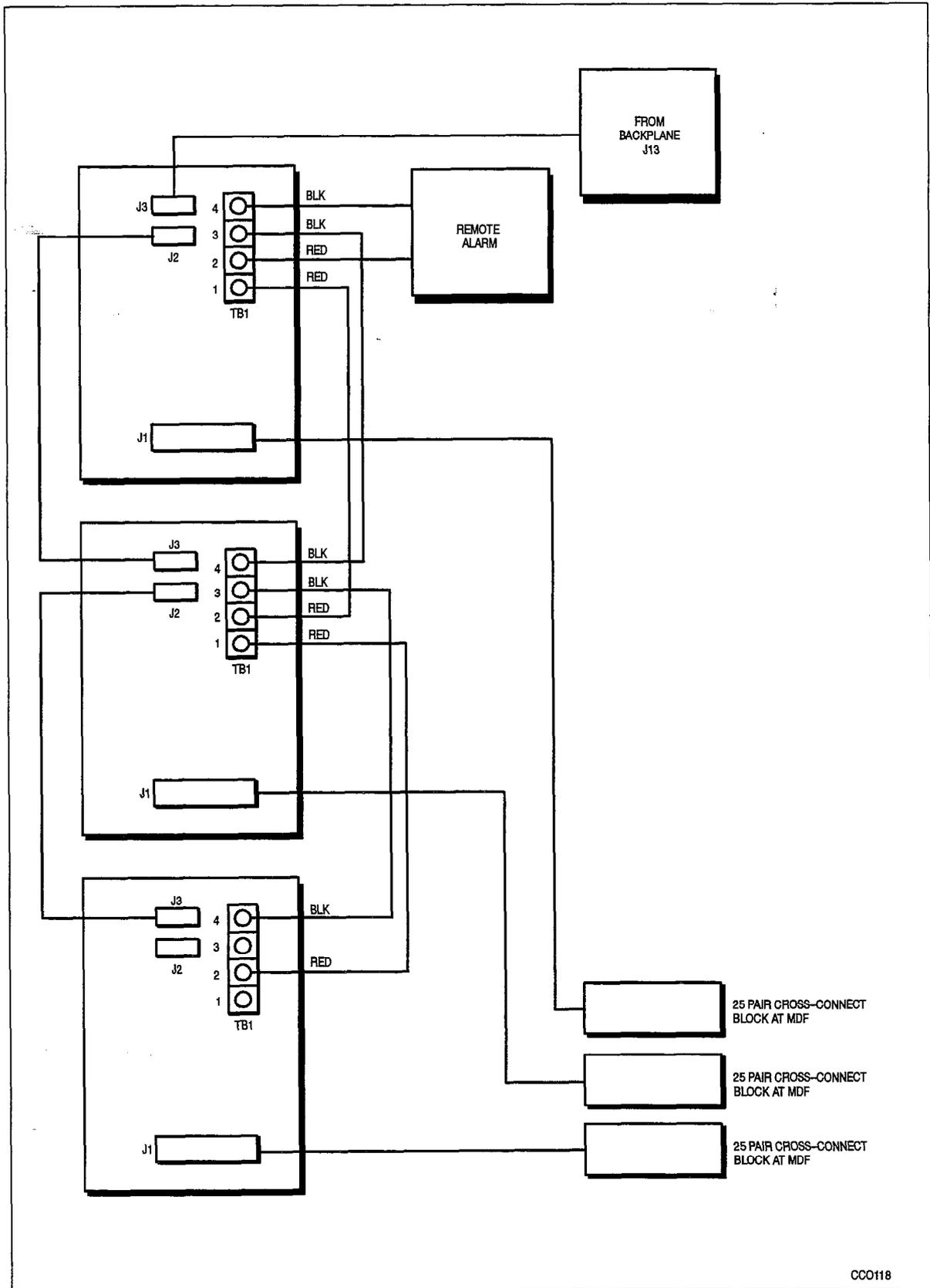


Figure 5-5 PFT Connections (Control Cabinet – Most Variants)

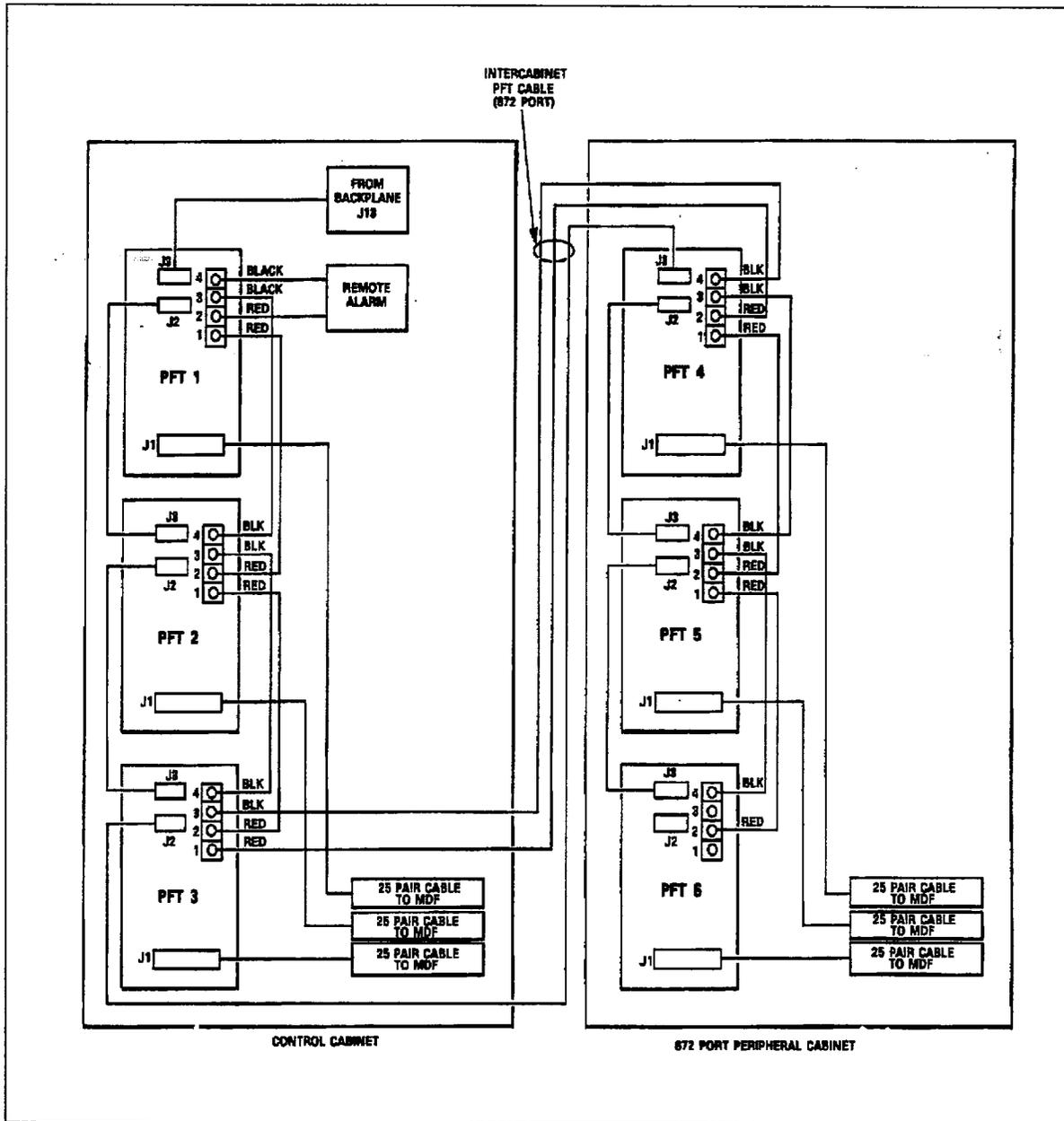


Figure 5-6 PFT Connections (672-Port Variant)

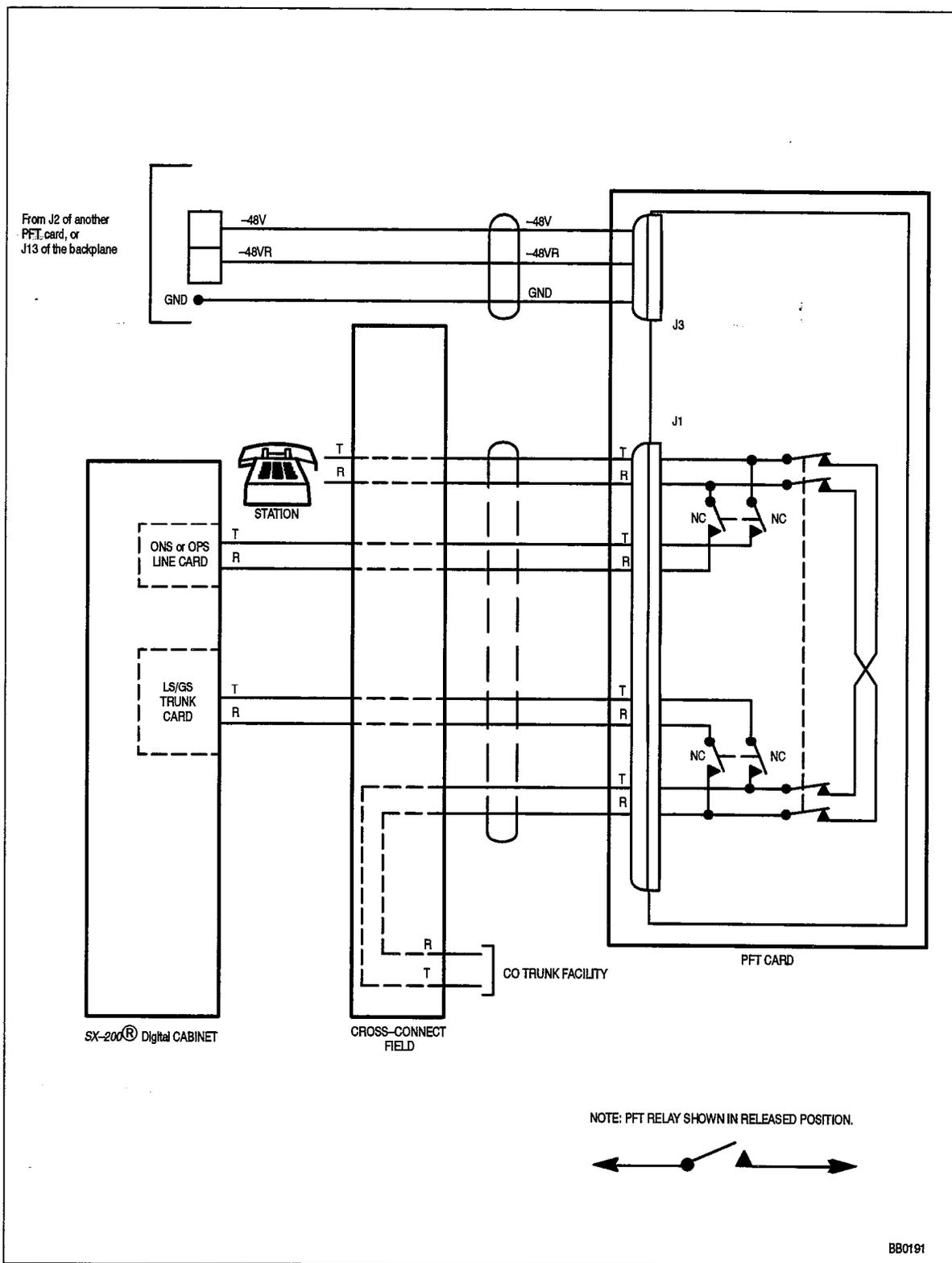


Figure 5-7 PFT Cross-Connect Field Connections

### 12-Circuit PFT Card

The 12-Circuit PFT Card is found in the control cabinet of the 480-ports system, as well as the peripheral cabinet of the 456-port and 480-port systems. Each of these cabinets supports one such card.

**Table 5-9 12-Circuit PFT Card Troubleshooting Summary**

Step	Possible Malfunction Source
1.	Maintenance panel switch set to <i>POWER FAIL TRANSFER</i> – set to <i>NORMAL</i> .
2.	Faulty PFT connections – see Figure 5-8.
3.	Faulty connections between the Interconnect card (TB301) and the PFT card (TB1).
4.	Faulty connections at the cross-connect field – see Figure 5-7.
5.	Faulty PFT Card.
6.	Faulty Interconnect card.
7.	Faulty power system – refer to that procedure.

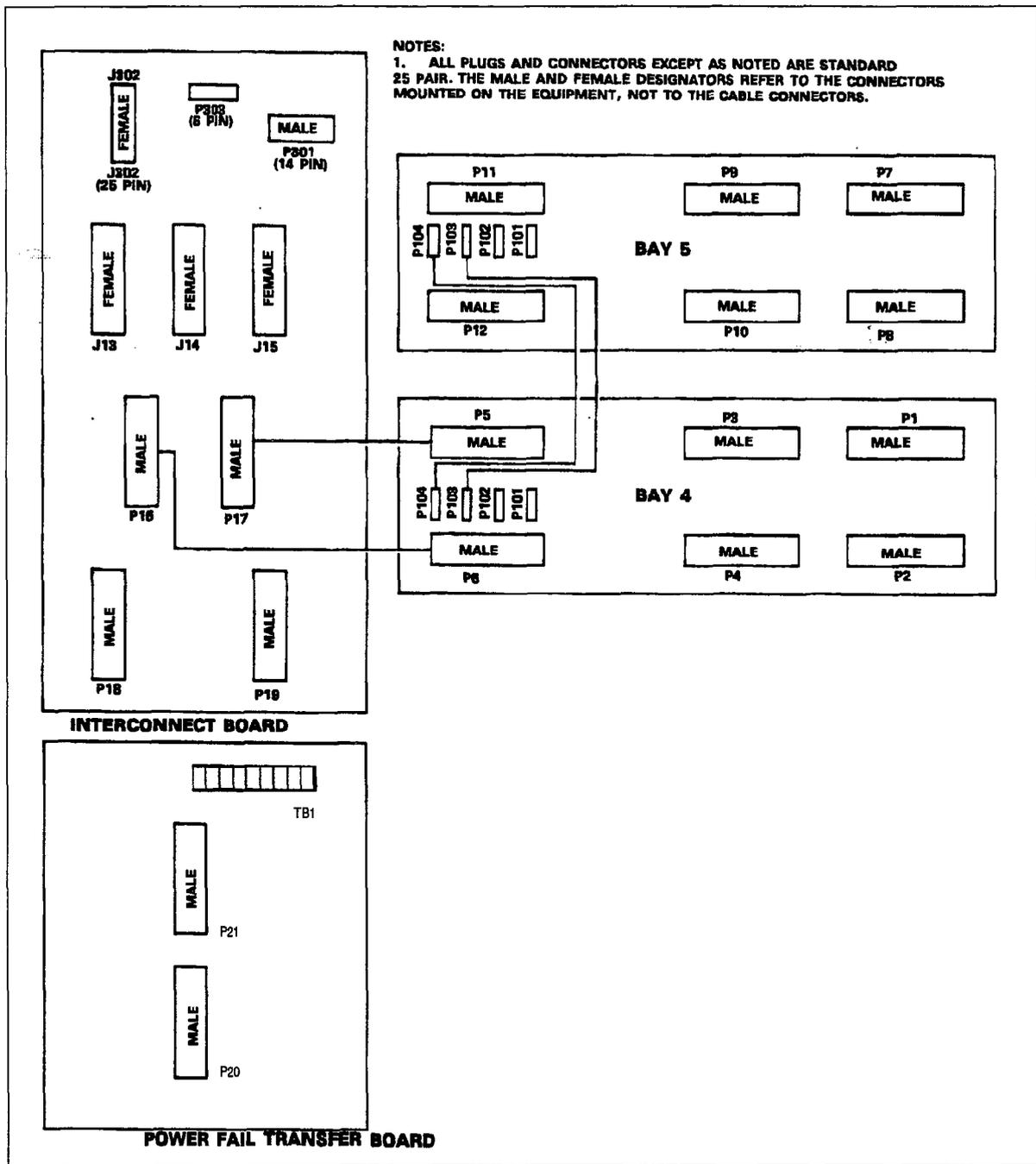


Figure 5-8 12-Circuit PFT Card Connections

**SX-200 FD System Fail Transfer Connector**

The System Fail Transfer Connector is found at each of the Peripheral cabinets of the SX-200 FD systems. Each peripheral cabinet provides one SFT connector. This connector is used to interface and control SFT equipment available from external suppliers.

**Table 5-10 SX-200 FD System Fail Transfer Connector Troubleshooting Summary**

Step	Possible Malfunction Source
1.	External SFT Equipment's override switch set to <i>POWER FAIL TRANSFER</i> – set to <i>NORMAL</i> . (or equivalent, if applicable)
2.	Faulty PFT connections – refer to External SFT Equipment manufacturer's instructions
3.	Faulty connections between the Peripheral FIM Carrier and the system's SFT connector assembly – see Table 7-1, see Figure 5-2.
4.	Faulty connections between the SFT connector and external SFT equipment. see Figure 5-9
5.	Faulty connections at the cross-connect field – refer to External SFT Equipment manufacturer's instructions.
6.	Faulty External SFT Equipment.
7.	Faulty Peripheral FIM Carrier (if the SFT Relay is not working) – see Figure 5-2.
8.	Faulty power system – refer to that procedure (if the -48 volt supply is not working).

**Note:** Relay contact is open during normal system operation. It is closed to indicate SFT.

**Table 5-11 SX-200 FD System Fail Transfer (SFT) Connector**

Pin No.	Wire Color	Signal	Comment
2	Yellow	-48	Voltage source for the external SFT Transfer Equipment. Note, this is limited to 250 mA.
3	Green	-48 return (GND)	Ground reference (return) for the external SFT Transfer Equipment
4	Red	SFT Relay (A)	First side of "normally closed" SFT control relay
5	Black	SFT Relay return (B)	Second side of "normally closed" SFT control relay

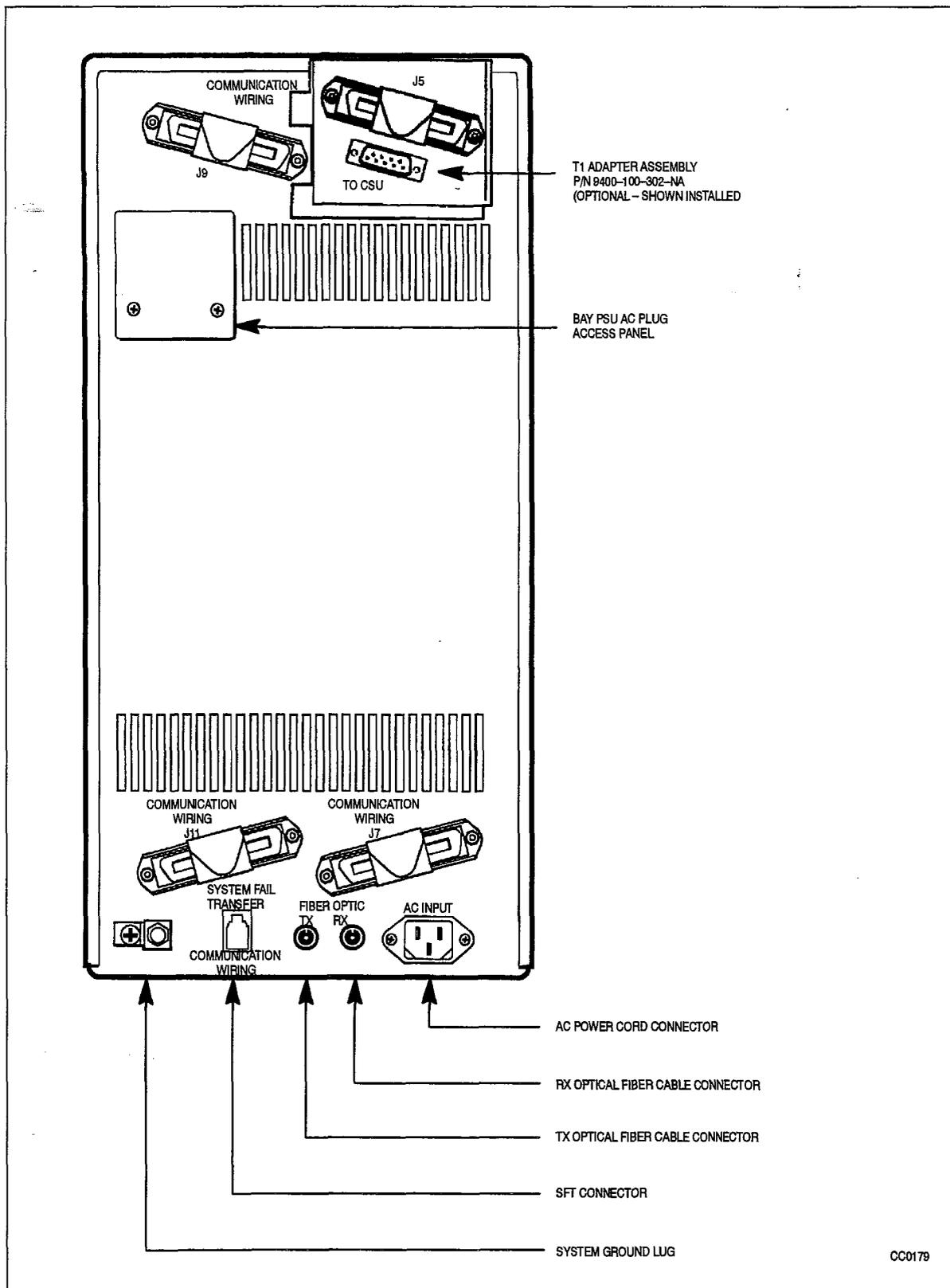


Figure 5-9 SX-200 FD Peripheral Node Rear View (with optional T1 Adapter)

## Modems / Modem Pools

5.5 Figure 5–10 is a block diagram of the modem pool configuration. Reference should be made to the appropriate manual provided by the manufacturer of the modem for any problems with the modem itself. The following table outlines the most likely items to cause modem / modem pool malfunction.

**Table 5–12 Modem / Modem Pool Troubleshooting Summary**

Step	Possible Malfunction Source
1.	Faulty originating station, or destination station (if applicable) – refer to the applicable procedure.
2.	Blown modem fuse (if applicable).
3.	Inconsistent communication parameters (the Dataset port, the modem and the originating station should all have the same parameters).
4.	Faulty connection between the modem and its power source.
5.	Faulty connection between the modem’s communication port and the modem adapter unit. See Figure 5–10.
6.	Faulty connection between the Dataset communication port and the modem adapter unit.
7.	Faulty connection between the Dataset and the system – refer to the applicable Dataset procedure if necessary.
8.	Faulty connections between the modem, the cross-connect field, and the system.
9.	Faulty CDE programming: likely forms: <ul style="list-style-type: none"> <li>• Modem Assignment</li> <li>• Data Circuit Descriptor</li> <li>• Data Assignment</li> <li>• COS Define</li> <li>• Device Interconnection</li> <li>• System Configuration</li> </ul>
10.	Incorrect modem switch settings or modem software set-up characteristics – see manufacturer’s instructions.
11.	Modem requires reset – refer to manufacturer’s instructions.
12.	Faulty modem.
13.	DATASET requires reset – disconnect, reconnect power cord. See Table 3–33 / Table 3–34.
14.	BCC / MCC requires reset (power down bay or press <i>MASTER RESET</i> on MCC).
15.	Faulty DATASET unit or power cord assembly.
16.	Digital Line card requires reinitialization (reseat card).
17.	Faulty Digital Line card.
18.	Faulty backplane cable connections.
19.	Faulty switching matrices – refer to ‘Supplementary Peripheral Equipment Procedures’.

**Note:** Useful maintenance commands: SHOW DEVICE, TEST DEVICE\_TYPE ONS / DNIC, SHOW ERRORS DEVICE\_TYPE DATASETS – see Practice 9109–096–351–NA, RS–232 Maintenance Terminal.

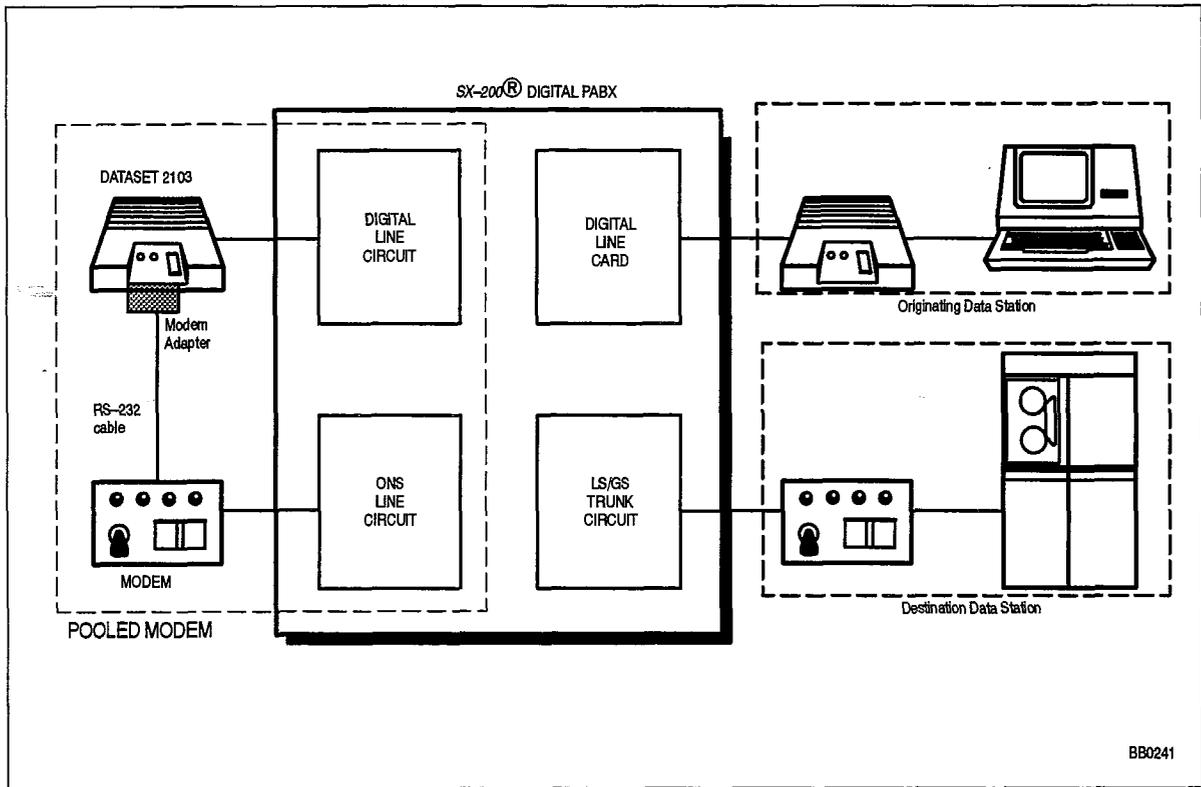


Figure 5-10 Typical Pooled Modem Configuration

## Recorded Announcement Devices (RADs)

5.6 Reference should be made to the appropriate manual provided by the manufacturer of the RAD unit for any problems with the RAD unit itself. The following table outlines the most likely items to cause RAD malfunction.

**Table 5-13 RAD Troubleshooting Summary**

Step	Possible Malfunction Source
1.	Faulty RAD device. (See Note 2.)
2.	Faulty connection between the RAD device and the cross-connect field.
3.	Faulty connection between the cross-connect field and the system.
4.	Faulty CDE programming: likely forms: (See Note 3.) <ul style="list-style-type: none"> <li>• COS Define</li> <li>• Hunt Groups</li> <li>• Station/<i>SUPERSET</i> Telephones</li> <li>• System Configuration</li> </ul>
5.	Faulty ONS port.
6.	Check items listed in Table 5-14.
7.	Faulty peripheral switch or circuit switch – refer to 'Supplementary Peripheral Equipment Procedures'.

**Notes:** 1. **Useful maintenance commands:** SHOW STATUS, SHOW DEVICE, TEST DEVICE\_TYPE ONS, SHOW STATUS SWID SW\_HUNT\_GRP <swid> CP\_DWA (check stagger and o\_msglen), TRAFFIC\_MEAS READ (check hunt group busy peg) – see Practice 9109-096-351-NA, RS-232 Maintenance Terminal.

2. Refer to the manufacturer's instructions for information on the repair and troubleshooting of the RAD unit. For cassette type units, tape wearout or dirty heads / dirty tape / dirty capstan are the most common failures.

3. Avoid using discriminating ringing in the RAD COS. Some RADs will operate only with standard ringing.

**Table 5-14 Supplementary RAD Troubleshooting Procedures**

Problem	Possible Cause(s)
No recordings at all.	RADs are in busy-out or DND status – use SHOW STATUS command on the corresponding ONS circuit.
RAD message is cut off.	Check that the Message Length Timer in the Hunt Groups CDE form is long enough.
RADs go into DND state.	Check if Failure To Hang Up Timer (COS 404) is long enough for proper RAD clear down.
No message heard, but RAD rings and answers.	Check that the Message Length Timer in the Hunt Groups CDE form is long enough.

<b>Table 5-14 Supplementary RAD Troubleshooting Procedures (continued)</b>	
<b>Problem</b>	<b>Possible Cause(s)</b>
RAD Staggering is selected, but RADs don't operate in staggering fashion.	<ul style="list-style-type: none"> <li>• Ensure RAD Staggering For Listen Only Conferences is enabled in the Hunt Groups CDE form.</li> <li>• Allow one RAD in the group to run to the end of its message – this allows the system to measure the group's message length. <b>NOTE:</b> staggering is not possible until this preliminary step is done.</li> </ul>
Staggered RADs not starting at evenly distributed times.	<ul style="list-style-type: none"> <li>• Ensure there are no 2-party call users of this RAD group.</li> <li>• Verify all RADs in the group have the same length of message – they must.</li> <li>• Check if RADs are available after message length – some RADs (tape) also require time to rewind, or play to the end of the tape, long after the system has hung up. May be necessary to add more RADs to the group.</li> </ul>
Staggered RAD stagger times longer than they should be.	Check that none of the RADs are in busy-out or DND status – use SHOW STATUS command on the corresponding ONS circuit.
Staggered RAD group busy peg increases.	RADs aren't available when they should be – check if turn-around time is too long.
Page 2 of 2	

**Note:** For further information on RADs, refer to practice 9109-096-105-NA, Features Description, under "RAD Support".

## Night Bell Equipment

5.7 Night Bells are connected in 2 basic configurations:

**1) Direct Connect Method:** Night bells can be connected directly if the total current requirement does not exceed the relay contact ratings (see Figure 5-11);

**2) Auxiliary Relay method:** Night bells must be connected through an auxiliary relay if the total current requirement exceeds the relay contact ratings (see Figure 5-12).

The DTMF Receiver / Relay module is installed on the Universal card; it can be used as night bell relay (2 circuits) – see practice 9109-096-125-NA, Circuit Card Descriptions; for further information. The following tables outline the most likely causes of night bell failure.

**Table 5-15 Night Bell Troubleshooting Summary**

Step	Possible Malfunction Source
1.	Faulty night bell device.
2.	Faulty external relay (auxiliary relay configuration only).
3.	Faulty external relay connections (see Note 2.).
4.	Faulty connection between the night bell device and the cross-connect field.
5.	Faulty connection between the cross-connect field and the system.
6.	Faulty CDE programming: likely forms: <ul style="list-style-type: none"> <li>• System Configuration</li> <li>• Miscellaneous System Ports</li> <li>• Call Rerouting Table</li> </ul>
7.	Faulty or improperly installed DTMF Receiver module on Universal card.
8.	Faulty Universal card.
9.	Faulty Universal card modules (see Note 3.).
10.	Faulty backplane cable connections between Bay Controller and Main Controller (672 port systems only).
11.	Faulty peripheral switch or circuit switch – refer to 'Supplementary Peripheral Equipment Procedures'.

**Notes:** 1. Useful maintenance commands: SHOW STATUS, TEST, SHOW ALARMS, SHOW ERRORS – see Practice 9109-096-351-NA, RS-232 Maintenance Commands.

2. Refer to Practice 9109-096-200-NA, Installation Information, for details on the installation of night bells using an auxiliary relay.

3. Receiver / relay module malfunction could be caused by the failure of other module(s) on the Universal card.

4. A simple test for a relay circuit is: (a) disconnect the relay from external equipment at the MDF; (b) connect ohmmeter across relay leads – an open circuit should be read. If not, there is a problem with the module.

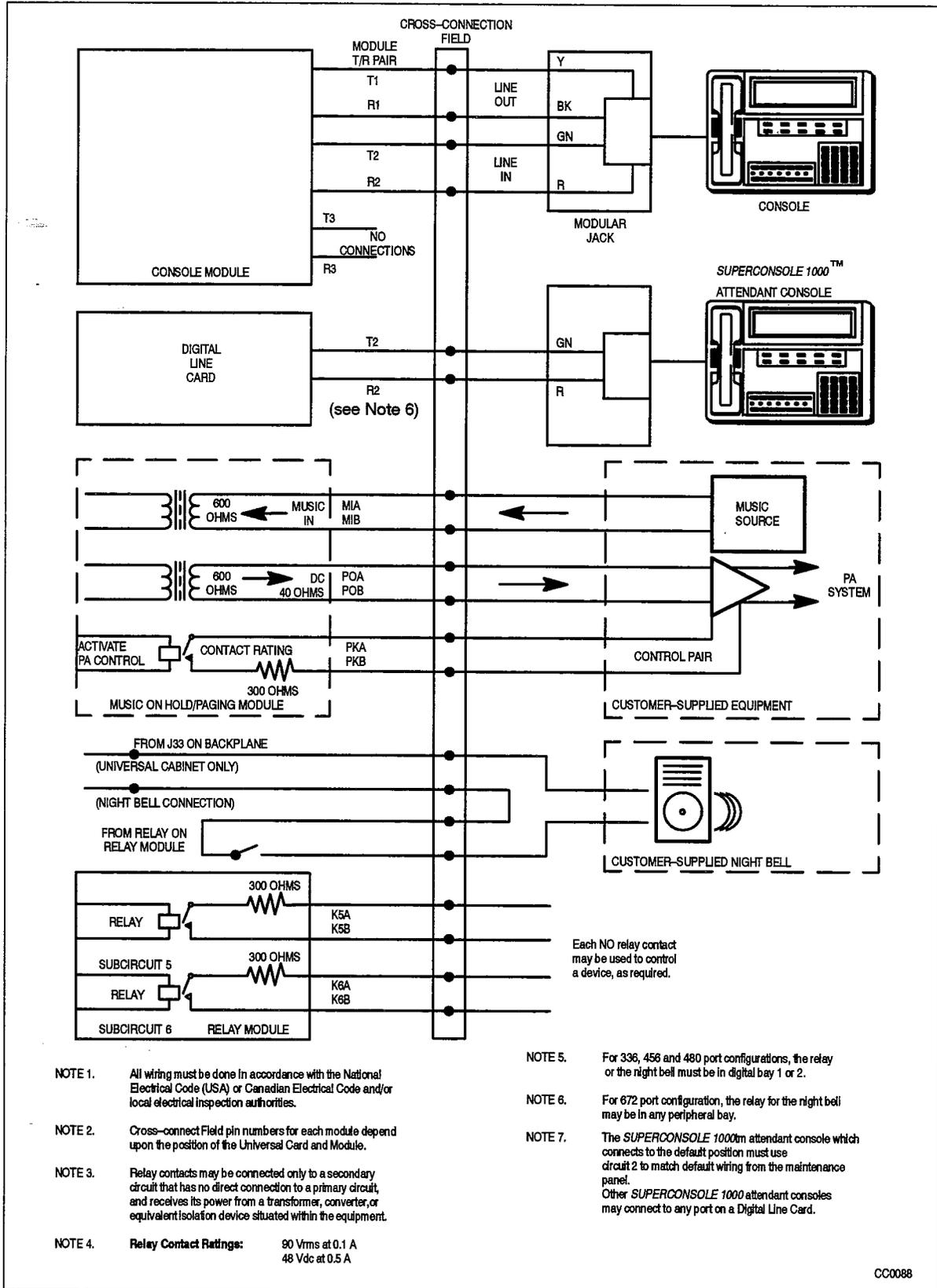
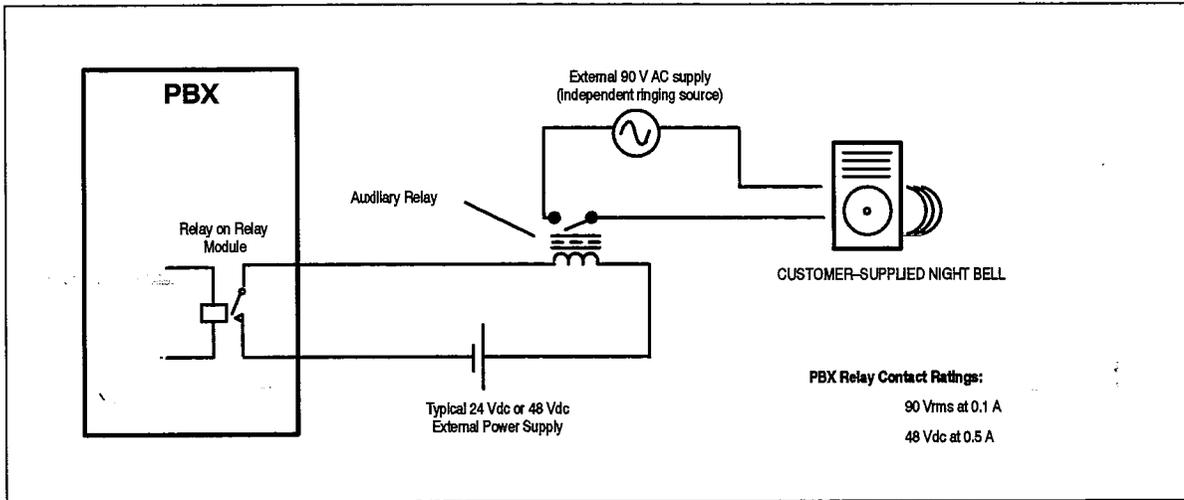


Figure 5-11 Music, Paging, Relay and Console Connections



**Figure 5-12 Night Bell Auxiliary Relay Configuration**

## Hotel / Motel

- 5.8 The *SX-200* DIGITAL Hotel / Motel features can be accessed by 2 major interfaces – the attendant console, or the front desk interface. Some features can be accessed via *SUPERSET* telephones as well. Note that this section covers only the Hotel / Motel feature, and not the PMS Interface feature. See Practice 9109-096-602-NA, Hotel / Motel Feature Package Description, for further information. The following table outlines the most likely causes of Hotel / Motel feature failure.

**Table 5-16 Hotel / Motel Troubleshooting Summary**

Step	Possible Malfunction Source
1.	Faulty front desk terminal device.
2.	Blown terminal fuse (if applicable).
3.	Faulty communication parameters – terminal and Dataset must have the same parameters.
4.	Faulty connection between the terminal and its power source.
5.	Faulty connection between the terminal's communication port and the Dataset port.
6.	Faulty connection between the Dataset and the cross-connect field.
7.	Faulty connection between the cross-connect field and the system.
8.	Faulty CDE programming: likely forms: <ul style="list-style-type: none"> <li>• System Configuration</li> <li>• COS Define</li> <li>• all Dataset and/or console forms – refer to the appropriate procedure.</li> </ul>
9.	Suspect Dataset – refer to DATASET 1103/2103 – DTE MODE.
10.	Suspect Digital Line card – refer to DATASET 1103/2103 – DTE MODE.
11.	Suspect console – refer to the appropriate procedure.
12.	Faulty peripheral switch or circuit switch – refer to 'Supplementary Peripheral Equipment Procedures'.

**Notes:** 1. **Useful maintenance commands:** SHOW STATUS, TEST, SHOW ALARMS, SHOW ERRORS – see Practice 9109-096-351-NA, RS-232 Maintenance Commands.

2. Loop length limit for devices connected to Digital Line card circuits is: 3300 ft with 26 AWG wire (with no bridge taps).

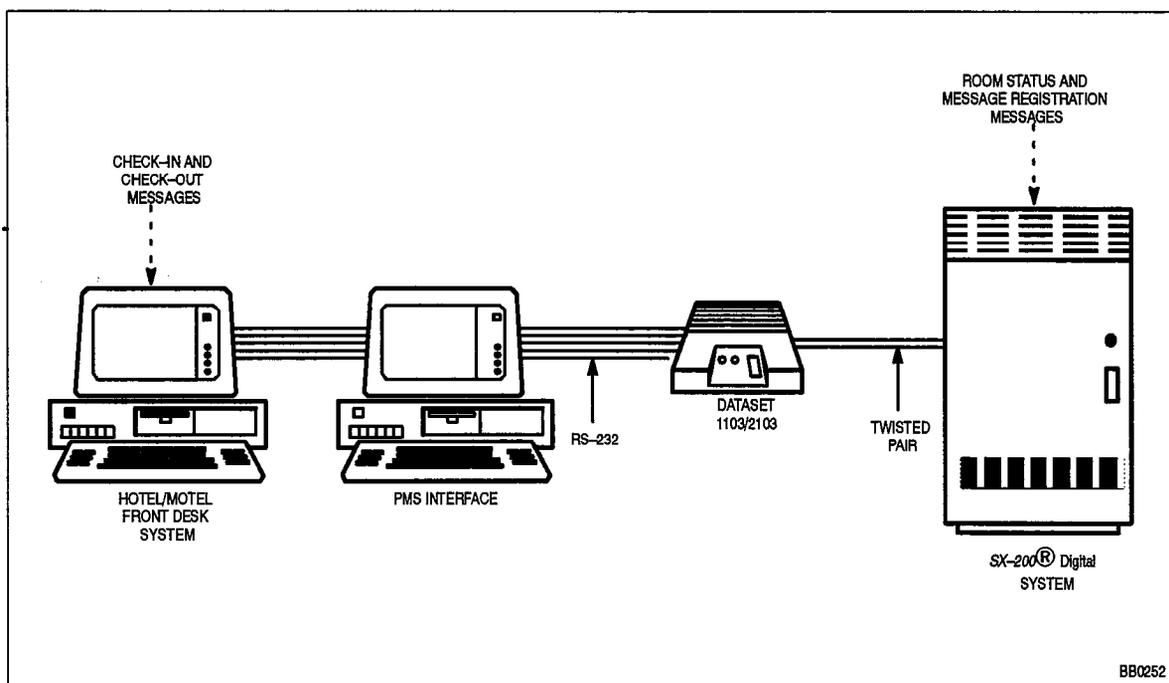
3. Loop length for consoles connected to Universal cards can be no more than 1000 ft with 26 AWG wire (with no bridge taps).

## Property Management System Interface

5.9 The following table outlines the most likely items to cause PMS malfunction.

<b>Table 5-17 PMS Procedures</b>	
<b>Step</b>	<b>Possible Malfunction Source</b>
1.	Faulty external equipment (front desk system, PMS interface system).
2.	Faulty connection between the external equipment devices (if applicable) – see Figure 5-13.
3.	Faulty connection between the PMS Interface system and the Dataset port.
4.	Faulty connection between the Dataset and the cross-connect field.
5.	Faulty connection between the cross-connect field and the system.
6.	Faulty CDE programming; likely forms: <ul style="list-style-type: none"> <li>• Hotel Options Assignment</li> <li>• COS Define</li> <li>• Data Circuit Descriptors</li> <li>• Data Assignment</li> <li>• Console Assignment</li> <li>• System Configuration</li> </ul>
7.	Dataset / Digital Line card requires reset – refer to DATASET 1103/2103 – DTE MODE.
8.	Faulty Dataset / Digital Line card.
9.	Faulty peripheral switch or circuit switch – refer to 'Supplementary Peripheral Equipment Procedures'.

**Note: Useful maintenance commands:** SHOW STATUS, TEST, SHOW ALARMS, SHOW ERRORS DATASETS – see Practice 9109-096-351-NA, RS-232 Maintenance Terminal.



**Figure 5-13 PMS Configuration (Typical)**

## Voice Mail Interface

### COV Port Voice Mail

5.10 The following table outlines the most likely items to cause COV Voice Mail malfunction.

<b>Table 5-18 COV Voice Mail Procedures</b>	
<b>Step</b>	<b>Possible Malfunction Source</b>
1.	Faulty external equipment (Voice-mail system) – see Note 2.
2.	Faulty connection between the Voice-mail device and the cross-connect field.
3.	Faulty connection between the cross-connect field and the system.
4.	Faulty CDE programming; likely forms: <ul style="list-style-type: none"> <li>• COS Define</li> <li>• Stations/<i>SUPERSET</i> Telephones</li> <li>• Hunt Groups</li> <li>• System Configuration</li> </ul>
5.	COV card requires reset (reseat card).
6.	Faulty COV card.
7.	Faulty peripheral switch or circuit switch – refer to 'Supplementary Peripheral Equipment Procedures'.

**Notes:** 1. Useful maintenance commands: SHOW STATUS, TEST, SHOW ALARMS, SHOW ERRORS SS3\_SS4  
– see Practice 9109-096-351-NA, RS-232 Maintenance Terminal.

2. For further information, refer to 9150-953-003-NA, VX Voice Processor Installation and Repair Manual VX-200/VX-400/VX-800 Systems.

3. Loop resistance on the COV circuit should not exceed 200 ohms. Voltage across Tip and Ring should be between 40 and 48 volts DC.

**ONS Port Voice Mail**

The following table outlines the most likely items to cause ONS Voice Mail malfunction.

<b>Table 5-19 ONS Voice Mail Procedures</b>	
<b>Step</b>	<b>Possible Malfunction Source</b>
1.	Faulty external equipment (Voice-mail system) – see manufacturer’s instructions.
2.	Faulty connection between the Voice-mail device and the cross-connect field.
3.	Faulty connection between the cross-connect field and the system.
4.	Faulty CDE programming; likely forms: <ul style="list-style-type: none"> <li>• COS Define</li> <li>• Stations/<i>SUPERSET</i> Telephones</li> <li>• Hunt Groups</li> <li>• System Abbreviated Dial Entry</li> <li>• Feature Access Codes</li> <li>• System Configuration</li> </ul>
5.	Faulty ONS card.
6.	Faulty peripheral switch or circuit switch – refer to ‘Supplementary Peripheral Equipment Procedures’.

**Notes:** 1. **Useful maintenance commands:** SHOW STATUS, TEST, SHOW ALARMS – see Practice 9109-096-351-NA, RS-232 Maintenance Terminal.

2. Loop length limit is: 1400 ft with 26 AWG wire (with no bridge taps).

## Application Platform Package Feature Package

- 5.11 The APP Feature Package allows a host computer to communicate directly with the SX-200 DIGITAL PABX via a DATASET 2100 unit. The following table outlines in descending order, the most likely items to cause malfunction.

**Table 5-20 APP Troubleshooting Summary**

Step	Possible Malfunction Source
1.	Faulty host computer.
2.	Faulty connection between the Dataset and the cross-connect field (see Figure 5-14).
3.	Faulty connection between the cross-connect field and the system.
4.	Faulty connections between the Dataset and the host computer. See Note 2.
5.	Faulty CDE programming; likely forms: <ul style="list-style-type: none"> <li>• Directed IO</li> <li>• Data Assignment</li> <li>• Data Circuit Descriptor Ass't</li> <li>• System Options (Option # 18 – Mitel Application Interface).</li> <li>• Feature Access Code</li> <li>• System Configuration</li> </ul>
6.	Incorrect Dataset switch settings. See Table 3-27 to Table 3-32.
7.	Dataset requires reset.
8.	Faulty Dataset. See Note 4.
9.	Digital Line card requires reload.
10.	Faulty Digital Line card.
11.	MCC or BCC requires reload – power down / power up bay, or press <i>MASTER RESET</i> on the MCC front panel.
12.	Faulty BCC or MCC.
13.	Faulty peripheral switch or circuit switch – refer to 'Supplementary Peripheral Equipment Procedures'.

**Notes:** 1. **Useful maintenance commands:** SHOW STATUS, TEST, SHOW ALARMS, SHOW ERRORS  
DATASETS – see Practice 9109-096-351-NA, RS-232 Maintenance Terminal.

2. If the Dataset is rack-mounted, verify connections as per Dataset 1102/2102 Troubleshooting.
3. Installation of the software and Datasets is covered in Practice 9109-096-200-NA, Installation Information. Further information is provided in Practice 9109-096-105-NA, Features Description.
4. If the Dataset is rack-mounted, other equipment may be faulty – refer to the Dataset 1102/2102 Troubleshooting.

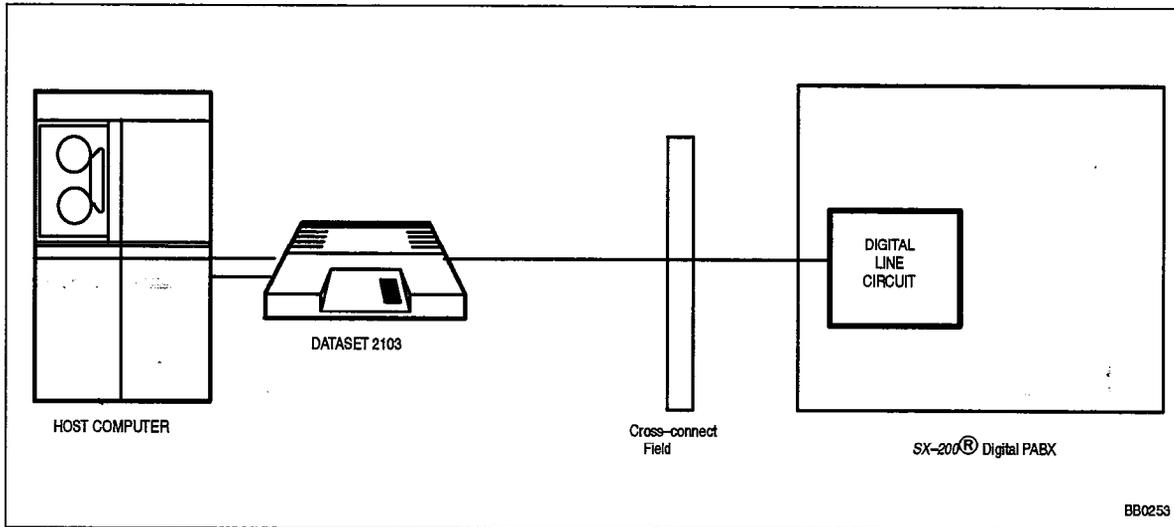


Figure 5-14 APP Configuration

## 6.

## SOFTWARE TROUBLESHOOTING PROCEDURES

These procedures are intended for the sole purpose of troubleshooting problems with programming and setup of applications. Fully functional hardware is assumed in all cases.

### Key System Features

Table 6-1 Key System Troubleshooting	
Problem	Possible Cause/Solution
<b>KEY SYSTEM PAGING</b>	
You dial the Key System – Direct Paging feature access code and get reorder tone and the NO ACCESS message, or rerouted to the illegal number intercept.	Verify that the set is programmed as a key system set ( form 45 ).
<b>GROUP PAGE</b>	
After dialing the access code or pressing the Feature key you dial the # sign ( end of dial character ). You then get NO ACCESS and reorder tone, or are rerouted to the illegal number intercept	Verify that a page group has been assigned.
After dialing the access code or pressing the Feature key you dial the # sign ( end of dial character ). You then get 1234 BUSY and busy tone.	Possibly due to one of the following: <ul style="list-style-type: none"> <li>• There is currently a group page in progress for your page group</li> <li>• There are no members totally idle (idle or hfi)</li> <li>• No channels ( system resource ) available</li> </ul> <b>Try the group page later.</b>
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**Table 6-1 Key System Troubleshooting  
(continued)**

Problem	Possible Cause/Solution
<b>DIRECTED PAGE</b>	
After dialing the access code or pressing the Feature key you dial a destination. You then get NO ACCESS and reorder tone (or are rerouted to the illegal number intercept point).	<ul style="list-style-type: none"> <li>• Verify that the destination is a valid Key System set extension number.</li> <li>• Check if the set is restricted from accessing the destination through tenanting – dial the destination directly and see whether you get NO ACCESS again. If so, this is NOT a problem with paging but rather the set is barred from ever calling this destination.</li> </ul>
After dialing the access code or pressing the Feature key you dial a destination. You then get xxxx BUSY and busy tone at this point.	<ul style="list-style-type: none"> <li>• the destination is not idle or hfi</li> <li>• the set's INTERCOM line is in use by another set</li> <li>• no channels ( system resource ) available</li> </ul>
<b>GROUP PAGE MEET ME ANSWER</b>	
Dial the Group Page – Meet Me Answer access code and you get reorder tone and NO ACCESS on the display, or you get rerouted to the illegal number intercept.	<ul style="list-style-type: none"> <li>• Verify that the set is programmed as a key system set ( form 45 )</li> <li>• Verify that the set has a page group assigned.</li> </ul>
You get NO PAGE ACTIVE on a display set and reorder tone.	<ul style="list-style-type: none"> <li>• The last page for the group was done more than 15 minutes ago (timed out)</li> <li>• The last telephone to page is no longer programmed in the data base</li> <li>• The last telephone to page is no longer programmed in Form 45 ( now programmed in Form 9 )</li> <li>• There has not been a group page for the group since the last system reset.</li> </ul>
<b>STORE PERSONAL SPEED CALL</b>	
You dial the access code and get NO ACCESS and REORDER tone.	THE SET IS NOT PROGRAMMED AS A KEY SYSTEM SET (FORM 45).
You dial the access code followed by an index number and get NO ACCESS and REORDER tone, or you get rerouted to the illegal number intercept.	THE INDEX NUMBER DIALED WAS NOT BETWEEN 1 AND 5.
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**Table 6-1 Key System Troubleshooting  
(continued)**

Problem	Possible Cause/Solution
You dial the access code followed by an index number and get INVALID # and REORDER tone.	THE INDEX NUMBER WAS DIALED AFTER THE INTERDIGIT TIMER EXPIRED.
You dial the access code followed by a VALID index and then digits and you get INVALID # and reorder tone.	<ul style="list-style-type: none"> <li>• The index number was dialed after the interdigit timer expired.</li> <li>• Invalid number combination dialed:               <ul style="list-style-type: none"> <li>– * must be followed by 3, 5 or *</li> <li>– *3 must be followed by 01 to 14</li> <li>– *5 must not be followed by further digits</li> </ul> </li> </ul>
<b>RETRIEVE PERSONAL SPEED CALL</b>	
You dial the access code and get NO ACCESS and REORDER tone.	VERIFY THAT THE SET IS PROGRAMMED AS A KEY SYSTEM SET ( FORM 45 ).
You dial the access code followed by an index number and get NO ACCESS and REORDER tone, or you get rerouted to the illegal number intercept.	The index number dialed was not between 1 and 5
You dial the access code, followed by a valid index number, and get INVALID # and reorder tone.	<ul style="list-style-type: none"> <li>• The interdigit timer expired.</li> <li>• Verify that the digits stored translate to a valid destination.</li> <li>• The speedcall number translation looped too many (more than 4) times within speedcall translation. (The speedcall translated into another speedcall which in turn translated into another speedcall, etc – and this occurred more than 4 times.)</li> </ul>
<b>CO LINE KEY</b>	
You get NO ACCESS and REORDER tone when the CO line key is pressed.	<ul style="list-style-type: none"> <li>• The CO trunk associated with the key is NOT a member of a trunk group.</li> <li>• The set has hotel/motel feature enabled and the user is disallowed to make external calls.</li> </ul>
You get INVALID # and REORDER tone after dialing a digit or several digits on the CO line.	<ul style="list-style-type: none"> <li>• The user is restricted to dial this specific number based on the user's COR ( check the COR restriction on the dialed number in Forms 20 and 46 ).</li> <li>• The user is required to dial account code prior to dialing.</li> <li>• The user is restricted from dialing this specific number on this CO Line ( check digit string entries in Form 46 ).</li> </ul>

**Table 6-1 Key System Troubleshooting  
(continued)**

Problem	Possible Cause/Solution
You get NO ACCESS and REORDER tone after dialing a few digits.	THE USER HAS EXCEEDED THE MAXIMUM NUMBER OF DIGITS THAT CAN DIAL BASED ON THE USER'S COR (CHECK FORM 27).
Press a CO line key and the key selection is ignored.	The user is barred from making calls on the CO line based on the Device/Tenant Interconnection table ( check Forms 5 and 30 ).
<b>LINE PREFERENCE</b>	
You get SELECT A LINE after going offhook.	<ul style="list-style-type: none"> <li>• The line preference is MANUAL. You are forced to select a line to originate calls.</li> <li>• The line preference is a CO Line Group Key and the Intercom Line is not available to make the call.</li> <li>• The line preference is not manual but the line is in use.</li> </ul>
<b>DIRECT CO LINE SELECT</b>	
You get NO ACCESS and REORDER tone after dialing the Direct CO Line Select access code.	<ul style="list-style-type: none"> <li>• Must use a key system telephone to access this feature.</li> <li>• The COS option "Key System – Direct CO Access" is disabled.</li> </ul>
You get INVALID # and REORDER tone after dialing the Direct CO Line Select access code and a trunk number.	<ul style="list-style-type: none"> <li>• The trunk number dialed is NOT a CO trunk.</li> <li>• The trunk number dialed is a DTS or Private trunk.</li> <li>• The trunk number dialed is not a programmed trunk.</li> <li>• The trunk number dialed is out of range (valid range is 1 – 200).</li> <li>• The feature was accessed via speedcall, and the speedcall digit string contained a trunk number of greater than 3 digits in length.</li> </ul>
<b>PROGRAM FEATURE KEY</b>	
You get REORDER tone on a non-display set after the Program Feature Key access code is dialed.	<ul style="list-style-type: none"> <li>• Another user is currently accessing the subform of Form 9 or Form 45 of this set.</li> <li>• The feature has been accessed via speed call, and the speedcall digit string contains more digits than expected ( the speedcall string cannot have any digits following the Program Feature Key access code ).</li> </ul>
You get REORDER tone after you dialed the Program Feature Key access code and a line key is pressed.	<ul style="list-style-type: none"> <li>• The line key selected is not a speedcall, DSS or feature key.</li> </ul>
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<b>Table 6-1 Key System Troubleshooting (continued)</b>	
<b>Problem</b>	<b>Possible Cause/Solution</b>
You get REORDER tone was heard after a 2-digit feature code was dialed .	<ul style="list-style-type: none"> <li>• The feature selected is already programmed on another key (check CDE).</li> <li>• User did not have proper COS for the selected Feature Key.</li> <li>• The feature code is out of range.</li> </ul>
On a display set, the CHANGE or CLEAR softkey is not shown.	Another user is currently accessing the sub-form of Form 9 or Form 45 of this set.
The feature you want to program does not appear on a display set.	<ul style="list-style-type: none"> <li>• User does not have proper COS Option enabled for the selected Feature Key.</li> <li>• The feature is already programmed on another key.</li> </ul>
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## Hotel/Motel Feature Package

- 6.1 It is assumed that system has been properly setup to allow data calls using the DTRX facility. Please note that in most cases if a System or COS option is enabled or disabled in CDE while the front desk terminal is displaying the applicable field, the terminal will not be updated until the display is RE-DRAWN. This can be accomplished by typing control-r or control-w while in the screen or by exiting from the screen and re-entering the screen.

<b>Table 6-2 Hotel/Motel Troubleshooting</b>	
<b>Problem</b>	<b>Possible Cause/Solution</b>
Entering MONITOR HM results in "Facility Not Available" message being displayed.	Enable System option 33 "Room Status".
On entry to House Statistics screen ALL data fields are displayed as dashes (" - ").	COS option 244 "Room Status Applies" must be enabled in all COS' that have guest room phones. After enabling, press the REFRESH softkey.
No guest rooms can be found search or Audits mode.	COS option 244 "Room Status Applies" must be enabled in all COS' that have guest room phones. After enabling, press the REFRESH softkey.
Page 1 of 3	

**Table 6-2 Hotel/Motel Troubleshooting  
(continued)**

Problem	Possible Cause/Solution
Data displayed on House Statistics screen is wrong: too few guest rooms	Some guest room phones are not programmed ( form 9 ) or are in a COS that does not have "Room Status Applies" enabled.
Pressing the YES softkey at the "Save changes to guest room before quitting?" prompt does not save the changes.	Names will not be stored for vacant guest rooms – check the occupancy setting.
Data displayed on House Statistics screen is wrong: too many guest rooms	Non – guest room phones are in a COS that has "Room Status Applies" enabled.
"Wake up Set" text field on House Stats screen is not displayed.	Enable System Option 11 "Automatic Wake-up" and redraw the screen.
"Call Blocking" text field on House Stats screen is not displayed.	Enable System Option 9 "Attendant Call Block" and redraw the screen.
MSG REG AUDIT softkey not provided.	Enable System option 24 "Message Register Audit".
ROOM STATUS AUDIT softkey not provided.	Enable System option 27 "Room Status Audit".
WAKE UP AUDIT softkey not provided.	Enable System option 13 "Automatic wake up print".
Unable to find any rooms of a particular TYPE in room search mode (or audit mode).	The COS associated with the guest room phone(s) in question does not have "Room Status Applies" enabled.
Room Type field is displayed as a number instead of a NAME.	COS for room type shown does not have name field programmed.
SET MESSAGE softkey is not displayed in Room Updates Form for non-display set room phones.	COS for the guest room phone does not have COS option 231 or 232 ( mes. waiting – BELL OR LAMP ) enabled.
The SET MESSAGE softkey is not displayed for any guest room telephones.	DIAL 0 routing in form 19 MUST be set to a console or console LDN for all settings (DAY, N1, N2).

**Table 6-2 Hotel/Motel Troubleshooting  
(continued)**

<b>Problem</b>	<b>Possible Cause/Solution</b>
Room has a message but it can't be cleared by the front desk.	Message is not from a console or console LDN (i.e., set to set message).
WAKEUP TIME text is not displayed in Room Updates form.	Enable System option 11.
MESSAGE REGISTER text is not displayed in Room Updates form.	Enable COS option 703 in guest room class of service.
DO NOT DISTURB text not displayed in Room Updates form.	Enable COS option 220 in guest room class of service.
No ENTER key is provided after a name has been programmed in Room Updates form.	Change the room occupancy to something other than VACANT.
Unable to find guest names.	Search string must be the STARTING letters of the last name of a guest room.
Non – guest names found when searching by name.	Non guest room phones are in a COS with "Room Status Applies" enabled.
Unable to access Room Updates form.	Logged in using the CDE Attendant level password. Must logout and log back in using the CDE supervisor password.
Attendant level password allows access to Room Updates form.	The CDE Attendant and Supervisor passwords are identical. Change passwords in CDE form 28 so are different.

### Sub-Attendant (Enhanced Function)

6.2 This procedure deals with the Sub-attendant – Enhanced Function feature. It does not apply to the Sub-attendant – Basic Function feature.

**Table 6-3 Enhanced Function Sub-attendant Troubleshooting**

Problem	Possible Cause/Solution
<b>PROGRAMMING: GENERAL</b>	
The SUB-ATT softkey does nothing when pressed.	The maximum number of enhanced-function sub-attendants has already been programmed.
<b>PROGRAMMING: LINE KEYS</b>	
The LDN softkey does not appear in the expand set form.	<ul style="list-style-type: none"> <li>• There are already the maximum number of LDN keys (3) possible on the set.</li> <li>• The LDN key is not programmable on a <i>SUPERSET DSS</i> Module associated with a sub-attendant station.</li> </ul>
Cannot alter LDN key information.	An LDN may not be altered when it is engaged in an active call.
The RECALL softkey does not appear in the expand set form.	<ul style="list-style-type: none"> <li>• There are already the maximum number of RECALL keys (1) possible on the set.</li> <li>• The RECALL key is not programmable on a <i>SUPERSET DSS</i> Module associated with a sub-attendant station.</li> </ul>
The HOLD softkey does not appear in the expand set form.	<ul style="list-style-type: none"> <li>• There are already the maximum number of HOLD keys (3) possible on the set.</li> <li>• The HOLD key is not programmable on a <i>SUPERSET DSS</i> Module associated with a sub-attendant station.</li> </ul>
<b>USING LDN KEYS</b>	
Set is ringing with an LDN key LCD flashing and I can't answer the line.	<ul style="list-style-type: none"> <li>• Check that the caller can connect to the sub-attendant where the LDN is programmed. Sub-attendants and consoles which share LDNs must be in the same tenant group.</li> <li>• Check that the prime line is free, since the LDN can only be answered if the set prime is available.</li> </ul>
Page 1 of 3	

**Table 6-3 Enhanced Function Sub-attendant Troubleshooting  
(continued)**

Problem	Possible Cause/Solution
Calls to the LDN are not answered.	<ul style="list-style-type: none"> <li>• Check that the calls are being noticed at the sub-attendant set. The RING option may be set to no ring for the appearance and so new calls may not be noticed. Instruct the sub-attendant on the Call Waiting indicator on the display or how to use the DISPLAY function on the set to see how many calls are waiting on the particular LDN or RECALL key.</li> <li>• Ensure that the proper LDN key is actually being called. Check the OTHER field in MAINT show status for the caller and make sure that it is referencing the correct LDN.</li> <li>• LDN appearances programmed as NO RING or as DELAY RING are considered lower priority calls before the delay ring timer has expired. Therefore, other calls to the set on ringing lines (other LDN appearances, RECALLs, calls to the prime line etc.) will be answered first.</li> </ul>
<b>USING RECALL KEY</b>	
Recalls go unanswered at the sub-attendant set.	<ul style="list-style-type: none"> <li>• Check that other recall features are not taking priority over the recall to the sub-attendant set.</li> <li>• Check that a RECALL key is programmed at the set. If not, recalls will attempt to ring the sub-attendant prime line which must be idle at the time. If it is not idle, the calls will attempt to recall again in a short time.</li> </ul>
Recall display is not there – only a normal display is shown.	A recall feature which uses CDE Form 19 Rerouting has taken precedence – the call is routed to the sub-attendant in that manner rather than using the default recall handling. These calls will appear at a key other than the RECALL key.
The RING AGAIN prompt is not present.	The prompt is only valid if the party that was answered can be put on consultation hold (i.e. they don't have a consultation hold, the party can be flashed on, etc.). The TRANS/CONF prompt is present on the Sub-attendant display if this is possible.
<b>STATIONS SOFTKEY</b>	
No features are available when the Stations softkey is pressed and an extension number is dialed.	<ul style="list-style-type: none"> <li>• Ensure that the extension number is valid (the back arrow prompt will be showing still if the number is invalid).</li> <li>• Ensure that the appropriate COS options are enabled in the Sub-attendant's COS (it is not necessary in the extension's COS).</li> </ul>
<b>TIME/DATE SOFTKEY</b>	
The softkeys for these features do not appear.	Check that COS Option 122 (Attendant Setup Time/Date) is enabled.
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**Table 6-3 Enhanced Function Sub-attendant Troubleshooting  
(continued)**

Problem	Possible Cause/Solution
<b>PAGED HOLD ACCESS</b>	
Paged Hold Access display doesn't show up when the Sub-attendant selects the pager.	<ul style="list-style-type: none"> <li>• Check that the Sub-attendant has a caller on hold in a hold position.</li> <li>• Check that feature access code 16 (Hold Pickup Access – Attendant Hold Slots) is enabled.</li> </ul>
<b>C/W INDICATOR</b>	
The Calls Waiting indicator shows calls waiting, but no LDNs or RECALL keys have calls on them.	A night bell may be ringing.
Page 3 of 3	

## Automatic Call Distribution (ACD)

<b>Table 6-4 ACD Troubleshooting</b>	
<b>Problem</b>	<b>Possible Cause/Solution</b>
<b>CALLING A PATH</b>	
Caller gets reorder tone.	<ul style="list-style-type: none"> <li>• Check that the correct access code is dialed.</li> <li>• Verify that the caller is not interflowing immediately to DROP CALL (the path called has Overflow to Interflow enabled, Interflow enabled, DROP CALL as the interflow point and there are no agents available to take the call within the overflow time).</li> <li>• If a DISA or CO trunk is calling, the trunk is loop start and the trunk's COS may have the option "Loop Start Trunk to ACD Connect" disabled.</li> </ul>
Interflow produces reorder tone.	<ul style="list-style-type: none"> <li>• If the programmed interflow point is DROP CALL, and the caller is a display set, the display will indicate that the path has hung up on the caller.</li> <li>• If the programmed interflow point is a speedcall, keep in mind that the interflow is handled in the same way as a call forward to a speedcall. First, check that the speedcall number is a valid destination and that the caller can connect to that destination. If the caller is a display set, the display will indicate an invalid number or connection in this case. Next, verify that a receiver is available – one is needed to complete the speedcall. If there are no receivers immediately available at the time of the interflow, the ACD caller is dropped. The only indication of this will be a receiver unavailable peg in the traffic measurement report. The call will still show up in the ACD statistics as an interflow.</li> </ul>
Trunk won't originate to a path.	Check the party state of the trunk using SHOW STATUS. If it is not able to originate at all due to resource shortage, the state will be IDLE. In this case, check traffic measurement for junctor/channel usage (most likely a junctor shortage problem in an analog bay). If the trunk is denied access to the routing point, or it is not programmed, the state will be ERROR. In this case, check the routing point in CDE Form 14 for the current night/day service. If correct, and it is an ACD path, and the trunk is loop start, check if the trunk's COS has the option "Loop Start Trunk to ACD Connect" enabled.
Caller runs right though the path and drops.	Check if interflow is enabled and if overflow to interflow is enabled. If there is a shortage of agents, the system may be predictively overflowing to the interflow point.
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**Table 6-4 ACD Troubleshooting  
(continued)**

Problem	Possible Cause/Solution
<p>Caller gets wrong agents.</p>	<ul style="list-style-type: none"> <li>• Check routing in form 14 for CO trunks.</li> <li>• Check that the correct path is actually being dialed.</li> <li>• Check to see if the agents are picking up other agent's calls using the CALL PICKUP feature.</li> </ul>
<p><b>ACD RECORDINGS</b></p>	
<p>Can't get recordings.</p>	<ul style="list-style-type: none"> <li>• Check path programming.</li> <li>• Check RADs in RAD group using MAINT SHOW STATUS or the console STATIONS softkey. If all are in the DND state, check the programming on the RAD group and in the COS of the RADs ( see above section on recording malfunction ) to see if timers are not setup properly.</li> <li>• Call RAD group directly and check that a RAD answers and gives the correct message.</li> </ul>
<p>Can't get first recording, but can get second recording.</p>	<p>The time for the second recording is occurring while waiting for the first recording, and the first recording is being abandoned. Make more recordings available in first group and increase the start time for the second recording (and subsequent recordings).</p>
<p>Silence between recordings.</p>	<ul style="list-style-type: none"> <li>• System music is not programmed</li> <li>• System music not connected properly</li> <li>• System music does not have enough gain.</li> </ul>
<p><b>ALTERNATE MUSIC SOURCE</b></p>	
<p>Alternate music source not heard.</p>	<ul style="list-style-type: none"> <li>• Check path (see above – <i>Calling a Path</i>).</li> <li>• Check the party state of the alternate music source – via SHOW STATUS. If state is ALTMUS, the port is plugged in and ready. Check the connections on the port. If the party state is not ALTMUS, the system has not seen the port go offhook, or the port was offhook when programmed as an alternate music source. It must be programmed first and then make the transition from IDLE to ALTMUS. Simply unplug and plug back in the alt music source and it should go to altmus state.</li> <li>• If the alternate music source is functioning, check the recordings. Music will not be applied, unless a caller has been given a RAD to listen to first.</li> </ul>
<p>Page 2 of 4</p>	

**Table 6-4 ACD Troubleshooting  
(continued)**

Problem	Possible Cause/Solution
<b>ACD POSITIONS</b>	
An ACD position cannot log in.	<ul style="list-style-type: none"> <li>• A valid login feature access code and position id code must be used ( check CDE ). The display will indicate an invalid number dialed (all of the other errors will cause the display to indicate an invalid feature access attempt).</li> <li>• The position must not already be logged in. Try dialing the position code – do you complete a call to the position?</li> <li>• The telephone type must be <i>SUPERSET 4</i>. No other telephone type may be used.</li> <li>• The <i>SUPERSET</i> telephone cannot have a party on consultation hold when the login is attempted.</li> <li>• The number of agents logged in must not exceed the maximum number. Check the number of agents logged in using the ACD MONITORS feature.</li> <li>• The position must have an ACD template enabled in its COS. Can the position log in at another <i>SUPERSET 4</i> where another position of the same type was able to log in?</li> <li>• To log in, the set must not having any appearances of its prime line anywhere in the system. To confirm this, do a review on the <i>SUPERSET</i> in form 9.</li> <li>• The <i>SUPERSET</i> telephone must not have a <i>SUPERSET DSS</i> Module associated with it. Check the ASSOC field in Form 09 for the circuit.</li> </ul>
An ACD position cannot log out.	Check that the agent is not an an ACD call when this is attempted. This includes ACD calls on consultation hold and hold on a line at the <i>SUPERSET</i> telephone.
Agents going make busy state.	<ul style="list-style-type: none"> <li>• If the <i>SUPERSET</i> is connected to a circuit in an analog bay, check traffic measurement report for junctor shortage problems (as well, check if the <i>SUPERSET</i> users in the same bay report the message "NO DIAL TONE" or "SYSTEM BUSY" on their display. This indicates a receiver or junctor shortage problem).</li> <li>• Check set errors via SHOW ERRORS DEVICE--TYPE SS3--SS4 command.</li> <li>• The set will be put make busy if the set is disconnected, or loses communication with the system.</li> <li>• Check call forward no answer time in the COS of the set – this controls the automatic call failure timing. Increase the time if necessary.</li> </ul>

**Table 6-4 ACD Troubleshooting  
(continued)**

Problem	Possible Cause/Solution
ACD positions are unexpectedly logged out.	<ul style="list-style-type: none"> <li>• If a <i>SUPERSET 4</i> telephone is unplugged, and replaced with a <i>SUPERSET 3</i> telephone while an ACD position is logged in at that position, the ACD position is automatically logged out by the system.</li> <li>• Could be caused by a system reset – check for this.</li> </ul>
Forwarding does not work after position logs in.	<ul style="list-style-type: none"> <li>• Problems with forwarding to a speedcall key may arise with ACD position sets.</li> <li>• Forwarding to a speedcall key works by reference to the speedcall key number and not to the digits in the speedcall key. If a position logs at a set that has forwarding to a speedcall key, the forwarding on the set is not altered – the reference to the old speedcall key number remains. If the speedcall key is replaced by an ACD feature key because of the login, the forwarding will be to a key key which is now a feature key – this is illegal. When someone calls the set and the forwarding takes place, the forwarding will fail and the caller will get reorder tone. A similar problem will occur even if the speedcall key is not replaced by a feature key – it will be replaced by a blank speedcall key and so the forwarding will fail because there are no digits to dial.</li> </ul>

## Automatic Attendant Overflow (AAO)

<b>Table 6-5 Auto Attendant Overflow Troubleshooting</b>	
<b>Problem</b>	<b>Possible Cause/Solution</b>
Calls come in to a console/LDN but get the wrong message.	<ul style="list-style-type: none"> <li>• Ensure that the RAD group (see CDE form 19) for the tenant group of the called party is the correct one, and that the called party is in the correct day/night service.</li> <li>• Ensure that the RADs programmed for the RAD group in form 17 are giving the correct message. Dial them directly to verify this.</li> </ul>
Calls come in to a console but do not get the recorded message.	<ul style="list-style-type: none"> <li>• Ensure that caller has COS Option 705 Automatic Overflow from Attendant enabled.</li> <li>• Ensure that Day, Night1 and Night2 answer points are programmed in Form 19.</li> <li>• Ensure that RADs are usable (i.e. not all DND, and have a message recorded). This can be done by calling the RAD group directly, or by calling them individually.</li> <li>• Ensure that time to start recording is small enough. If it is set too high, the caller may be answered by the console before hearing the message.</li> <li>• Ensure that the call is not being dropped (due to the final Ring timer) prior to hearing a message (i.e. the final Ring timer may be set too low).</li> </ul>
The caller is cut off in the middle of a recording.	<ul style="list-style-type: none"> <li>• Ensure that the message length timer for the RAD group is long enough for the RAD message.</li> <li>• Ensure that the call is not being dropped due to the final Ring timer, which runs while listening to the recording. It should be at least the time to the recording plus the time to hear the recording.</li> </ul>
Ringback followed by silence.	<ul style="list-style-type: none"> <li>• Call may have been dropped, due to the final ringback timer.</li> <li>• Check via MAINTENANCE SHOW STATUS, the OTHER field for the caller, to see if it actually gets connected up to the recording.</li> <li>• There may not be a properly recorded message on the RAD (the recording may be silence). Call the RAD directly to verify this.</li> </ul>

**Automated Attendant**

**Table 6-6 Automated Attendant Troubleshooting**

Problem	Possible Cause/Solution
<p>Call is never answered by RAD. The call always routes to the default destination.</p>	<ul style="list-style-type: none"> <li>• Ensure that RAD is functioning (not all DND or busied-out). Use MAINTENANCE or the attendant console to check the DND status of the device. (Use SHOW STATUS command.)</li> <li>• Ensure that the RAD message length is not too short. If the message length for the RAD group is very short, the RAD may not even get a chance to play its message.</li> <li>• Check traffic measurement for skip pegs for the group. This will indicate a shortage of RADs or receivers.</li> <li>• Check the wait-for-resources time for the group. It may be too short, resulting in there being not enough recordings for the number of callers (given the length of time that the recording plays). The time must be at least as long as the turn around time for the RADs in the group, since this is the longest time that a waiting caller will have to wait if there are receivers available. Competition for receiver resources will increase this wait time.</li> </ul>
<p>Call is dropped when caller dials no digits.</p>	<p>Ensure that there is a default destination for the group.</p>
<p>Recording does not end when digits are dialed.</p>	<ul style="list-style-type: none"> <li>• Ensure that the option "Dialing Over Recording" is ENABLED for that auto-attendant group.</li> <li>• In the case of an attendant calling, the console must have TONES ON in order to perform end-to-end signalling and dial over the auto-attendant recording.</li> </ul>
<p>Caller gets the wrong message.</p>	<ul style="list-style-type: none"> <li>• Ensure that message was recorded correctly</li> <li>• Ensure that RAD is programmed in the correct group (use the EXT NUM softkey in CDE form 17 to find the RAD).</li> <li>• Ensure that RAD is plugged in at correct extension by dialing the RAD extension number directly.</li> </ul>
<p>Dialing is slow and SUPERSET users report seeing SYSTEM BUSY on their displays.</p>	<p>There may not be enough non-auto-attendant receivers allocated. Check traffic measurement for receiver attempt pegs and adjust the receiver count for non-auto-attendant features in the system options form if necessary.</p>

## Call Forwarding

6.3 This procedure deals with the Generic 1004 Call Forwarding; it does not apply to Call Forwarding in software releases prior to Generic 1004.

**Table 6-7 Call Forwarding Troubleshooting**

Problem	Possible Cause/Solution
No access to call forwarding.	<ul style="list-style-type: none"> <li>• If an attendant, ensure that COS option 123 – Attendant Call Forward Setup And Cancel is enabled.</li> <li>• If an extension user, ensure that at least one of the following COS options is enabled:               <ul style="list-style-type: none"> <li>– 209 – Call Forward – Follow Me</li> <li>– 206 – Call Forward – Busy</li> <li>– 207 – Call Forward – Don't Answer</li> </ul> </li> </ul>
No access to split (internal / external) call forwarding.	Ensure that COS option 260 < Internal/External split call forwarding > is enabled.
Reorder tone and/or INVALID error message.	<ul style="list-style-type: none"> <li>• Ensure that the forwarding destination you are entering is valid. The forwarding destination must be ( directly or translate into ) one of the following :               <ul style="list-style-type: none"> <li>– an industry standard telephone</li> <li>– a <i>SUPERSET</i> telephone</li> <li>– an attendant console</li> <li>– a hunt group (not data or modem)</li> <li>– a night bell</li> <li>– an ACD path</li> <li>– a dial 0 access code</li> <li>– an LDN</li> </ul> </li> <li>• The extension must be allowed ( i.e. device interconnection ) to connect to the forwarding destination.</li> <li>• The forwarding destination must NOT have the COS option 234 – Never A Forwardee enabled.</li> </ul>

**Table 6-7 Call Forwarding Troubleshooting  
(continued)**

Problem	Possible Cause/Solution
<p>Reorder tone and/or INVALID error message (cont'd).</p>	<ul style="list-style-type: none"> <li>• The forwarding destination cannot be the same as your extension number (i.e. you can't forward to yourself).</li> <li>• If entering a personal abbreviated dial access code as a forwarding destination, the forwarding extension must be programmed as a key system set.</li> <li>• If entering a personal or system abbreviated dial access code as a forwarding destination, the forwarding extension must have the following COS option settings:                         <ul style="list-style-type: none"> <li>– 245 – Abbreviated Dialing Access – ENABLED</li> <li>– 208 – Call Forwarding – External – ENABLED</li> <li>– 200 – Account Code, Forced Entry – External Calls – DISABLED.</li> </ul> </li> <li>• If entering a personal speedcall button as a forwarding destination, the forwarding extension must have the following COS option settings :                         <ul style="list-style-type: none"> <li>– 208 – Call Forwarding – External – ENABLED</li> <li>– 200 – Account Code, Forced Entry – External Calls – DISABLED.</li> </ul> </li> <li>• Programming call forwarding while a system copy database operation is in progress is NOT permitted.</li> <li>• If programming "I'm Here" forwarding, the "from" party must be a industry standard telephone or a <i>SUPERSET</i> telephone, and cannot be a member of any type of voice mail hunt group.</li> <li>• If programming forwarding using dialed forwarding access codes, verify the following :                         <ul style="list-style-type: none"> <li>– the extension is permitted access to the feature,</li> <li>– For feature access codes 03, 04 and 05, the access code is entered, followed by one of: 1 (always), 2 (busy), 3 (no answer) or 4 (busy/no answer).</li> </ul> </li> </ul>

**Table 6-7 Call Forwarding Troubleshooting  
(continued)**

Problem	Possible Cause/Solution
<p>Calls are not being forwarded properly.</p>	<ul style="list-style-type: none"> <li>• If a display set user, use the appropriate softkeys to examine the current forwarding settings. The forwarding may have been changed by the attendant console or a sub-attendant.</li> <li>• If the forwarding was set using a personal speedcall button, ensure that the contents of the button still translate into a valid forwarding destination. Ensure using form 9/ form 45 that the key is still in fact programmed as a speedcall key.</li> <li>• Ensure that the COS options permit Call Forwarding. Check specifically COS options 200,206,207,208,209,245, and 260. Consult Practice 9109-096-105-NA, Features Description, for proper settings.</li> <li>• Ensure that the forwarding destination is idle and has COS option 234 – Never A Forwardee disabled.</li> <li>• Ensure that the forwarding destination has not been deprogrammed.</li> <li>• Note that calls will NOT be forwarded if : <ul style="list-style-type: none"> <li>– it is the attendant or a <i>SUPERSET</i> telephone that is overriding/intruding.</li> <li>– it already has been forwarded via any type of speedcall</li> <li>– it already has been forwarded twice without being answered or rerouted.</li> </ul> </li> <li>• If a logical line appears on the extension and on another extension, calls to the first extension on the logical line will not be forwarded.</li> <li>• If the last programmed call forwarding with COS option 260 (Internal/External Split Call Forwarding) enabled and subsequently the option was disabled, calls will be forwarded according to the external forwarding settings.</li> </ul>

**Table 6-7 Call Forwarding Troubleshooting  
(continued)**

Problem	Possible Cause/Solution
Calls are not being forwarded properly (cont'd).	<ul style="list-style-type: none"> <li>• Any changes in device interconnection rules may prohibit calls from being forwarded. Ensure that the calling party can indeed connect to the forwarding destination.</li> <li>• Trunk calls to the extension will not be forwarded if calls are forwarded using any type of speedcall, with System Option 21 (Incoming To Outgoing Call Forward) disabled.</li> <li>• Calls will not be forwarded if the forwarding destination is the same as the calling party ( i.e. calling party cannot be forwarded to itself ).</li> <li>• Cannot forward a caller to a busy hunt group if the caller does not have the capability of camping on to the hunt group.</li> <li>• Cannot forward calls from the attendant console if the forwarding destination is a Dial 0 Access Code.</li> <li>• If forwarded via a speedcall of any type, the system may be encountering difficulty acquiring the necessary resources to complete the forwarding. Ensure that there are ample available receivers and/or outgoing trunks to allow this type of forwarding.</li> </ul>

**SUPERSET Telephones**

**Table 6-8 SUPERSET Telephone Troubleshooting**

Problem	Possible Cause/Solution
Audio always come out of the handset, even when onhook.	<ul style="list-style-type: none"> <li>• Check that COS Option 612 – Headset Operation is not enabled in the set COS, the ACD position COS or the COS of a verified account code that the user dialed. This is usually the source of the problem.</li> <li>• Ensure that the call is not being answered handsfree when COS Option 612 – Headset Operation enabled in the set's COS. The call will go to the handset even if the call is answered using the speaker key or a line key.</li> <li>• Run the loopback test to ensure that the hookswitch is working correctly.</li> </ul>

# Appendix A.

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## MAINTENANCE LOG MESSAGES

### General

- A.1 This Appendix contains the complete set of information messages which are recorded in the maintenance log when a significant event occurs. Each message is self-explanatory, identifying the event and providing details about it. Information on options available to maintenance personnel is included under the "Action Required" heading.

There are three types of log reports:

1. **Fault Report** – a report generated when the maintenance system or Call Processing detects a fault, or an abnormal condition.
2. **Reset Report** – a report generated when a bay or the system is reset.
3. **Alarm Report** – a report generated when a change in any of the alarm levels occurs.

This Appendix is divided into three sections which correspond to the three types of log messages. The 'Fault Reports' section is arranged using the Alarm Code, an index number specific to the type of fault indicated. The Reset and Alarm Report sections are arranged in a logical manner.

Information on access to the maintenance log, and the use of other maintenance tools may be found in Practice 9109-096-351-NA, RS-232 Maintenance Terminal. Information on overall maintenance philosophy and specific diagnostic tests may be found in Practice 9109-096-353-NA, General Maintenance Information.

**Table A-1 Fault Reports**

Alarm Code	Message	Action Required
00	Link 07 Channel 19 failed Junctor test Alarm Code = 00	Do a directed test on the specified link to verify the problem. Refer to Practice 9109-096-180-NA, Engineering Information, for link assignments. If the problem persists, refer to the Analog Junctor Part of this Practice. Otherwise, investigate further, using the MONITOR DIAGNOSTICS command.
01	Link 07 Channel 19 failed Junctor dgl codec Alarm Code = 01	Do a directed test on the specified link to verify the problem. Refer to Practice 9109-096-180-NA, Engineering Information, for link assignments. If the problem persists, refer to the Digital Interface Card Part of this Practice. Otherwise, investigate further, using the MONITOR DIAGNOSTICS command.
02	Link 07 channel 19 failed Junctor ang codec Alarm Code = 02	Do a directed test on the specified link to verify the problem. Refer to Practice 9109-096-180-NA, Engineering Information, for link assignments. If the problem persists, refer to the Digital Interface Card Part of this Practice. Otherwise, investigate further, using the MONITOR DIAGNOSTICS command.
03	DLIC module failed at 02 03 01 00 console test Alarm Code = 03	Do a directed test on the specified circuit to verify the problem. If the problem persists, refer to the Console/DLIC module Part of this Practice. Replace as required. Otherwise, investigate further, using the MONITOR DIAGNOSTICS and SHOW STATUS commands.
04	DLIC module failed at 02 03 01 00 console dgl codec Alarm Code = 04	Do a directed test on the specified circuit to verify the problem. If the problem persists, refer to the Console/DLIC module Part of this Practice. Replace as required. Otherwise, investigate further, using the MONITOR DIAGNOSTICS and SHOW STATUS commands.
05	DLIC module failed at 02 03 01 00 console ang codec Alarm Code = 05	Do a directed test on the specified circuit to verify the problem. If the problem persists, refer to the Console/DLIC module Part of this Practice. Replace as required. Otherwise, investigate further, using the MONITOR DIAGNOSTICS and SHOW STATUS commands.

**Table A-1 Fault Reports  
(continued)**

Alarm Code	Message	Action Required
06	<p>ONS card failed at 02 01 01 00 ext 2101 inject codec test Alarm Code = 06</p> <p>COV card failed at 01 05 01 00 ext 1501 inject codec test Alarm Code = 06</p> <p>LS/GS trnk card failed at 02 02 01 00 inject codec test Alarm Code = 06</p> <p>E&amp;M module failed at 02 02 01 00 inject codec test Alarm Code = 06</p> <p>DTMF RX module failed at 02 02 01 00 inject codec test Alarm Code = 06</p>	<p>Do a directed test on the specified circuit to verify the problem. If the problem persists, refer to the Fault Isolation Part of this Practice. Otherwise, investigate further, using the MONITOR DIAGNOSTICS and SHOW STATUS commands.</p>
07	<p>ONS card failed at 02 01 01 00 ext 2101 Dgl L/B codec test Alarm Code = 07</p> <p>COV card failed at 01 05 01 00 ext 1501 Dgl L/B codec test Alarm Code = 07</p> <p>LS/GS trnk card failed at 02 02 01 00 Dgl L/B codec test Alarm Code = 07</p> <p>E&amp;M module failed at 02 02 01 00 Dgl L/B codec test Alarm Code = 07</p> <p>DTMF RX module failed at 02 02 01 00 Dgl L/B codec test Alarm Code = 07</p>	<p>Do a directed test on the specified circuit to verify the problem. If the problem persists, refer to the Fault Isolation Part of this Practice. Otherwise, investigate further, using the MONITOR DIAGNOSTICS and SHOW STATUS commands.</p>
08	<p>ONS card failed at 02 01 01 00 ext 2101 Ang L/B codec test Alarm Code = 08</p> <p>COV card failed at 01 05 01 00 ext 1501 Ang L/B codec test Alarm Code = 08</p> <p>LS/GS trnk card failed at 02 02 01 00 Ang L/B codec test Alarm Code = 08</p> <p>E&amp;M module failed at 02 02 01 00 Ang L/B codec test Alarm Code = 08</p> <p>DTMF RX module failed at 02 02 01 00 Ang L/B codec test Alarm Code = 08</p>	<p>Do a directed test on the specified circuit to verify the problem. If the problem persists, the fault is isolated to the specified circuit. Refer to the appropriate Part of this Practice. Replace as required. Otherwise, investigate further, using the MONITOR DIAGNOSTICS and SHOW STATUS commands.</p>
09	<p>ONS card failed at 02 01 01 00 ext 2101 Message lamp test Alarm Code = 09</p>	<p>The specified station has been unplugged, or lamp bulb needs to be replaced.</p>

**Table A-1 Fault Reports  
(continued)**

Alarm Code	Message	Action Required
10	ONS card failed at 02 01 01 00 ext 222 Hook test Alarm Code = 10	Do a directed test on the specified circuit to verify the problem. If the problem persists, refer to the ONS Line card Part of this Practice. Replace as required. Otherwise, investigate further, using the MONITOR DIAGNOSTICS and SHOW STATUS commands.
11	ONS card failed at 02 01 01 00 ext 2101 Adc reference test Alarm Code = 11  LS/GS trnk card failed at 02 02 01 00 Adc reference test Alarm Code = 11	Do a directed test on the specified circuit to verify problem. If the problem persists, refer to the Fault Isolation Part of this Practice. Otherwise, investigate further, using the MONITOR DIAGNOSTICS and SHOW STATUS commands.
12	Card read test Alarm code = 12	
13	LS/GS trnk card failed at 02 02 01 00 Hybrid loopback test Alarm Code =13	Do a directed test on the specified circuit to verify the problem. If the problem persists, the fault is isolated to the specified circuit. Refer to the appropriate Part of this Practice. Otherwise, investigate further, using the MONITOR DIAGNOSTICS and SHOW STATUS commands.
14	DIG line card failed at 01 08 01 01 ext 111 DNIC output L/B test Alarm Code =14	DNIC chip failed at circuit 01. Problem with DIGITAL Line Card.
15	DIG line card failed at 01 08 01 01 ext 111 DNIC input L/B test Alarm code =15	DNIC chip failed at circuit 07. Problem with DIGITAL Line Card.
16	DIG line card failed at 01 08 01 01 ext 111 dn set c/s test Alarm Code = 16	Replace the specified digital <i>SUPERSET</i> telephone.
17	DIG line card failed at 01 08 01 01 ext 122 dn set bphone test AlarmCode = 17	Replace the specified digital <i>SUPERSET</i> telephone.
18	DIG line card failed at 01 08 01 01 ext 122 dn set t'ducer test Alarm Code=18	Replace the specified digital <i>SUPERSET</i> telephone.
19	DIG line card failed at 01 08 01 02 ext 222 dataset L/B test Alarm Code = 19	Replace the specified dataset.
20	DTMF RX module failed at 02 02 01 00 DTMF receiver test Alarm Code = 20	Do a directed test on the specified circuit to verify the problem. If the problem persists, the fault is isolated to the specified DTMF Receiver. Refer to the DTMF Receiver Part of this Practice. Otherwise, investigate further, using the MONITOR DIAGNOSTICS and SHOW STATUS commands.

**Table A-1 Fault Reports  
(continued)**

<b>Alarm Code</b>	<b>Message</b>	<b>Action Required</b>
21	PRINTER failed at 00 00 02 00 Printer test Alarm Code = 21	Do a directed test on the printer to verify this. Check if printer is off-line or disconnected. Refer to printer troubleshooting procedures.
22	DSP failed at 00 00 06 00 DSP memory test Alarm Code = 22	Do a directed test on the DSP to verify the problem. If it persists, refer to the Main Control Card Part of this Practice. Otherwise, investigate further, using the MONITOR DIAGNOSTICS command.
23	DSP failed at 00 00 06 00 DSP tone detect test Alarm Code = 23	Do a directed test on the DSP to verify the problem. If it persists, refer to the Main Control Card Part of this Practice. Otherwise, investigate further, using the MONITOR DIAGNOSTICS command.
24	DSP failed at 00 00 06 00 DSP tone gen test Alarm Code = 24	Do a directed test on the DSP to verify the problem. If it persists, refer to the Main Control Card Part of this Practice. Otherwise, investigate further, using the MONITOR DIAGNOSTICS command.
25	DSP failed at 00 00 06 00 DSP conference test Alarm Code = 25	Do a directed test on the DSP to verify the problem. If it persists, refer to the Main Control Card Part of this Practice. Otherwise, investigate further, using the MONITOR DIAGNOSTICS command.
27	Link 07 Channel 19 Failed unisolated PCM loopback test Alarm Code = 27	Check inter-bay cables
29	Link 07 Channel 19 Failed isol to bay PCM loopback test Alarm Code = 29  Link 07 Channel 19 Failed isol to mcc PCM loopback test Alarm Code = 29	Failure on Bay Control Card (for digital bay), or DIC card (for analog bay). Replace card.  Failure on DX module. Replace Main Control Card.
31	Link 07 Channel 19 Failed isol to bay PCM loopback test Alarm Code = 31	Failure on Bay Control Card (for digital bay), or DIC card (for analog bay). Replace card.
32	Link 07 Channel 19 Failed unisolated PCM loopback test Alarm Code = 32  Link 07 Channel 19 Failed isol to bay PCM loopback test Alarm Code = 32	Check inter-bay cables.  Failure on Bay Control Card (for digital bay), or DIC card (for analog bay). Replace card.
33	Link 07 Channel 19 Failed isol to mcc PCM loopback test Alarm Code = 33	Failure on DX module. Replace Main Controller Card.
34	Link 07 Channel 19 Failed unisolated PCM loopback test Alarm Code = 34	Check inter-bay cables.

**Table A-1 Fault Reports  
(continued)**

Alarm Code	Message	Action Required
34	Link 07 Channel 19 Failed isol to mcc PCM loopback test Alarm Code = 34	Failure on DX module. Replace Main Control Card.
36	DIG line card passed at 01 08 01 01 ext 111 Alarm Code = 36	Information only. Previous problem corrected.
40	ONS card failed at 03 01 01 00 Analog 8804 test Alarm Code = 40	Card fault – replace card.
41	ONS card failed at 03 01 01 00 Analog 8804 test Alarm Code = 41	Card fault – replace card.
42	ONS card failed at 03 01 01 00 No path to junct ## Alarm Code = 42	Card fault – replace card.
43	DIG line card failed at 01 08 01 01 ext 111 dn set earpiece test Alarm Code = 43	Refer to Digital set troubleshooting procedures.
44	DIG line card failed at 02 02 01 00 ext 111 dn set speaker test Alarm Code = 44	Refer to Digital set troubleshooting procedures.
45	DIG line card failed at 02 02 01 00 ext 111 dn set microphe test Alarm Code = 45	Refer to Digital set troubleshooting procedures.
46	DIG line card failed at 02 02 01 00 ext 211 dn set mouthpce test Alarm Code = 46	Refer to Digital set troubleshooting procedures.
47	T1 trunk card failed at 01 06 01 00 Trk 19 t1 channel L/B test Alarm Code =47	Refer to T1 Trunk troubleshooting procedures.
48	DIG line card failed at 05 01 01 Modem answer test Alarm Code = 48	The modem at this location is not able to answer a call. Refer to applicable Dataset Troubleshooting procedure.
49	DIG line card failed at 05 01 01 Modem originate test Alarm Code = 49	The modem at this location is not able to originate a call. Refer to applicable Dataset Troubleshooting procedure.
52	ONS card failed at 03 01 01 00 Analog 8804 test Alarm Code = 52	Card fault – replace card.
53	ONS card failed at 03 01 01 00 No path to junct ## Alarm Code = 53	Card fault – replace card.
57	Link 07 Channel 19 failed Junctor I/back test Alarm Code = 57	Do a directed test on the specified link to verify the problem. Refer to Practice 9109-096-180-NA, Engineering Information, for link assignments. If the problem persists, refer to the Analog Junctor Part of this Practice. Otherwise, investigate further, using the MONITOR DIAGNOSTICS command.

<b>Table A-1 Fault Reports (continued)</b>		
<b>Alarm Code</b>	<b>Message</b>	<b>Action Required</b>
100	DSP failed at 00 00 06 00 DSPwent insane Alarm Code = 100	Do a directed test on the DSP to verify the problem. If the problem persists, refer to Main Control Card troubleshooting procedures.
101	ONS card failed at 02 01 01 00 ext 2101 OFF hook too long Alarm Code = 101  Stn line card failed at 03 01 01 00 ext 221 OFF hook too long Alarm Code = 101  COV card failed at 01 05 01 00 ext 1501 OFF hook too long Alarm Code = 101  Superset card failed at 03 01 01 00 ext 21 OFF hook too long Alarm Code = 101	Information only.
102	ONS card failed at 02 01 01 00 ext 2101 Card removed Alarm Code = 102  Stn line card failed at 03 01 01 00 ext 120 Card removed Alarm Code = 102  COV card failed at 01 05 01 00 ext 1501 Card removed Alarm Code = 102  Superset card failed at 03 01 01 00 ext 21 Card removed Alarm Code = 102  DIG line card failed at 03 01 01 01 Card removed Alarm Code = 102  LS/GS trnk card failed at 02 02 01 00 Tk 9 Card removed Alarm Code = 102  CO trunk card failed at 02 02 01 00 Tk 09 Card removed Alarm Code = 102  E&M trunk card failed at 02 02 01 00 Tk9 Card removed Alarm Code = 102  DID trunk card failed at 02 02 01 00 Tk9 Card removed Alarm Code = 102  UNIVERSAL card failed at 02 03 01 00 Card removed Alarm Code = 102  T1 trunk card failed at 02 06 00 00 Card removed Alarm Code = 102	Verify card has been removed. If alarm is raised due to this, either replace/re-install the card, or deprogram it via CDE. Refer to Practice 9109-096-210-NA, Customer Data Entry, for details.
103	ONS card passed at 02 01 01 00 ext 2101 Card installed Alarm Code = 103	Information only.

**Table A-1 Fault Reports  
(continued)**

Alarm Code	Message	Action Required
103 (cont.)	<p>Stn line card passed at 03 01 01 00 ext 21 Card installed Alarm Code =103</p> <p>COV card passed at 01 05 01 00 ext 32 Card installed Alarm Code =103</p> <p>Superset card passed at 03 01 01 00 ext 4 Card installed Alarm Code =103</p> <p>DIG line card passed at 03 01 01 01 Card installed Alarm Code = 103</p> <p>LS/GS trnk card passed at 02 02 01 00 Tk 9 Card installed Alarm Code = 103</p> <p>CO trunk card passed at 02 02 01 00 Tk08 Card installed Alarm Code = 103</p> <p>E&amp;M trunk card passed at 02 02 01 00 Tk8 Card installed Alarm Code = 103</p> <p>DID trunk card passed at 02 02 01 00 Tk 8 Card installed Alarm Code = 103</p> <p>UNIVERSAL card passed at 02 03 01 00 Card installed Alarm Code = 103</p> <p>T1 trunk card passed at 02 06 00 00 Card installed Alarm Code = 103</p>	

**Table A-1 Fault Reports  
(continued)**

Alarm Code	Message	Action Required
104	<p>ONS card failed at 02 01 01 00 ext 2101 Wrong card in slot      Alarm Code = 104</p> <p>Stn line card failed at 03 01 01 00 ext 312 Wrong card in slot      Alarm Code = 104</p> <p>COV card failed at 01 05 01 00 ext 1501 Wrong card in slot      Alarm Code = 104</p> <p>Superset card failed at 03 01 01 00 ext 31 Wrong card in slot      Alarm Code = 104</p> <p>LS/GS trk card failed at 02 02 01 00 Tk 08 Wrong card in slot      Alarm Code = 104</p> <p>CO trunk card failed at 02 02 01 00 Tk 8 Wrong card in slot      Alarm Code = 104</p> <p>E&amp;M trunk card failed at 02 02 01 00 Tk 8 Wrong card in slot      Alarm Code = 104</p> <p>DID trunk card failed at 02 02 01 00 Tk 09 Wrong card in slot      Alarm Code = 104</p> <p>UNIVERSAL card failed at 02 03 01 00 Wrong card in slot      Alarm Code = 104</p>	<p>The specified card type is not programmed for the specified card slot. Use the SHOW CONFIG command to observe the correct configuration. Either insert the correct card type, or reprogram the card slot (see Practice 9109-096-210-NA, Customer Data Entry).</p>
105	<p>COV card failed at 01 05 01 00 ext 1501 Superset unplugged      Alarm Code = 105</p> <p>Superset card failed at 03 01 01 00 ext 21 Superset unplugged      Alarm Code = 105</p>	<p>The specified extension has been unplugged. If this is not the case, check wiring.</p>
106	<p>Database failed at 00 00 04 00 Serious ram shortage      Alarm Code = 106</p>	<p>This is a warning. Stop CDE programming activity. Wait for a low traffic period, and reset the system. If this persists, search for an Alarm Code 108 message. Watch for further occurrences.</p>
107	<p>Database failed at 00 00 03 00 Serious dsk shortage      Alarm Code = 107</p>	<p>This is a warning. Stop CDE activity. Wait for a low traffic period, perform a COPY DATABASE, and reset the system using the new database. If this persists, search for an Alarm Code 109 message. Watch for further occurrences.</p>

**Table A-1 Fault Reports  
(continued)**

Alarm Code	Message	Action Required
108	RAM failed at 00 00 04 00 No Ram space left Alarm Code = 108	No further CDE programming will be possible. There is no RAM space available. Wait for a period of low traffic, and reset the system. If further programming is required, other devices, account code numbers, ARS strings, or speed call numbers will have to be deprogrammed.
109	DISK failed at 00 00 03 00 No Disk space left Alarm Code = 109	No further CDE programming will be possible. There is no disk space available. Wait for a period of low traffic, perform a COPY DATABASE, and reset the system using the new database. If further programming is required, other devices, account numbers, ARS strings, or speed call numbers will have to be deprogrammed.
110	ONS card failed at 02 01 01 00 ext 120 Msg reg overflow Alarm Code = 110  Stn line card failed at 03 01 01 00 ext 111 Msg reg overflow Alarm Code = 110  COV card failed at 01 05 01 00 ext 1501 Msg reg overflow Alarm Code = 110  Superset card failed at 03 01 01 00 ext 12 Msg reg overflow Alarm Code = 110	The message registration counter for the specified extension has overflowed. The overflow threshold is 50,000. Ensure that the counters are periodically reset at the Attendant Console.
111	LS/GS trnk card failed at 02 02 01 00 Trk 1 Can't seize trunk AlarmCode=111  CO trunk card failed at 02 02 01 00 Trk 01 Can't seize trunk Alarm Code = 111  E&M trunk card failed at 02 02 01 00 Tk2 Can't seize trunk Alarm Code = 111  DID trunk card failed at 02 02 01 00 Tk7 Can't seize trunk Alarm Code = 111	Verify the wiring from the trunk circuit to the public network. Correct as required. Refer to Practice 9109-096-200-NA, Installation Information. If this is not the problem, suspect failure or bad wiring at the Central Office.
112	LS/GS trnk card failed at 02 02 01 00 Trk 1 Can't release trunk Alarm Code = 112  CO trunk card failed at 02 02 01 00 Trk 1 Can't release trunk Alarm Code = 112  E&M trunk card failed at 02 02 01 00 Tk7 Can't release trunk Alarm Code = 112  DID trunk card failed at 02 02 01 00 Trk 7 Can't release trunk Alarm Code = 112	No release signal was received from the Central Office. Verify wiring. Refer to Practice 9109-096-200-NA, Installation Information, for details.

**Table A-1 Fault Reports  
(continued)**

Alarm Code	Message	Action Required
113	UNIVERSAL card failed at 02 03 01 00 Exceeds power rating Alarm Code = 113	The total power rating of the modules installed on the specified Universal card exceeds the maximum permitted total power rating. Refer to Practice 9109-096-200-NA, Installation Information, for details.
114	PRINTER failed at 00 00 02 00 SMDR printer down Alarm Code = 114	The printer used for SMDR printing is off-line or not working. Check printer. Refer to printer troubleshooting procedures.
115	Disk failed at 00 00 03 00 Disk removed/Bad ID Alarm Code = 115	Contact MITEL Field Service.
116	Disk passed at 00 00 03 00 Disk inserted Alarm Code = 116	Information only.
117	RAM failed at 00 00 05 00 CMOS checksum failed Alarm Code = 117	This is not a serious problem if it occurs once. However, if it is persistent, refer problem to MITEL Field Service.
118	COV card failed at 01 05 01 00 ext 1501 Card in low pwr slot Alarm Code = 118  UNIVERSAL card failed at 02 03 01 00 Card in low pwr slot Alarm Code = 118  DID card failed at 01 05 01 00 Card in low pwr slot Alarm Code = 118  OPS card failed at 02 03 01 00 ext 1502 Card in low pwr slot Alarm Code = 118	The specified card is a high power card installed in a low power slot. Use SHOW CONFIG command to obtain information on the card slot. Re-install/reprogram the card for a high power slot.
119	Temp sense failed at 00 00 07 00 System over-heated Alarm Code = 119	System is overheating. Inspect fan cooling system. If inoperative, refer to the Fan/Cooling System Part of this Practice.
120	Temp sense passed at 00 00 07 00 Temp back to normal Alarm Code = 120	Information only.
121	PFT sense failed at 00 00 08 00 Bay has cut through Alarm Code = 121  BAY failed at 03 00 00 00 Bay has cut through Alarm Code = 121	The digital bays have gone into Power Fail Transfer mode. Use SHOW ALARMS command and examine logs further to find the actual cause of the cut through. The specified analog bay has gone into Power Fail Transfer mode. Check for messages indicating that other bays have cut through. Use SHOW ALARMS command and examine logs further to find the actual cause of the cut through.

**Table A-1 Fault Reports  
(continued)**

Alarm Code	Message	Action Required
122	PFT sense passed at 00 00 08 00 Bay has cut back Alarm Code = 122  BAY passed at 03 00 00 00 Bay has cut back Alarm Code = 122	The specified bay has been cut back to normal operation. Verify that appropriate action was taken to rectify the event which caused the cut through.
123	ONS card failed at 02 01 01 00 ext 123 Recording dev failed Alarm Code = 123  ONS card failed at 02 01 01 00 ext 2101 Recording device failed – false origination Alarm Code = 123  ONS card failed at 02 01 01 00 ext 2101 Recording device failed to hang up–lok Alarm Code = 123  ONS card failed at 02 01 01 00 ext 2101 Recording device failed to hang up – sus Alarm Code = 123  ONS card failed at 02 01 01 00 ext 2101 Recording device failed to answer Alarm Code = 123  ONS card failed at 02 01 01 00 ext 2101 Recording device failed – nil error Alarm Code = 123  Stn line card failed at 03 01 01 00 ext 111 Recording device failed ... unknown reason ... Alarm Code = 123  Stn line card failed at 03 01 01 00 ext 111 Recording device failed – false origination Alarm Code = 123  Stn line card failed at 03 01 01 00 ext 111 Recording device failed to hang up–lok Alarm Code = 123  Stn line card failed at 03 01 01 00 ext 111 Recording device failed to hang up–sus Alarm Code = 123  Stn line card failed at 03 01 01 00 ext 111 Recording device failed to answer Alarm Code = 123  Stn line card failed at 03 01 01 00 ext 111 Recording device failed – nil error Alarm Code = 123	GENERAL: The recording device attached to the specified port has malfunctioned. Check wiring. Refer to the instructions provided by the manufacturer of the recording device.  RAD failed to hang up – locked out.  RAD failed to hang up – suspect state.  RAD failed to hang up – locked out  RAD failed to hang up – suspect state.

**Table A-1 Fault Reports  
(continued)**

Alarm Code	Message	Action Required
124	PRINTER failed at 00 00 02 00 Wakeup printer down <p align="right">AlarmCode=124</p>	The printer used for Hotel/Motel wakeup printing is off-line or not working. Check printer. Refer to Printer troubleshooting procedures.
125	ONS card failed at 02 01 01 00 ext 210 Wakeup not answered AlarmCode=125  Stn line card failed at 03 01 01 00 ext 111 Wakeup not answered Alarm Code=125  COV card failed at 01 05 01 00 ext 111 Wakeup not answered Alarm Code=125  Superset card failed at 03 11 11 00 ext11 Wakeup not answered Alarm Code=125	Information only.
126	Any line card failed at 02 01 01 00 ext123 Plid Restored Alarm Code = 126	Record this and watch for further occurrences. If system performance is degraded substantially, contact MITEL Field Service.
127	DISK failed at 00 00 03 00 Disk corrupt Alarm Code = 127	Disk has been corrupted. Check to see if disk is properly installed. Attempt to access the disk by logging into CDE or Maintenance. Reset the system at the earliest low traffic period. New diskette will likely be required.
128	DTMF RX module failed at 02 02 01 00 Receiver locked out Alarm Code = 128	Reseat the affected Universal card.
129	** anything ** failed at 00 00 00 00 Group_Link_Test not a proper member <p align="right">Alarm Code = 129</p> ** anything ** failed at 00 00 00 00 Group_Link_Test Invalid Group Link <p align="right">Alarm Code = 129</p> ** anything ** failed at 00 00 00 00 Group_Link_Test many members in Group <p align="right">Alarm Code = 129</p> ** anything ** failed at 00 00 00 00 Group_Link_Test nil error <p align="right">Alarm Code = 129</p>	Record this and watch for further occurrences. Perform a Verify Database operation and check for further occurrences of this Alarm Code. If system performance is degraded substantially, contact MITEL Field Service.

**Table A-1 Fault Reports  
(continued)**

Alarm Code	Message	Action Required
130	<p><b>** anything ** failed at 00 00 00 00</b>                      Plid to Swid failed      Alarm Code = 130</p>	<p>Record this and watch for further occurrences. Perform a Verify Database operation and check for further occurrences of this Alarm Code. If system performance is degraded substantially, contact MITEL Field Service.</p>
131	<p><b>RAM failed at 00 00 04 00</b>                      Disk VS Ram Failed      Alarm Code=131</p>	<p>Record this and watch for further occurrences. Perform a Verify Database operation and check for further occurrences of this Alarm Code. If system performance is degraded substantially, contact MITEL Field Service.</p>
132	<p><b>** anything** failed at 00 00 00 00</b>                      Key DB corrupt. Set has no prime key.</p> <p><b>** anything ** failed at 00 00 00 00</b>                      Key DB corrupt. Key data not for set.</p> <p><b>** anything **failed at 00 00 00 00</b>                      Key DB corrupt. Invalid key number.</p> <p><b>** anything **failed at 00 00 00 00</b>                      Key DB corrupt. Prime is not key 1.</p> <p><b>** anything **failed at 00 00 00 00</b>                      Key DB corrupt. Prime is not immediate ring.</p> <p><b>** anything **failed at 00 00 00 00</b>                      Key DB corrupt. Prime not in and out.</p> <p><b>** anything** failed at 00 00 00 00</b>                      Key DB corrupt. Line WA index wrong.</p> <p><b>** anything** failed at 00 00 00 00</b>                      Key DB corrupt. Line owner swid wrong.</p> <p><b>** anything** failed at 00 00 00 00</b>                      Key DB corrupt. Nil error.</p>	<p>A CDE audit has failed. If this persists, attempt a COPY DATABASE as soon as possible. Perform a Verify Database operation and check for further occurrences of this Alarm Code. If this still persists; contact MITEL Field Service.</p>

**Table A-1 Fault Reports  
(continued)**

Alarm Code	Message	Action Required
132 (cont.)	<p>Key_DB_test failed at 00 00 00 00 ICM is not key 1</p> <p>Key_DB_test failed at 00 00 00 00 ICM not immed ring</p> <p>Key_DB_test failed at 00 00 00 00 ICM not in and out</p> <p>Key_DB_test failed at 00 00 00 00 Trk DTS and CO</p> <p>Key_DB_test failed at 00 00 00 00 Trk Private and CO</p>	<p>Key 1 is not programmed as an INTERCOM key – key 1 must be an INTERCOM key.</p> <p>The INTERCOM key is not programmed as IMMEDIATE RING – must be so.</p> <p>The DIRECTION for the INTERCOM key is not programmed as In/Out – must be so.</p> <p>A trunk has been programmed as a DTS key on a PBX SUPERSET telephone and a CO Line on a Key System SUPERSET telephone – this is not permitted.</p> <p>A trunk has been programmed as a PRIVATE key on a PBX SUPERSET telephone and a CO Line on a Key System SUPERSET telephone – this is not permitted.</p>
133	** anything ** failed at 00 00 00 00 Trunk Number Corrupt.	A CDE audit has failed. If this persists, attempt a COPY DATABASE as soon as possible. Perform a Verify Database operation and check for further occurrences of this Alarm Code. If this still persists; contact MITEL Field Service.
134	** anything ** failed at 00 00 00 00 Access Code Tbl Bad.	A CDE audit has failed. If this persists, attempt a COPY DATABASE as soon as possible. Perform a Verify Database operation and check for further occurrences of this Alarm Code. If this still persists; contact MITEL Field Service.
135	UPS sense failed at 00 00 09 00 UPS not available Alarm Code = 135	The Uninterruptable Power Supply is not operating. Check the relevant wiring (see Practice 9109-096-200-NA, Installation Information). Refer to the UPS Part of this Practice.
136	UPS sense passed at 00 00 09 00 UPS available Alarm Code = 136	Information only.
137	UPS sense failed at 00 00 09 00 ac voltage failure Alarm Code = 137	The line ac voltage has failed. Ensure UPS is functioning.
138	UPS sense failed at 00 00 09 00 Battery/charger Alarm Code = 138	Either the battery is failing, or the battery charger is not functioning. Examine battery, charger, and wiring. Also refer to the instructions provided by the manufacturer of the UPS.

**Table A-1 Fault Reports  
(continued)**

Alarm Code	Message	Action Required
139	UPS sense failed at 00 00 09 00 AC/battery/charger Alarm Code = 139	There is no line ac voltage. Also, the battery is failing, or the charger is/was not functioning properly. Examine battery, charger and wiring. Also, refer to the instructions provided by the manufacturer of the UPS.
141	Nil device failed at 00 00 00 00 PMS is down Alarm Code = 141	The PMS system failed to respond to 20 consecutive queries from the SX-200 DIGITAL system. Refer to PMS procedures.
142	Nil device failed at 00 00 00 00 PMS is up Alarm Code = 142	After failing to respond, the PMS system has now responded to an SX-200 DIGITAL enquiry.
143	Nil device failed at 00 00 00 00 PMS buffer is full Alarm Code = 143	The system attempted to send a message to the PMS message buffer; buffer was full. If persistent, refer to PMS procedures.
144	Nil device failed at 00 00 00 00 No STX from PMS Alarm Code = 144	PMS has sent the PBX an invalid START-OF-TEXT message. Refer to PMS procedures.
145	Nil device failed at 00 00 00 00 No ETX from PMS Alarm Code = 145	PMS has sent the PBX an invalid END-OF-TEXT message. Refer to PMS procedures.
146	Nil device failed at 00 00 00 00 Bad PMS function Alarm Code = 146	PMS has sent the PBX an invalid function message. Refer to PMS procedures.
147	Nil device failed at 00 00 00 00 Bad PMS status Alarm Code = 147	PMS has sent the PBX an invalid status message. Refer to PMS procedures.
148	Nil device failed at 00 00 00 00 Bad PMS room number AlarmCode=148	PMS has sent the PBX an invalid room number message. Refer to PMS procedures.
149	Nil device failed at 00 00 00 00 Cannot send PMS msg AlarmCode=149	If the PMS refuses to accept a transaction from the PBX after five tries, the PBX will generate this log.
150	LS/GS trk card failed at 01 05 01 00 trk 001 Trunk no dial tone Alarm Code = 150	This trunk was seized and after 10 seconds dial tone was not detected. The trunk has been busied out.
151	Link 07 Channel 19 Busied out Alarm Code = 151	Device busied out by maintenance personnel.
151	ONS card failed at 01 01 01 00 ext 1101 Busied out Alarm Code = 151	Device busied out by maintenance personnel.
152	ONS card passed at 01 01 01 00 ext 1101 Returned to service Alarm Code = 152	Device returned to service by maintenance personnel.
152	Link 07 Channel 19 Returned to service Alarm Code = 152	Device returned to service by maintenance personnel.

**Table A-1 Fault Reports  
(continued)**

Alarm Code	Message	Action Required
155	<p>T1 trunk card passed at 01 06 01 00 Trk 019 has exceeded the maintenance slip threshold</p> <p>T1 trunk card passed at 01 06 01 00 Trk 019 is now below the maintenance slip threshold</p> <p>T1 trunk card at 01 06 01 00 Trk 019 has exceeded the service slip threshold</p> <p>T1 trunk card at 01 06 01 00 Trk 019 has exceeded the maint loss frame threshold</p> <p>T1 trunk card at 01 06 01 00 Trk 019 is now below the maint loss frame threshold</p> <p>T1 trunk card at 01 06 01 00 Trk 019 has exceeded the service loss frame threshold</p> <p>T1 trunk card at 01 06 01 00 Trk 019 has exceeded the maintenance ber threshold</p> <p>T1 trunk card at 01 06 01 00 Trk 019 is now below the maintenance ber threshold</p> <p>T1 trunk card at 01 06 01 00 Trk 019 removed from service and transmitting yellow alarm</p> <p>T1 trunk card at 01 06 01 00 Trk 019 is returned to service</p>	<p>The link has exceeded the specified threshold – this is a warning – watch for further occurrences. If persistent, refer to T1 troubleshooting procedures.</p> <p>Link was running with errors, is now running at an acceptable error rate. Information only.</p> <p>The link has exceeded the specified threshold. A yellow alarm has been sent to the far end, and the link has been removed from service, and a new sync source selected. The RTS – Service Limit timer has been started. Refer to T1 Trunk troubleshooting procedures.</p> <p>The link has exceeded the specified threshold – this is a warning – watch for further occurrences. If persistent, refer to T1 troubleshooting procedures.</p> <p>Link was running with errors, is now running at an acceptable error rate. Information only.</p> <p>The link has exceeded the specified threshold. A yellow alarm has been sent to the far end, and the link has been removed from service, and a new sync source selected. The RTS – Service Limit timer has been started. Refer to T1 Trunk troubleshooting procedures.</p> <p>The link has exceeded the specified threshold – this is a warning – watch for further occurrences. If persistent, refer to T1 troubleshooting procedures.</p> <p>Link was running with errors, is now running at an acceptable error rate. Information only.</p> <p>Refer to T1 troubleshooting procedures.</p> <p>The link yellow alarm has been cleared. Possibly the RTS service limit timer has expired, and the link is within an acceptable threshold allowing it to be returned to service. The link may now be used as the network sync source. Information only.</p>

**Table A-1 Fault Reports  
(continued)**

Alarm Code	Message	Action Required
155 (cont.)	<p>T1 trunk card at 01 06 01 00 Trk 019 is receiving a yellow alarm</p> <p>T1 trunk card at 01 06 01 00 Trk 019 is in red alarm condition due to loss of sync</p> <p>T1 trunk card at 01 06 01 00 Trk 019 is in red alarm condition due to loss of power</p> <p>T1 trunk card at 01 06 01 00 Trk 019 exceeded sync slip thresh as current sync source</p> <p>T1 trunk card at 01 06 01 00 Trk 019 is now below the net sync slip threshold</p> <p>T1 trunk card at 01 06 01 00 Trk 019 alarm condition is now cleared</p> <p>T1 trunk card at 01 06 01 00 Trk 019 System in freerun mode no sync source available</p> <p>T1 trunk card at 01 06 01 00 Trk 019 is current sync source and is in auto mode</p> <p>T1 trunk card at 01 06 01 00 Trk 019 is current sync source and is in manual mode</p>	<p>The link has received a yellow alarm condition from the far end, and has been removed from service. If this is the network sync source, a new source has been selected. Problem with either the local Channel Service Unit, or at the far end.</p> <p>There is no synchronization detected on the link; it has been removed from service. If this is the network sync source, a new source has been selected. Problem with either the local Channel Service Unit, or at the far end.</p> <p>No power on the link; it has been removed from service. If this is the network sync source, a new source has been selected. Problem with either the local Channel Service Unit, or at the far end.</p> <p>The link is the current network sync source – a new sync source has been selected. Refer to T1 troubleshooting procedures. If this message persists, may be necessary to make changes to the network synchronization source list.</p> <p>The RTS net slip timer has expired, and the link is within an acceptable threshold allowing it to be returned to service. The link may now be used as the network sync source. Information only.</p> <p>A red or yellow alarm has been cleared, and the RTS after alarm timer has expired. The link has returned to service. Information only.</p> <p>There is no network synchronization source that can be used (the source list has been exhausted) – the system is therefore in free-run mode. Refer to the T1 Trunk troubleshooting procedures. May be necessary to make changes to the network synchronization source list.</p> <p>The link is the new sync source, and the system is in auto mode. Information only.</p> <p>The link is the new sync source, and the system is in manual mode. Information only.</p>

**Table A-1 Fault Reports  
(continued)**

Alarm Code	Message	Action Required
155 (cont.)	<p>T1 trunk card at 01 06 01 00 Trk 019 The system's previous sync source was freerun mode</p> <p>T1 trunk card at 01 06 01 00 Trk 019 was previous sync source in manual mode</p> <p>T1 trunk card at 01 06 01 00 Trk 019 was previous sync source in auto mode</p> <p>T1 trunk card at 01 06 01 00 Trk 019 is reporting unstable link (phase error)</p> <p>T1 trunk card at 01 06 01 00 Trk 019 is reporting unstable link (no phase error)</p> <p>T1 trunk card at 01 06 01 00 Trk 019 sync source manual timer has expired</p> <p>T1 trunk card at 01 06 01 00 Trk 019 No T1 clock module, running in freerun mode</p> <p>T1 trunk card at 01 06 01 00 Trk 019 created log for unknown reason</p>	<p>There was a change in the network sync source. The system was previously in free-run mode. Information only.</p> <p>There was a change in the network sync source. The link was the old sync source, and the system was in manual mode. Information only.</p> <p>There was a change in the network sync source. The link was the old sync source, and the system was in auto mode. Information only.</p> <p>The link is reporting phase errors. If this is the network sync source, a new source has been selected. Problem with either the local Channel Service Unit, or at the far end.</p> <p>The link is no longer reporting phase errors. It is now available for use as the network sync source. Information only.</p> <p>The network sync source manual timer has expired and the system is changing from manual to auto or freerun mode. A network sync source is picked from the network synchronization source list. Information only.</p> <p>Links for network sync have been specified, but there is no T1 clock module in the system. The system is running in freerun mode as a result. Check if T1 module is installed. If so, refer to Main Control card procedures.</p> <p>Non problem. If persistent, contact MITEL Field Service.</p>
156	DIG line card and failed at 05 01 01 PST checksum failed Alarm Code =156	Checksum of dataset firmware failed, replace set. Device will be busied out.
157	DIG line card failed at 05 01 01 PST RAM failed Alarm Code = 157	RAM in dataset failed (external or 6803). Replace set. Device will be busied out.
158	DIG line card failed at 05 01 01 PST UART I/b failed Alarm Code =158	UART loopback power up test failed; replace set. Device will be busied out.
159	DIG line card failed at 05 01 01 PST DNIC I/b failed Alarm Code =159	DNIC loopback power up self test failed; replace set. Device will be busied out.
160	DIG line card failed at 05 01 01 PSC HDLC failed Alarm Code = 160	HDLC controller failed in power up test; replace set. Device will be busied out.

**Table A-1 Fault Reports  
(continued)**

Alarm Code	Message	Action Required
161	DIG line card failed at 01 02 11 02 ext 123 Firmware trap Alarm Code = 161	Firmware trap occurred in set; check power supply. The device will not be busied out.
162	DIG line card failed at 01 02 11 02 ext 123 Flood of EIA input Alarm Code = 162	Call Processing received more than 125 EIA input reports within 2 minutes while in the idle state; the data device was busied out. When the device is replaced, the data device will be unbusied. Check the equipment attached to the data device for a faulty EIA output.
163	DIG line card failed at 01 02 11 02 ext 123 Flood of Ascii input Alarm Code = 163	A flood of ASCII characters (100 more than the maximum input) was received, and the data device was busied out. If the device is replaced the data device will be unbusied. Check the equipment attached to the data device for flooding of ASCII characters (such as a large file being dumped to the DTRX process).
164	NIL PLID failed at 00 00 00 00 Bad PMS Name Alarm Code = 164	The name field received from the PMS system is improperly formatted, or is inconsistent with the name operator. Refer to PMS procedures.
165	NIL PLID failed at 00 00 00 00 Bad PMS Time Alarm Code = 165	The time field received from the PMS system is improperly formatted. Refer to PMS procedures.
166	NIL PLID failed at 00 00 00 00 PMS requires console Alarm Code= 166	Dial 0 routing for the PMS is not a console LDN or a console prime number. Problem either with PMS database or local SX-200 DIGITAL programming.
170	DIG line card failed at 05 01 01 Firmware trap Alarm Code = 170	Firmware trap occurred in set; check power supply. The device will not be busied out.

**Table A-1 Fault Reports  
(continued)**

<b>Alarm Code</b>	<b>Message</b>	<b>Action Required</b>
171	DIG line card failed at 05 01 01 Flood of EIA input      Alarm Code = 171	Call Processing received more than 125 EIA input reports within 2 minutes while in the idle state; the data device was busied out. When the device is replaced, the data device will be unbusied. Check the equipment attached to the data device for a faulty EIA output.
172	DIG line card failed at 05 01 01 Flood of ASCII input      Alarm Code = 172	A flood of ASCII characters (100 more than the maximum input) was received, and the data device was busied out. If the device is replaced the data device will be unbusied. Check the equipment attached to the data device for flooding of ASCII characters (such as a large file being dumped to the DTRX process).

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**Table A-2 Alarm Log Reports**

<b>Alarm Code</b>	<b>Action Required</b>
Tot alarm went from No Alarm to MAJOR see Alarm Reasons' in Table A-3	Use SHOW ALARMS command for more detailed information. Also see the applicable entry in Table A-3.
Tot alarm went from MINOR to MAJOR see Alarm Reasons' in Table A-3	Use SHOW ALARMS command for more detailed information. Also see the applicable entry in Table A-3.
Tot alarm went from MAJOR to CRITICAL see Alarm Reasons' in Table A-3	Use SHOW ALARMS command for more detailed information. Also see the applicable entry in Table A-3.
Tot alarm went from MAJOR to MINOR see Alarm Reasons' in Table A-3	This is an improvement in service. Information only.
Tot alarm went from MINOR to No Alarm see Alarm Reasons' in Table A-3	This is an improvement in service. Information only.

**Table A-3 Alarm Reset Reasons**

Alarm Level Change Reason	Action Required
Alarm level change due to Bay XX pcm Alarm level change due to Bay XX rcvrs Alarm level change due to Bay XX trunks Alarm level change due to Bay XX lines	Check the status of the specified bay (XX) via the SHOW ALARMS and SHOW STATUS commands. Refer to the 'Analog Bay Peripheral Control Subsystem' Part of this Practice.
Alarm level change due to system pcm Alarm level change due to system rcvrs Alarm level change due to system trunks Alarm level change due to system lines	Check the system status via the SHOW ALARMS and SHOW STATUS commands. Refer to the 'Analog Bay Peripheral Control Subsystem' Part of this Practice.
Due to threshold change of Bay XX pcm Due to threshold change of Bay XX rcvrs Due to threshold change of Bay XX trunks Due to threshold change of Bay XX lines	Check the status of the specified bay (XX) via the SHOW ALARMS and SHOW STATUS commands. Refer to the 'Analog Bay Peripheral Control Subsystem' Part of this Practice.
Due to threshold change of system PCM Due to threshold change of system rcvrs Due to threshold change of system trunks Due to threshold change of system lines	Check the status via the SHOW ALARMS and SHOW STATUS commands. Refer to the 'Analog Bay Peripheral Control Subsystem' Part of this Practice.

**Table A-4 Main Control Reset Log Reports**

Reset Log Message	Action Required
Main Control was reset due to power up	Information only. Main Control Card is reset at power-up.
Main Control was reset due to pushbutton	The SYSTEM RESET pushbutton on the Main Control Card was pushed. Investigate.
Main Control was reset due to watch dog timer Main Control was reset due to local bay cause Main Control was reset due to msg link failure Main Control was reset due to software error Process 00 ANYTHING at address 012345 Main Control was reset due to software error RAM parity error at address = 012345 Main Control was reset due to parity failure RAM parity error at address = 012345 Main Control was reset due to software error Process 00 has overflowed its stack Main Control was reset due to software error Exception = ANYTHING at address 012345	In all cases, check if Main Control Card is functioning; if not, go to Emergency Troubleshooting procedures (Table 9-1).
Main Control was reset due to Copy Database Upgrade disks left in drives.	A copy was done and the update disks were left in causing a reset.

<b>Table A-5 Bay Reset Log Reports</b>	
<b>Reset Log Message</b>	<b>Action Required</b>
Bay X was reset due to msg link failure Bay X reported cause: scanner/power	The main control was unable to communicate with the bay, and therefore reset the bay. Bay may have lost power; possibly faulty Scanner card.
Bay was reset due to msg link failure Bay X reported cause: cutover	The PCM cable may be faulty. Possibly faulty Main Control or DIC card.
Bay X was reset due to local bay cause Bay reported cause: Scanner/power	Push button may have been pushed on the Scanner card. If not, possibly faulty Scanner card.
Bay number X reported cause: parity failure at address XXXXXX	Failure of on-board DRAM. If persistent, replace the Bay Control card.
Bay number X reported cause: power up at address XXXXXX	Information only. Bay Control Card is reset at power-up.
Bay number X reported cause: reset by MCC at address XXXXXX	Bay was reset because Main Control card was reset. Investigate possible Main Control card problem.
Bay number X reported cause: watchdog timer at address XXXXXX	Software failure. Check if Main Control Card is functioning; if not, go to Emergency Troubleshooting procedures (Table 9-1).
Bay number X reported cause: ** anything else** at address XXXXXX	Software failure. Check if Main Control Card is functioning; if not, go to Emergency Troubleshooting procedures (Table 9-1).

<b>Table A-6 DIC Recovery Log Reports</b>	
<b>Log Message</b>	<b>Action Required</b>
Bay X recovered DIC : Lower/Upper Type 1	DIC was hung; reset by PCC. The DIC recovered. If persistent, could be a defective DIC card.
Bay X recovered DIC : Lower/Upper Type 2	The DIC performed an unexpected software reset. If persistent, could be a defective DIC card.
Bay X recovered DIC : Lower/Upper Type 3	The PCC reset the DIC – the DIC did not require a reset. If persistent, could be a defective PCC card.
Bay X recovered DIC : Lower/Upper Type 4	The DIC did an unexpected reset, but did not require one. If persistent, could be a defective PCC card.

**Table A-7 Bay Log Reports**

Log Message	Action Required
Bay number X reported cause: Lower DIC failed	The PCC forced an expected lower DIC recovery – the DIC did not require one. If persistent, could be a defective PCC card.
Bay number X reported cause: Upper DIC failed	The PCC forced an expected upper DIC recovery – the DIC did not require one. If persistent, could be a defective PCC card.
Bay number X reported cause: DIC's failed – Type 1	The PCC forced an expected upper DIC recovery – but the DIC required a reboot. If persistent, could be a defective DIC card in bay 5.
Bay number X reported cause: DIC's failed – Type 2	The PCC forced an expected upper DIC recovery – but the DIC required a reboot. If persistent, could be a defective DIC card in bay 3 or bay 4.
Bay number X reported cause: Lower DIC reset	The lower DIC unexpectedly reset, but did not require it. If persistent, could be a defective DIC card in bay 3 or bay 4.
Bay number X reported cause: Upper DIC reset	The upper DIC unexpectedly reset, but did not require it. If persistent, could be a defective DIC card in bay 5.
Bay number X reported cause: DIC's reset – Type 1	The upper DIC unexpectedly reset, and required a reboot. If persistent, could be a defective DIC card in bay 5.
Bay number X reported cause: DIC's reset – Type 2	The lower DIC unexpectedly reset, and required a reboot. If persistent, could be a defective DIC card in bay 3 or bay 4.
Bay number X reported cause: Power up	The analog bay has been powered up, or the power monitor circuit caused the reset.
Bay number X reported cause: Scanner	The Scanner watch dog reset the bay – if persistent, indicates faulty Scanner card.
Bay number X reported cause: Software error XXXX	The PCC watchdog timer expired – if persistent, indicates faulty PCC card.
Bay number X reported cause: Scanner/Power	Caused by pushbutton reset of the Scanner card. If not, could be caused by power tuned off at the bay, ac power failure, or power system failure. Also could be defective Scanner card.
Bay number X reported cause: Cut over	Information only.

Table A-8 Miscellaneous Log Reports

Reset Log Message	Action Required
System Configuration/Decryption module conflict Change system configuration to clear error.	Check the installation of the decryption module.
Log(s) deleted by user	A user logged in to the maintenance facility (maintenance terminal or console) deleted one or more log entries via the DELETE LOGS command.
Involved in recovery is 01 04 04 04 ext 1100 01 03 03 03 Trk 001 Main Control trace back at address = XXXXXX (anything) CP Process recovered from software error # XX (anything)	In all cases, this indicates a software error. Refer the problem to MITEL Field Service.

## Troubleshooting

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## Appendix B.

### CALL PROCESSING INFORMATION

**Table B-1 Digital Bay to Digital Bay Call**

Step	Event
1.	The Main Control Card (MCC) scans for on-hook/off-hook change of state.
2.	An extension goes off-hook in Bay 1.
3.	The MCC detects the off-hook during its line card scan.
4.	MCC checks for the COS of the extension to determine if the call is allowed.
5.	The MCC checks for an idle receiver.
6.	The MCC connects the DTMF receiver to the line circuit through the DX matrix on a PCM channel.
7.	The MCC connects the same channel to the Digital Signal Processor (DSP) to provide dial tone.
8.	The MCC monitors the circuit for rotary pulses.
9.	The DTMF receiver detects any DTMF tones and sends a message to the MCC indicating the value of the dialed digits.
10.	On receipt of the first digit, the MCC removes the DSP from the assigned channel.
11.	The MCC monitors the digits dialed and checks the idle/busy condition of the destination.
12.	If the destination is idle, the MCC connects the DSP to the originator and ringback is supplied.
13.	The MCC sends the originator a cadence message to provide interruption of the ringback tone.
14.	The MCC sends ringing to the Bay Power Supply from the DSP via a DX link.
15.	The Bay Power Supply amplifies and routes the ringing to the destination.
16.	The MCC sends a message to the destination to turn ringing on.
17.	When the destination answers, the MCC detects the off-hook change of state.
18.	Ringing is removed from the destination.
19.	Ringback is removed from the originator.
20.	A channel is connected between the originator and the destination.
21.	The MCC scans for on-hook/off-hook changes of state.
22.	When an on-hook is detected, the MCC removes the channel, and the call is terminated.

**Table B-2 Analog Bay to Analog Bay Call**

Step	Event
1.	The Scanner card scans the line circuits for on-hook/off-hook changes of state.
2.	An extension goes off-hook in Bay 3.
3.	The Scanner detects an off-hook during the line card scan.
4.	The Scanner sends an IRQ to the Peripheral Control Card (PCC).
5.	The PCC determines the originator, generates a message and passes it to the Digital Interface Card (DIC).
6.	The DIC formats and sends a message to the MCC.
7.	The MCC checks the originator's COS to determine if the call is allowed.
8.	The MCC checks for an idle DTMF receiver.
9.	The MCC sends a message to the PCC to connect a junctor to the originator.
10.	The MCC assigns a channel of the link to the junctor, and connects the DTMF receiver to the channel through the DX matrix.
11.	The MCC connects the same channel to the Digital Signal Processor (DSP) to provide dial tone.
12.	The PCC monitors the circuit for rotary pulses.
13.	The DTMF receiver detects any DTMF tones and sends a message to the MCC indicating the value of the tones.
14.	On receipt of the first digit, the MCC removes the DSP from the assigned channel.
15.	The MCC monitors the digits dialed and checks the idle/busy condition of the destination.
16.	If the destination is idle, the MCC connects the DSP to the originator and ringback tone is supplied.
17.	The MCC sends a cadence message to the PCC of the originator to provide interruption of the ringback tone.
18.	The MCC sends a message to the PCC to ring the destination.
19.	When the destination answers, the Scanner detects the off-hook
20.	The Scanner sends an IRQ to the PCC.
21.	The PCC stops ringing and sends a message to the MCC indicating that the destination is off-hook.
22.	Ringback is removed from the originator.
23.	Since both parties are in Bay 3, the MCC sends a message to the PCC to provide a connection between the originator and the destination using a speech path (there are no PCM channels used in this connection).
24.	The Scanner scans for on-hook/off-hook changes of state.
25.	When an on-hook is detected, the PCC sends a message to the MCC indicating that the extension(s) has gone on-hook; the call is terminated.

Table B-3 Digital Bay to Digital Bay Call (672 Port System)

Step	Event
1.	Caller in Bay 1 goes Off-Hook (the event).
2.	The Bay Control Card (BCC) scans circuits on each card in its bay for events (hardware).
3.	When an event occurs, the BCC assembles a message (in HDLC format) describing the event, the associated PLID, and the device which caused the event.
4.	The message is then sent via a dedicated message channel, over one of the 3 links which interconnect the peripheral bay to the control bay, to the Main Control Card (MCC). The Switch Matrix Card (SMC) provides the digital crosspoint (DX) connection between the BCC and the MCC.
5.	The message is picked up by the message system and routed to the appropriate destination; in this case, the call processing (CP) processes messages in a first in – first out manner.
6.	CP, taking the message from its message queue, then accepts the message and looks up the Device Work Area (DWA). This work area allows CP to determine the COS, COR, and other features enabled for the device which caused the event.
7.	CP checks for an available receiver and channel, and connects them to the device via the DX matrices on the SMC and on the BCC.
8.	Once the Receiver is connected to the device, dial tone is sent from the Digital Signal Processor (DSP) on the MCC. This also must be connected to the device via the DX matrices.
9.	The caller then hears dial tone and begins dialing digits.
10.	For ONS calls only, the Receiver decodes the first digit and passes it to the MCC. For <i>SUPERSET</i> telephones, digits are sent to Call Processing (CP).
11.	The MCC accepts the digit and turns off dial tone from the DSP; it then waits for further digits.
12.	While waiting for and receiving the digits, the MCC checks validity of digits dialed against database and against COS/COR limits for the device.
13.	Once all digits are accepted, the MCC uses the information received to find the destination device and set up a channel to initiate the call.
14.	Assuming the destination is idle, the MCC sends the ringing message to the BCC to ring the destination. The receiver is dropped during ringback.
15.	The BCC then instructs the Bay Power Supply (BPS) to send ringing voltage via the backplane and dry contact relays on the line card to the destination. Ringing reference is supplied by the DSP and cadenced by the BCC for a specified pattern such as 1 second ON, 3 seconds OFF. <i>SUPERSET</i> telephones are sent a message to cause the set to begin warbling..
16.	While the destination is being rung, ringback tone is sent to the calling party. This is supplied by the DSP from the MCC.
17.	Destination hears ringing and goes OFF-HOOK.

**Table B-3 Digital Bay to Digital Bay Call (672 Port System)  
(continued)**

Step	Event
18.	BCC detects off-hook while scanning all ports in its bay and sends the answer message to the MCC.
19.	MCC accepts the answer message, instructs the BCC to turn off the ringing being sent to the destination, turns off ringback tone being sent to the source, and then instructs the SMC to connect the source to the destination. This establishes the voice connection.
20.	Conversation is carried out and completed.
21.	One party hangs up. BCC detects and sends disconnect message to MCC. MCC puts other party in 'suspended - xxx hung up' or 'lockout - locked out' until he also hangs up. Then the MCC returns the set to idle.

# Appendix C.

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## TROUBLESHOOTING KIT

The following is a recommended list of items required in the Field Service Engineering Troubleshooting Kit:

- One of each circuit card as a spare, including modules
- Butt set
- Digital multimeter
- Moving coil multimeter
- Static strap
- Ground mat
- Assorted screwdrivers, wrenches
- Long nose pliers
- Spare fuses
- Wire strippers
- Fan filter
- Breakout Box (for Data)



# Appendix D.

## LOOP CURRENT MEASUREMENT

There are two methods available to measure loop current:

- In-Line method.
- Voltage conversion measurement.

If it is not possible to break the loop (i.e., open the Tip or Ring lead) the second method may be used; however, it is not as accurate.

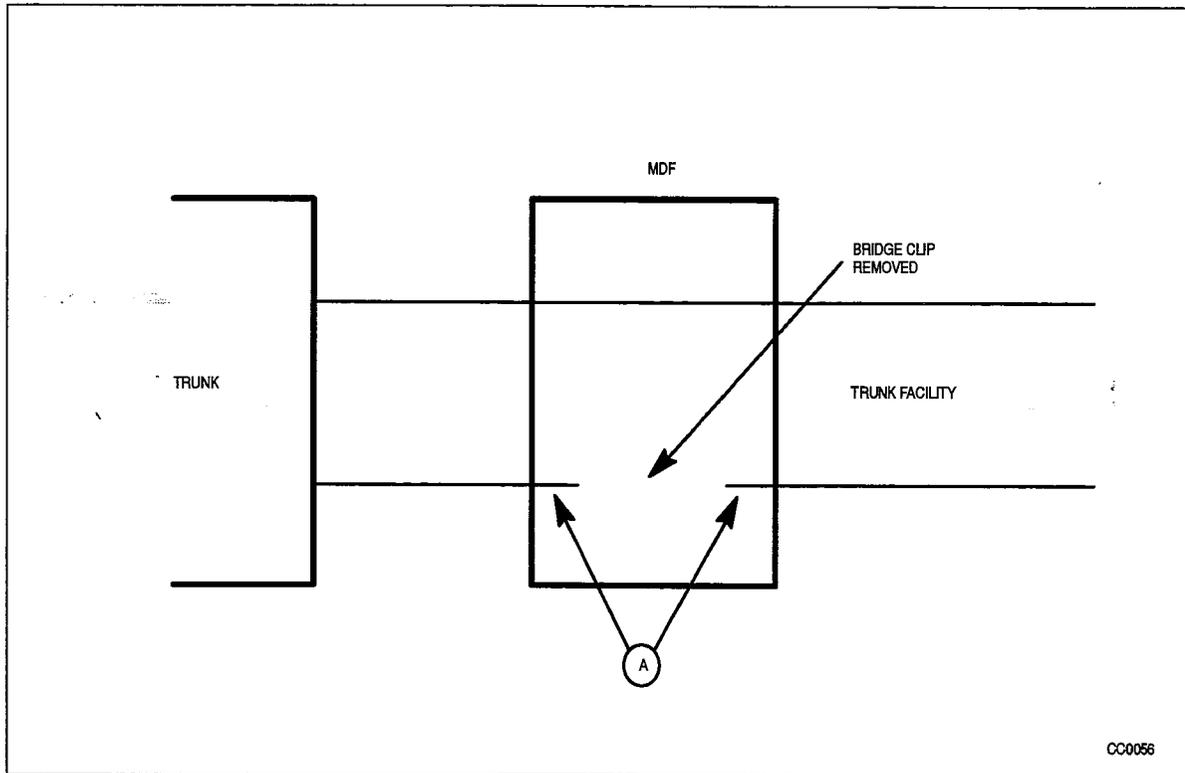
**In-Line Method.** The procedure for the in-line method of measuring loop current is shown in Figure D-1 and is described as follows:

1. Open either the Tip or Ring lead of the trunk facility by removing one of the bridge clips on the MDF.
2. Insert an ammeter where the clip was.
3. Take current readings at the instant the trunk is seized, and after the call has been completed. Do this in both incoming and outgoing directions.
4. Release the trunk and repeat the measurements several times on the same Central Office at peak and low traffic hours.
5. Repeat the above using different Central Office trunks.

**Voltage Conversion Method.** This method of loop current measurement should be used only in such instances when it is not desirable to open the Tip or Ring leads. The procedure is as follows:

1. With the trunk seized, use a voltmeter to measure the voltage between the Tip and Ring of the trunk.
2. This voltage is then used to calculate the loop current (see below).
3. Release the trunk and repeat the measurement several times using the same Central Office trunk at peak and low traffic hours.
4. Repeat the above measurements using different Central Office trunks.
5. Typical equivalent resistance seen between Tip and Ring, when the trunk is seized, is approximately 250 ohms.
6. The following is a simple calculation used to obtain the loop current value:

$$\text{Loop Current} = \frac{\text{measured Tip to Ring voltage}}{250}$$



**Figure D-1 In-Line Current Measurement**

## Appendix E.

---

### LOOP START VS GROUND START CHECK

The loop start VS ground start check should be performed as follows (also refer to Figure E-1):

1. Locate the PBX trunk circuit Tip and Ring on the connecting block at the MDF.
2. Remove the bridge clips on the Tip and Ring (i.e., disconnect the PBX trunk circuit from the Central Office Tip and Ring).
3. Connect the butt set across the Central Office Tip and Ring.
4. Go off-hook with the butt set. If Central Office dial tone is returned, then the Central Office trunk is loop start.
5. If no dial tone is returned, then momentarily ground the Ring lead with a butt set off-hook across Tip and Ring. If Central Office dial tone is returned, then the Central Office is ground start.
6. If still no dial tone is returned, repeat the previous step and ground the Tip lead instead. If Central Office dial tone is returned, the Central Office trunk is ground start (however, the Tip and Ring are reversed).
7. If still no dial tone is returned in either of these cases, there is a problem (perhaps Tip and Ring opened or shorted, or a large ground differential between PABX ground and Central Office ground.) Check PABX ground. If PABX ground is good, then report problem to telephone company.

**Note:** In most cases with ground start trunks, dial tone may be returned by grounding either Tip or Ring. If this should occur, repeat the 5th and 6th steps using the butt set in its "on-hook" or "monitor" state. Hold the ground lead on for a few seconds; CO should return dial tone as long as the ground lead is connected.

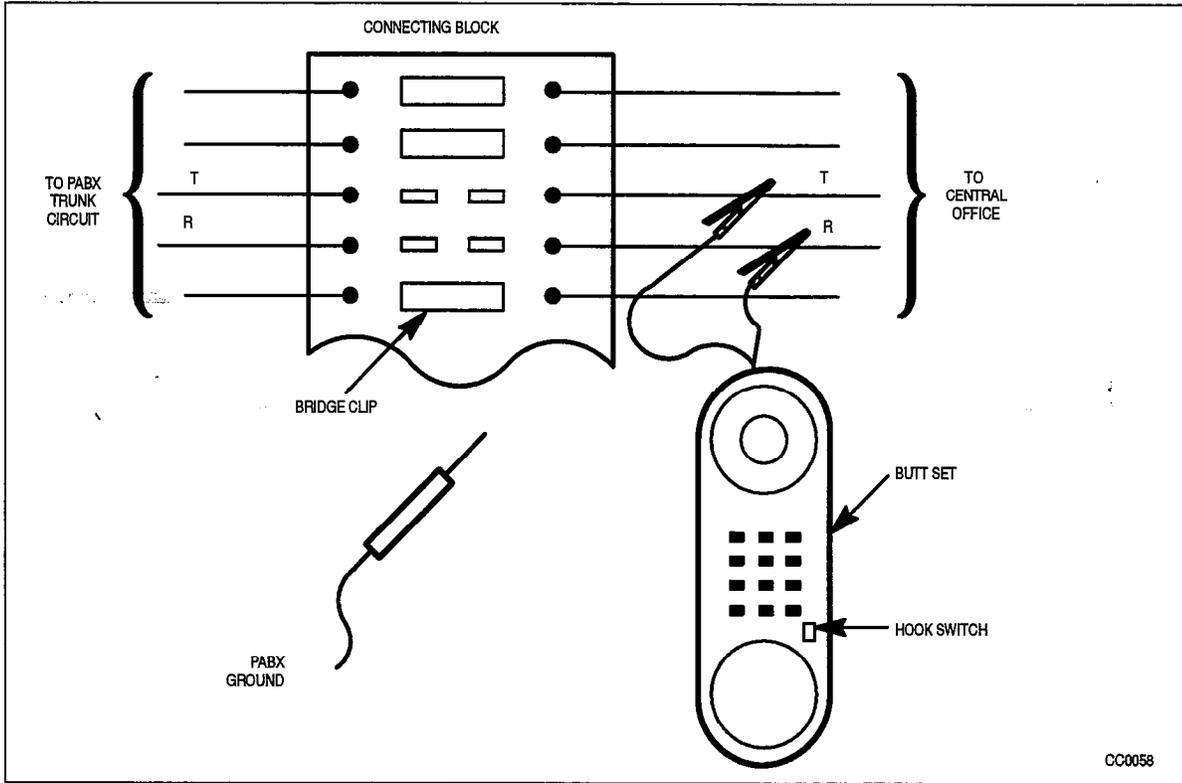


Figure E-1 Loop Start Versus Ground Start Check

# Appendix F.

## MITEL REPAIR TAG

Any card or any other device found faulty must be returned with a Mitel Repair Tag (see Figure F-1). The following information must be included on the repair tag:

1. The date on which the device was returned.
2. The location of the point of origin (the installation site).
3. The company name.
4. The product name (i.e., *SX-200 DIGITAL*).
5. The system serial number (located on the front of the cabinet).
6. The software generic (i.e., *GENERIC 1003* or *GENERIC 1002*).
7. The software Revision (i.e., *480P/D64.1 9-SEP-1986*).
8. The assembly part number of the item being returned (i.e., *DTMF Receiver Module - 9109-016-000*).
9. The assembly serial number of the item being returned - this is a white sticker located on the card itself.
10. Any pertinent alarm/error displays; this may include circuit card alarm LEDs, 7-segment displays, console or maintenance terminal error messages, or maintenance log messages.
11. A brief description of the symptoms of the problem.
12. Indicate whether the fault occurred during installation, or while the system was in service.
13. Include any further information that may be useful on the rear of the repair tag.



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**SX-200<sup>®</sup> DIGITAL PABX**

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# RS-232 Maintenance Terminal

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**NOTICE**

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## 1.

**GENERAL****Introduction**

- 1.1 This Practice is intended to assist maintenance personnel in obtaining the maximum benefit from the extensive built-in maintenance features of the *SX-200*® DIGITAL PABX. It provides information on the setting up and use of the RS-232 Maintenance Terminal, which is the prime maintenance tool on the *SX-200* DIGITAL system. The maintenance terminal is also used for Customer Data Entry (CDE) and Traffic Measurement. All of those functions are also accessible from the Attendant Console. Since the scope of this Practice is primarily maintenance-related, refer to Practices 9109-096-210-NA, Customer Data Entry (CDE), and 9109-096-450-NA, Traffic Measurement, for information on these topics.

**Reason for Issue**

- 1.2 This Practice forms part of the MITEL® Standard Practices issued to provide technical information for the *SX-200* DIGITAL PABX including the *SX-200* FD (Fiber Distributed).

**How to Use this Practice**

- 1.3 This Practice has been arranged in such a way as to serve two distinct functions: first, as a self-teaching guide for those using the *SX-200* DIGITAL PABX maintenance terminal for the first time; secondly, as a reference manual for those requiring review material. For the first group, it is recommended that the section be read through carefully, preferably with a maintenance terminal available so that the various commands may be tried out as the material is studied. For the second group, it is recommended that this document and its Table of Contents be used as a reference to the features and commands available.

**Note:** Some displays and messages (such as ACD or T1 Trunk related) are not available with Generic 1001, Generic 1002, or Generic 1005 FPKG 1 and LIT96.



## 2.

### SETTING UP

#### Terminal Type

2.1 The *SX-200* DIGITAL PABX maintenance subsystem is designed to interface with most 80-column terminals having an RS-232 type interface. The terminal may be either a video display terminal or a hard copy teleprinter. For ease of operation, a video display terminal capable of using the ANSI X3.64-1977 special character set for special graphics (i.e., VT100™ compatible) is preferred. The system prompts the user to specify the terminal type at the start of the login sequence (see paragraph 2.4 ). To ensure compatibility with the maintenance subsystem, the terminal should be set up for the following data characteristics:

- 8 data bits
- 1 start bit
- 1 stop bit
- no parity.

The maintenance subsystem will automatically set itself to the terminal's baud rate; however, the terminal baud rate must be one of:

- 300
- 600
- 1200
- 2400
- 4800
- 9600.

#### Connection to the System (Terminal)

##### ***SX-200* DIGITAL**

2.2 The maintenance terminal is connected to the *SX-200* DIGITAL PABX by means of a standard 25-pin RS-232 cable. One end of the cable is plugged into the main RS-232 communication port of the terminal; the other end is plugged into the RS-232 Maintenance Connector port on the system Maintenance Panel (see Figure 2-1 and Figure 2-2). The Maintenance Port Selection Switch on the panel should be set to "TERMINAL (DTE)". Alternatively, a modem may be plugged into the "REMOTE" connector, located on the rear maintenance panel, for communication with a remote maintenance terminal. The port selection switch should be set to "MODEM (DCE)".

- Notes:**
1. A terminal MAY NOT be connected directly to the "REMOTE" connector.
  2. The "REMOTE" and "LOCAL" connectors may not be used concurrently.

**SX-200 FD**

The Maintenance terminal can be connected to either the Control Cabinet or one of the Peripheral Cabinets (Bays) of the SX-200 FD. A standard RS-232 cable is connected to the main RS-232 communication port of the terminal. The other end of the cable is connected to the 9-pin RS-232 cable connector which is located at the bottom left rear of the Control Cabinet (see Figure 2-3). Alternatively, the Maintenance terminal can be connected to the 9-pin RS-232 connector located at the bottom of the Peripheral FIM Carrier which is plugged into the Bay Control Card (see Figure 2-4).

- Notes:**
1. If the RS-232 cable for the maintenance terminal uses the standard 25-pin connector, a 25-pin to 9-pin connector adaptor must be used.
  2. The RS-232 Maintenance port in the Peripheral Cabinet is deemed to be a service port only. Therefore when a Maintenance Session is completed at the Peripheral Cabinet the cabling that was used for the session must be removed.
  3. Two dip switches are provided on the Control Resource Card (located in the Main Control Cabinet) to allow the maintenance person to switch connectivity to either the control or the peripheral node. See Table 6-1 for the switch settings.

<b>Table 2-1 Control Resources Card Switch Settings</b>				
	<b>Switch Settings</b>			
	<b>S1</b>	<b>S2</b>	<b>S3</b>	<b>S4</b>
Forced Maintenance to Control	Open or Closed	Open	Not Used	Not Used
Forced Maintenance to Peripheral	Open	Closed	Not Used	Not Used

## Connection to the System (Printer)

- 2.3 If required, a printer (or any other ASCII output device) may be connected to the system by means of a standard 9-pin or 25-pin RS-232 cable. On the *SX-200 DIGITAL* one end of the 25-pin cable is connected to the RS-232 port of the printer and the other end is connected to the connector on the bottom left rear of the Control Cabinet (see Figure 2-2). On the *SX-200 FD* one end of the RS-232 cable is connected to the RS-232 port of the printer and the other end is connected to the 9-pin connector (beside the maintenance terminal connector) on the bottom left rear of the Control Cabinet (see Figure 2-4). The printer should initially be set up for the following data characteristics:

- 8 data bits
- 1 start bit
- 1 stop bit
- no parity
- 1200 baud.

**Note:** The baud rate of the printer port may be changed via a command from the maintenance terminal.

## Login Procedures

- 2.4 With the terminal powered-up, or reset, the system is ready for the user to log in. Pressing the RETURN key twice within 1 second causes the system to automatically determine the terminal's baud rate, and to query the user for the terminal type as follows:

```
1 - VT100 COMPATIBLE
2 - TTY TYPE
3 - IBM PC
SELECT A TERMINAL TYPE :
```

If the terminal is capable of using special graphic characters, enter 1; if not, enter 2. The system will then query the user for the type of action or application intended; i.e., Maintenance or Customer Data Entry (CDE):

```
1 - MAINTENANCE
2 - CDE
6 - QUIT
SELECT AN APPLICATION ( OR QUIT TO START OVER ) :
```

If the maintenance system (or CDE) is being accessed by another terminal, or an attendant console, the following message will be returned after pressing the RETURN key twice:

```
MAINTENANCE or CDE in use by Console Ext 1234.
Please Try Again Later
```

This will happen because only one user may access maintenance or CDE at any one time. Assuming that there are no users currently logged in, the system will return the username prompt after an application number (1 or 2) is chosen:

ENTER USERNAME :

Users of the *SX-200* DIGITAL PABX system have five levels of system access priority available when logging-in to the maintenance terminal. Each level has its own username, and corresponding command privileges. The usernames, in descending order of priority, are:

- INSTALLER
- MAINT1
- MAINT2
- SUPERVISOR
- ATTENDANT.

Respond to the username prompt by entering one of these usernames. The system will then query the user for a password:

ENTER PASSWORD :

The *SX-200* DIGITAL system database contains one default password for all of the usernames. Passwords may be changed as required (see paragraph 4.06). The default password for all users is "1000". Observe that for security reasons the system does not echo the password back to the terminal. If the password is accepted, the system will prepare to set up the maintenance screen, displaying the following message briefly:

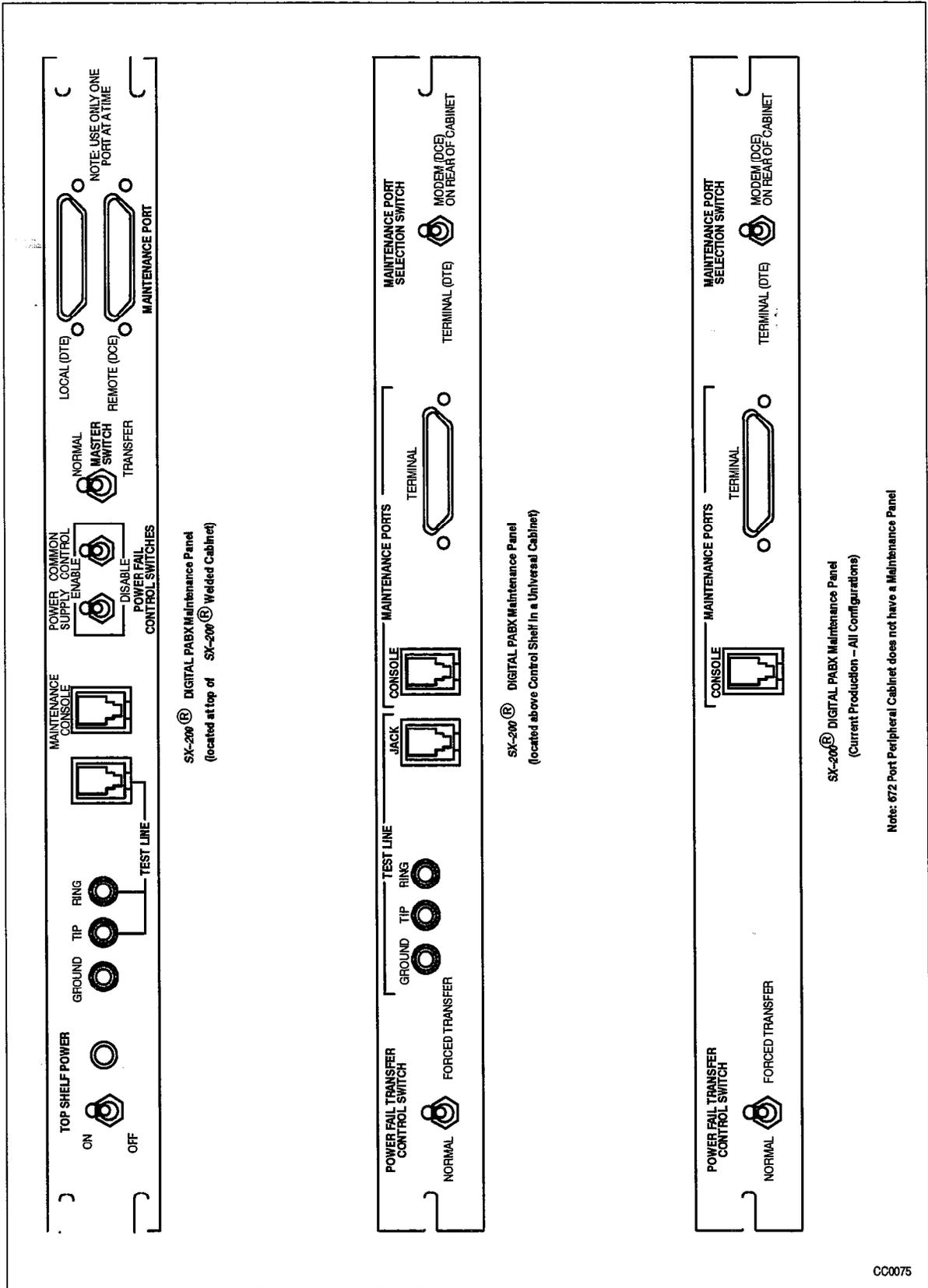
Please Wait...

## Logout Procedures

- 2.5 To ensure the security of the system, the logout procedure should be used whenever the maintenance terminal is to be left unattended. To log out, the user presses the QUIT softkey to get out of the maintenance application. At this point, the application prompt is returned:

Enter "6" to log out or

System will log out when the 10 second logout time out is reached.



CC0075

Figure 2-1 SX-200 DIGITAL Maintenance Panels

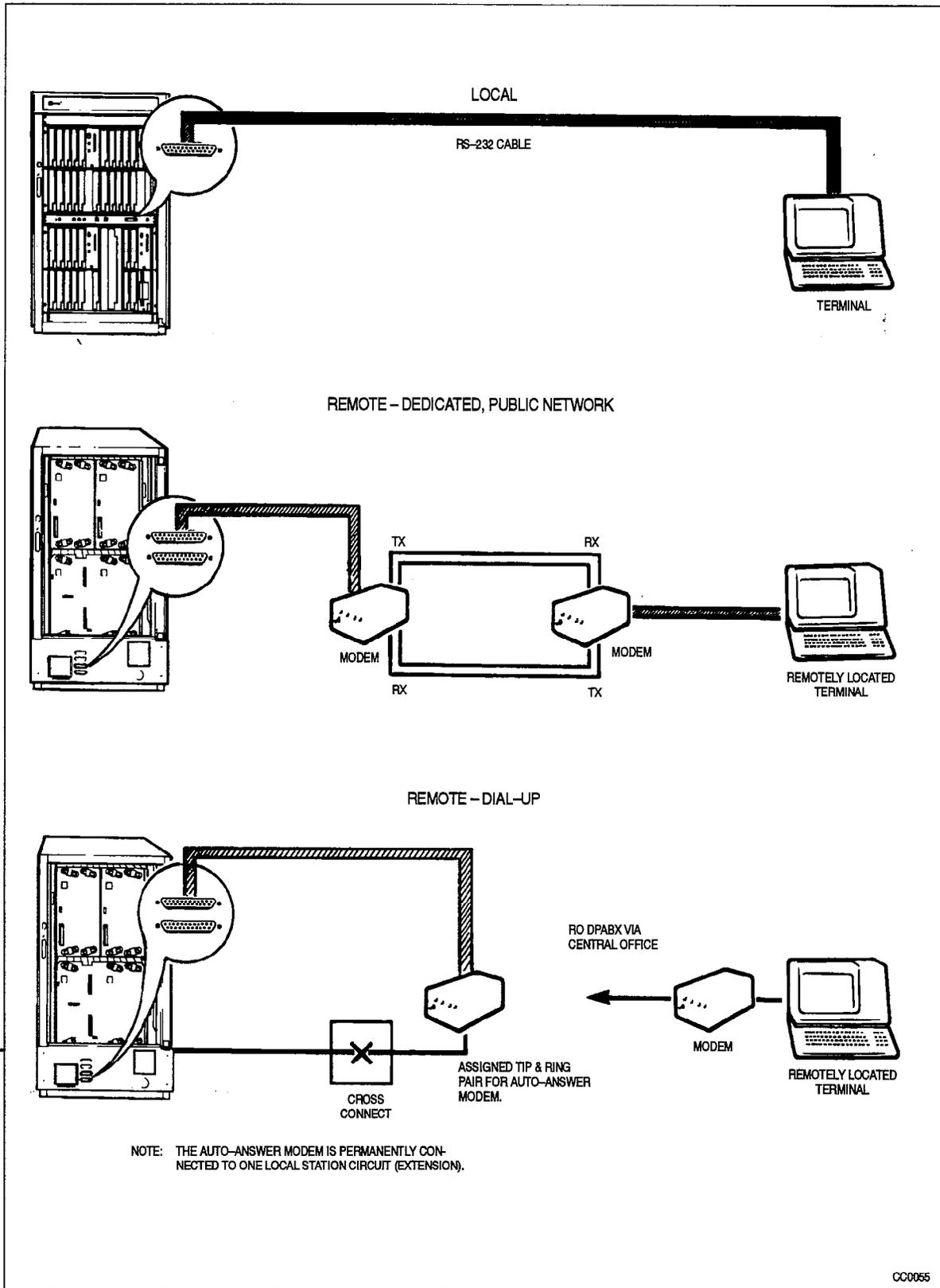


Figure 2-2 Maintenance Terminal Connection

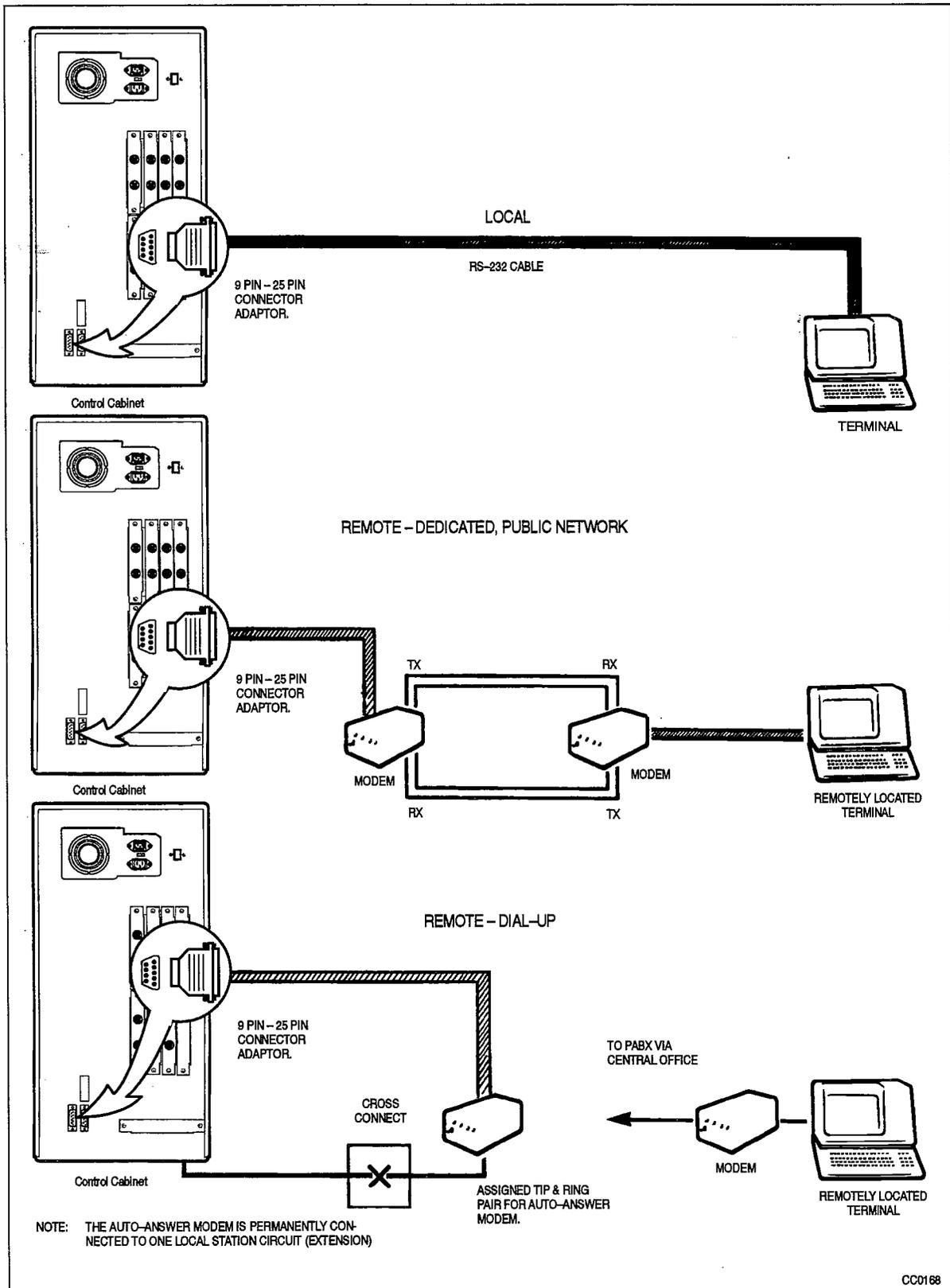
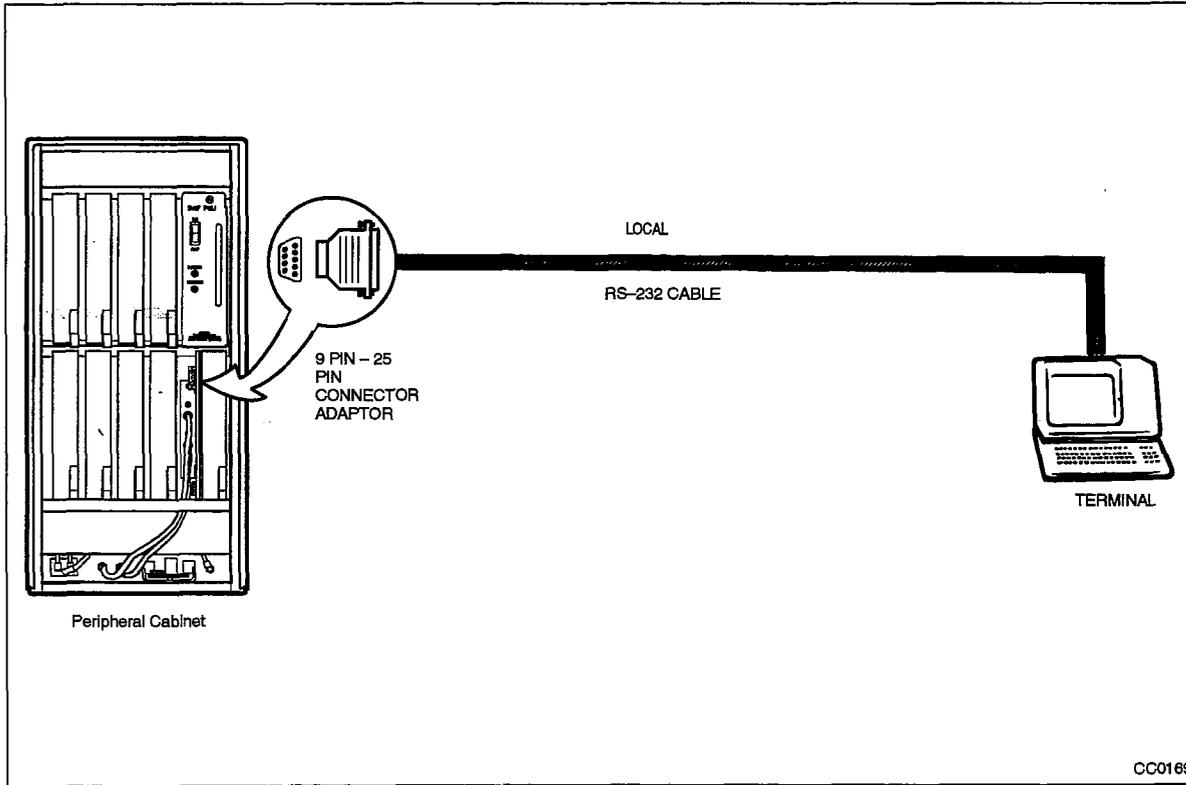


Figure 2-3 SX-200 FD Maintenance Terminal Connections for the Control Cabinet



**Figure 2-4 SX-200 FD Maintenance Terminal Connections for the Peripheral Bay**

### 3.

## MAINTENANCE COMMAND INPUT

### Maintenance Terminal Display

- 3.1 The maintenance display screen is shown in Figure 3-1. There are five distinct and separate areas to the screen:

**Status Line:** This occupies a single line above the bordered area, and displays the time and date, and the system alarm status.

**Header Line:** This occupies the top line within the bordered area. It identifies the running software version, and its creation date. It also describes which MAINTENANCE menu is currently being displayed; one of Main Menu, System, Diagnostics, Traffic Measurement, Logs, or Reports.

**Applications Area:** This occupies the next 12 lines in the bordered area. Output information resulting from command input is displayed in this area.

**Command Line:** This occupies the line directly below the Applications Area. Commands are echoed onto this line as they are input by the user. Responses to command input (other than data; e.g., error messages) are also returned here.

**Softkey Area:** The Softkey Area changes dynamically with the MAINTENANCE mode (System, Diagnostics, Traffic Measurement, Logs, or Reports) and identifies the functions of the maintenance terminal's 10 softkeys. The Softkey Area occupies the bottom two lines of the bordered area: the first line identifies the functions of softkeys 1 through 5; the second line identifies the functions of softkeys 6 through 10.

### Softkey Presentation

- 3.2 Command entry on the SX-200 DIGITAL PABX is designed to make commands easy to use, especially for those using the maintenance terminal for the first time. All commands are entered using softkeys. "Softkeys" are programmable keys, the functions of which may be changed to suit any particular application. The maintenance terminal has 10 such keys; they are the number keys (1 through 0) on the terminal keyboard. The "1" key corresponds to softkey 1 in the Softkey Area; all other softkeys are similar.

9:55 7-NOV-91		alarm status = NO ALARM		
SX-200 DIGITAL G1005 ACD-APP 672P/F06		28-OCT-1991		Main menu
1-SYSTEM	2-	3-DIAGNOSTICS	4-	5-TRAFFIC MEAS
6-QUIT	7-LOGS	8-ACD-REPORTS	9-REPORTS	0-

Figure 3-1 Top Level Maintenance Terminal Screen Layout

## Entering of Commands

- 3.3 Commands are entered by pressing the desired softkeys in sequence, terminating each command sequence with softkey 0, the ENTER softkey. Note that pressing the conventional keyboard RETURN key has the same effect as the ENTER softkey. As softkeys are pressed, they are displayed on the Command Line. After the ENTER softkey is pressed, the command is processed by the maintenance system, and the appropriate response is returned. Pressing the QUIT softkey ends the current operation and returns to the previous level of access.

## Incorrect Command Entry

- 3.4 The *SX-200* DIGITAL PABX user interface provides a comprehensive set of error messages to inform the user of incorrect command entry. While the softkey-oriented command input interface minimizes the chance of incorrect command entry, the error messages provide concise descriptions of the input error. A summary of the error messages with descriptions may be found in Appendix B.

## Non-VT100™ Compatible Terminal Use

- 3.5 When using a terminal not compatible with *VT100* softkeys are presented as described above, but without the graphic bordering. Similarly, commands are entered in exactly the same manner. Instead of a Title line, the current menu is identified by the command input prompt:

- SYS> – System level menu

- DIAG> – Diagnostics level menu
- TRAFF> – Traffic Measurement menu
- LOGS> – Logs level menu
- REP> – Reports level menu.

### Device Number Parameters

- 3.6 Some commands require the inclusion of card/circuit location numbers (referred to as physical location identification numbers – bay number, slot number, circuit number, sub-circuit number) or extension numbers as part of the input. The user is prompted for these, one at a time on the Command Line of the screen:

enter Bay then press RETURN:  
enter Slot then press RETURN:  
enter Circuit then press RETURN:  
enter Sub-circuit then press RETURN:

or

enter Ext. Number then press RETURN:

When these prompts occur, the softkeys are disabled, and the required numbers must be entered in the conventional manner; using the keyboard number keys and pressing the RETURN key after each entry. Note that if a 2-digit number is entered, the RETURN key is not required after each digit. When all of the required device numbers have been entered, the appropriate softkeys will again be presented.

When entering circuit location numbers, the sub-circuit qualifier is often not required, and may be answered by simply pressing the RETURN key. The only devices that require sub-circuit numbers are Digital Line Card circuits and Universal card modules such as DTMF/Receiver Modules and Music-On-Hold/Pager Modules.

### Wild Card Characters

- 3.7 Wild card characters may be used to perform some command-initiated functions on a range of devices. This is done simply by not specifying circuit location numbers when prompted (pressing only the RETURN key). For example, entering Bay 1, but not specifying the slot, circuit or sub-circuit would translate to “all circuits on all cards in Bay 1”. Note that this does not apply to all commands; refer to the individual command descriptions.

## Canceling a Command

- 3.8 The user may cancel any command at any point before entering the ENTER softkey; this is done by pressing the CANCEL softkey. The effect of this is that any softkeys that were entered and echoed back onto the Command Line are now canceled, leaving the Command Line empty and ready for new command input.

## Command Line Correction

- 3.9 The user may correct a current command input line before entering the ENTER softkey, without having to cancel and enter the command over again. This is done by pressing the DELETE key. Each time the DELETE key is pressed, the most recently entered softkey or device number is deleted.

## 4.

**SYSTEM LEVEL FUNCTIONS****Introduction**

- 4.1 The System Level of operation contains commands that are not necessarily maintenance applications, but affect maintenance in some way (e.g., the setting of time, date, and passwords). To access the system level commands, press the SYSTEM softkey. All of the following operations are done while in the System Level. Table 4-1 provides a quick reference for all operations available in system level functions.

**Set and Show Time**

- 4.2 The system time-of-day may be set and verified from the maintenance terminal although the hour format used is specified during CDE. Note that the user may set the time in either 12-hour or 24-hour format by using the PM softkey as required. To set the system time from the maintenance terminal, press the following softkeys:

SET  
TIME

At this point the softkeys are disabled, and the user is prompted to press the desired time:

enter Time HH:MM

After entering a valid time, the user may implement the new time-of-day by pressing the ENTER softkey, or cancel the new time by pressing the CANCEL softkey.

The user may verify the time-of-day by pressing the following softkeys:

SHOW  
TIME  
ENTER

**Set and Show Date**

- 4.3 The system date may be set and verified from the maintenance terminal. To set the system date from the maintenance terminal, press the following softkeys:

SET  
DATE

At this point the softkeys are disabled, and the user is prompted to press the desired date:

enter Date DD/MM/YY

After entering a valid date, the user may implement the new date by pressing the ENTER softkey, or cancel the new date by pressing the CANCEL softkey.

The user may verify the date by pressing the following softkeys:

SHOW  
DATE  
ENTER

### Show Device Status

- 4.4 The maintenance user may view the current data characteristics of the *SX-200* DIGITAL PABX maintenance terminal and printer ports. Information in the reports includes communication speed (baud rate), the parity sense (odd, even, or none) and the number of stop bits. To view the status of the maintenance terminal port, press the following softkeys:

SHOW  
DEVICE  
MAINT-PORT  
ENTER

To view the status of the printer port, enter the following softkeys:

SHOW  
DEVICE  
PRINTER-PORT  
ENTER

### Show Firmware Identity

- 4.5 The firmware identity report provides the firmware identities of the installed base. The information includes card name, bay number, PROM ID, and debug capability. The PROM ID consists of two bytes. To be compatible with PROMs that do not have an identity, the PROM checksum is displayed as \*\*FD, where FD is the checksum.

SHOW  
IDENTITY  
ENTER

Table 4-1 System Level Functions

LEVEL	COMMAND	PARAMETER	QUALIFIER	QUALIFIER	QUALIFIER	QUALIFIER			
1-SYSTEM	1-SET	1-DATE [dd/mm/yy]							
		2-TIME [hh:mm]							
		3-PASSWORD	1-ATTENDANT						
			2-SUPERVISOR						
			3-MAINT2						
			4-MAINT1						
			7-INSTALLER						
		4-SPEED	1-MAINT-PORT [speed]						
			6-PRINTER_PORT [speed]						
		8-RESET_TIME	1-AFTER_N_FLTS	2-DAY/TIME		1-MONDAY	1-TIME [hh:mm]		
						2-TUESDAY	1-TIME [hh:mm]		
						3-WEDNESDAY	1-TIME [hh:mm]		
						4-THURSDAY	1-TIME [hh:mm]		
						6-FRIDAY	1-TIME [hh:mm]		
						7-SATURDAY	1-TIME [hh:mm]		
						8-SUNDAY	1-TIME [hh:mm]		
						9-DAILY	1-TIME [hh:mm]		
						3-IMMEDIATELY			
				9-ALARM_THRESH	1-LINES	1-SYSTEM		8-CONFIRM	
		2-TRUNKS				2-BAY NOTE: User must enter Bay number			
3-RECEIVERS									
4-PCM_CHANNELS									
2-SHOW	1-DATE	2-TIME							
		4-DEVICE	1-MAINT-PORT						
			4-DATASTN_PLID		1-BAY/SLOT/CCT				
					3-EXT-NUM				
			8-PRINTER_PORT						
			8-RESET-TIME						
			9-IDENTITY						
		3-COPY	1-DATABASE						
		4-MONITOR	1-SMDR	2-DATA_SMDR					
				3-DIAGNOSTICS	1-STEP				
2-SLOW_SCAN									
3-FREE_RUN									
7-LOGS	1-MAINT-PORT								
	2-SYS_PRINTERS								
5-SUSPEND_PRTR	7-PRINTER_PLID	1-BAY/SLOT/CCT							
		3-EXT-NUM							
	8-PRINTER_PORT								
6-QUIT									

**Table 4-1 System Level Functions  
(continued)**

LEVEL	COMMAND	PARAMETER	QUALIFIER	QUALIFIER	QUALIFIER	QUALIFIER
	7-RESUME_PRTR	7-PRINTER_PLID	1-BAY/SLOT/CCT			
			3-EXT-NUM			
		8-PRINTER_PORT				
	8-RE-START	2-RESET_SYSTEM				
	9-STOP	7-LOGS				

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## Set Password

- 4.6 It is recommended, for system security, that passwords be changed regularly once the SX-200 DIGITAL PABX has been put into service. Password changes may be made by the affected username, or any other username with a higher priority (see paragraph 2.05). A password may be any string of alphanumeric characters of up to 20 characters in length (any more characters are ignored).

**CAUTION**

**Entering new passwords with alphabetic characters will inhibit login from the Attendant Console, as only numeric characters may be entered from the console.**

To change the password, press the following softkeys:

```
SET
PASSWORD
(select the required Username)
ENTER
```

The system then prompts the user for the old password (see Note):

Enter Old Password then press RETURN/ENTER:

The user enters the old password, and the system prompts the user for the new password:

Enter New Password then press RETURN/ENTER:

The system then prompts the user to verify the new password:

Enter New Password to verify then press RETURN/ENTER:

After the user verifies the new password, the system implements the password change; the old password is no longer valid. An incorrect entry of the old or new passwords will cause the password changing process to be aborted. Observe that neither the old nor the new passwords are echoed back to the maintenance terminal display.

**Note:** If the Username selected is the one used when logging in, the system will prompt for the old password. When the username selected is a lower level than the login user, the system will not require verification of access priority and will prompt for the new password only.

### Set Maintenance Port Baud Rate

- 4.7 To change maintenance terminal port baud rate from its value at login time, any one of six different baud rates may be chosen: 300, 600, 1200, 2400, 4800 or 9600 baud. To change the terminal baud rate, press the following softkeys:

SET  
SPEED  
MAINT-PORT  
(select the softkey for the desired baud rate)  
ENTER

**Note:** This operation changes the baud rate of the SX-200 DIGITAL PABX maintenance terminal port only. The maintenance terminal baud rate must be changed separately. Refer to the manufacturer's instructions for the particular terminal being used.

At this point, the softkeys are disabled, and the system prompts the user to change the terminal speed:

Change terminal speed and press RETURN when ready

### Set System Printer Port Baud Rate

- 4.8 To change system printer port baud rate from its default value of 1200 baud, any one of six different baud rates may be chosen: 300, 600, 1200, 2400, 4800 or 9600 baud. To change the printer port baud rate, press the following softkeys:

SET  
SPEED  
PRINTER-PORT  
(select the softkey for desired baud rate)  
ENTER

Before pressing the ENTER softkey, the entry may be canceled it by pressing the CANCEL softkey. Note that this operation changes the baud rate of the SX-200 DIGITAL system port only; the baud rate of the printer itself must be changed separately. Refer to the manufacturer's instructions for the particular printer being used.

### Printer Port Assignment

- 4.9 Printouts are produced at the device specified in CDE Form 34, DIRECTED IO. See Practice 9109-096-210-NA, Customer Data Entry, for details. Setting speed for

printer ports other than the system printer port is done in CDE Form 11, Data Circuit Descriptors.

## Copy Database

- 4.10 The user may make a copy of the system database on another floppy disk for use as a backup source. Only the database is copied; the diskette being written to must already have the system software stored on it. To copy the database, press the following softkeys:

COPY  
DATABASE  
ENTER

Insert new disks, close doors and press CONTINUE

At this point the user may press the CONTINUE softkey to write to the new disks, or the CANCEL softkey to abort the process. If the user presses the CONTINUE softkey the saved database will be written to the new disks; the save will take several minutes, depending upon the size of the database. When the process is successfully completed, the following message is returned to the terminal:

Copy successful. If upgrading then RESET – else press CANCEL to continue.

**Note:** Pressing CANCEL at this time with the new software installed in the disk drives causes a SYSTEM RESET.

**CAUTION**

**It is important to note that these procedures involve a complete reset of the system (needed to initialize the new software). Therefore, this procedure should be done only at night, or during a period of low traffic to ensure minimum effect upon system users.**

The backup disks and the original disks will now have identical databases. Refer to Practice 9109-096-353-NA, General Maintenance Information, for additional information.

- Notes:**
1. The copy database operation can only be initiated once the system is ready after a reset. An error message appears if a copy database is started before the system is ready. System busy, please try again later.
  2. When upgrading from a Generic1003 release that can store 100 call-me-back messages to one that can store 250 messages (Generic 1003 D05 and later) or downgrading from 250 to 100, all messages will be lost.

## The Monitor Command

### Monitor Diagnostics

- 4.11 The Monitor Diagnostics command is a “window” into the maintenance system’s diagnostic controller, the Maintenance Manager. With this, the user may monitor the progress of the *SX-200* DIGITAL PABX diagnostics as they are being run. See Part 7 of this Practice for further information on diagnostics.

To monitor the progress of the currently running diagnostic, press the following softkeys:

MONITOR  
DIAGNOSTICS

At this point the user may press the ENTER softkey to begin the monitor process, or the CANCEL softkey to cancel the command. If the user presses the ENTER softkey, diagnostic data will be written on the Application Area of the screen.

The user may alter the manner in which the monitor display is updated, through the use of the “STEP”, “SLOW\_SCAN” and “FREE\_RUN” softkeys. Either the “SLOW\_SCAN” or the “FREE\_RUN” softkey is displayed; they do not appear concurrently (unless STEP is selected).

The “STEP” softkey enables the user to advance through the diagnostic process step-by-step. This manual control permits user viewing of one diagnostic state each time softkey 1 – STEP is pressed.

The “SLOW\_SCAN” softkey results in the display of each diagnostic test as it is run until a command is given to stop. The Maintenance Manager decreases the speed at which the monitoring of the diagnostics occurs, and the Maintenance Terminal display is updated as each test is run.

The “FREE\_RUN” softkey causes the monitor to run the diagnostic tests at full speed. The Maintenance Terminal display is only updated intermittently. This permits the user the ability to progress quickly through the diagnostic tests, until the area of specific interest is encountered.

An example of the monitor output is shown in Figure 4-1 (for definition of terms, see Table 4-2).

4:27 10-FEB-87

alarm status = NO ALARM

SX-200 DIGITAL Generic 1003 336P/D64.1				6-FEB-1987		System	
	BKGRND	SYSTEM	PWR UP	FLT ISO	PWR RET	FLT RET	USR DIR
SYST :	4	0	0	0	0	0	0
BAY :	4	0	0	0	0	0	0
CARD :	2	0	0	0	0	0	0
DEV :	1	0	0	0	0	0	0
DEV PLID : 2 3 3 2	EXTTRNK : -			CUR MODE : backgrnd			
CARDTYPE : rcvr mod	BCKGR EN : on			MODESTAT : dg avail			
CARDSTAT : instld	PWRUP EN : off			DIAG NAM : digl cod l/b			
DEV TYPE : rcvr	NUM CCTS : 4			DIAGSTAT : state 2			
DEV STAT : avail				DIAGRSLT : pass			
TX LK-CH : 12-23	RX LK-CH : 12-23						
DIAGNOSTICS							
1- STEP	2- SLOW SCAN	3- FREE RUN	4-	5- CANCEL			
6-	7-	8-	9-	0-			

(For definition of terms, see Table 4-2) Note: softkeys 2 and 3 will not appear together

**Figure 4-1 Example of MONITOR DIAGNOSTICS Display**

The following is a summary of the terms used in the "Monitor Diagnostics" display:

Table 4-2 Terms Used In Monitor Diagnostics Display	
Term	Meaning
SYST	The total systemwide number of devices waiting to be tested on the following queues: BKGRND – Background diagnostic queue SYSTEM – system request diagnostic queue PWR UP – Power-up diagnostic queue FLT ISO – second chance test queue PWR RET – Power-up diagnostic retry queue (CP had device) FLT RET – second chance test retry queue (CP had device) USR DIR – User (directed diagnostic) queue
BAY	The number of devices in this Bay (see "DEV PLID") waiting to be tested, on the same queues as above.
CARD	The number of devices on this card (see "DEV PLID") waiting to be tested, on the same queues as above.
DEV	Tests pending for the device being monitored.

**Table 4-2 Terms Used In Monitor Diagnostics Display  
(continued)**

Term	Meaning
DEV PLID	The physical location identification of the circuit being monitored; a 4 to 8-digit number representing Bay, slot, circuit and sub-circuit numbers.
CARDTYPE	The type of card being monitored; one of the following:
	nil – nil card
	ons – ONS line card
	lsgs trk – CO trunk card
	universal – Universal card
	dlc – Digital line card
	superset – COV line card
	did trunk – DID trunk card
	em trunk – E&M trunk card
	ops – OPS line card
	main cntl – Main Control card
	bay cntl – Bay Control card
	digtl if – Digital Interface card
	perip ctl – Peripheral Control card
	ram mod – DRAM module
	T1 trunk – Digital Trunk card
	dx mod – DX module
	rcvr mod – DTMF Receiver module
	moh mod – Music on hold module
	cons mod – DLIC (digital line interface circuit) module
modem mod – ls_modem_mod_type	
emtrk mod – E&M trunk module	
CARDSTAT	The status of the card being monitored; one of the following:
	instld – the correct card type is installed
	unplug – the card is either unplugged, or not installed
	wrong – an incorrect card type is installed
DEV TYPE	The type of device being monitored; one of the following:
	dsp – Digital signal processor
	ons – ONS line circuit
	ops – OPS line circuit
	rcvr – DTMF receiver module
	moh – Music on hold module

**Table 4-2 Terms Used In Monitor Diagnostics Display  
(continued)**

Term	Meaning
	lsgs – CO trunk circuit cons – DLIC (digital line interface circuit) module jnctr – junctor set – COVdigital set or data set dnic – Digital line circuit did – DID trunk circuit e & m – E&M trunk circuit pcm – Bay DX circuit T1 – T1 circuit poolm – pooled modem dncon – DNIC based console
DEV STAT	The status of the device being monitored; one of the following: avail – available to CP and maintenance progr – programmed in CDE but not installed unpro – not programmed in CDE suspt – suspect, failed one diagnostic test flty0 – faulty flty1 – faulty with one pass flty2 – faulty with two passes flty3 – faulty with three passes flty4 – faulty with four passes flty5 – faulty with five passes flty6 – faulty with six passes bsout – forced busy, busied-out
EXTTRNK	Extension numbertrunk number of the device being monitored
BCKGR EN	Background diagnostics enable flag; either "on" or "off"
PWRUP EN	Power-up diagnostics enable flag; either "on" or "off"
NUM CCTS	Number of circuits programmed for the specified card type
CUR MODE	The current test mode; one of the following: system – system request diagnostics backgrnd – background diagnostics power up – power-up diagnostics pwr rtry – power-up diagnostics retry fault isol – diagnostic second-chance

**Table 4-2 Terms Used In Monitor Diagnostics Display  
(continued)**

Term	Meaning
	fit retry – diagnostic second-chance retry
	user – directed diagnostics
MODESTAT	The status of the specified test mode; one of the following:
	idle – idle device
	reqst dev – requesting device to test
	dev locatd – located device to test
	dev na – device being used by call processing
	res alloc – test resources allocated
	res na – test resources could not be allocated
	dg avail – determined which test to run
	reqst test – message to Bay to request test
	enter test – message to Bay to start test
	dg disable – diagnostics disabled
	dg active – testing
	wait msg – waiting for test result
	diag done – current diagnostic done
	dg pending – other tests pending on circuit
	dgs compl – all tests done
	dg incompl – test incomplete
	dg aborted – circuit taken by CP before test completed
	audit req – requests out of sync; checking
DIAG NAME	The current diagnostic test being run; one of the following:
	force hilow – junctor test
	dig bay test – digital bay test
	digl cod l/b – codec digital loopback test
	anlg cod l/b – codec analog loopback test
	status check – console test
	inject codec – codec transmission test
	message lamp – message lamp ringer present test
	switch hook – switch hook test
	a/d convert – AD converter reference test
	read card id – card read test
	hybrid l/b – hybrid loopback test
	dtmf tones – dtmf receiver test

**Table 4-2 Terms Used In Monitor Diagnostics Display  
(continued)**

Term	Meaning
	printer port – printer port test
	dnic o/p l/b – dnic output loopback test
	dnic i/p l/b – dnic input loopback test
	dnic chksum – dnic set eprom checksum test
	dnic bphone – dnic set bphone test
	dnic transdu – dnic set transducer test
	dataset lb – dataset data loopback test
	earpiece tst – dnic set transducer earpiece test
	speaker test – dnic set transducer speaker test
	microph test – dnic set transducer microphone test
	mouthpce tst – dnic set transducer mouthpiece test
	DSP memory – digital signal processor memory test
	DSP tone det – digital signal processor tone detect test
	DSP tone gen – digital signal processor tone generation test
	DSP conferen – digital signal processor conference test
	PCM loopback – full pcm loopback test
	link shared? – is link shared test
	rd bc dx+1 – read next bay dx
	rd mc dx+1 – read next mcc dx
	rd bc dx – read bay dx
	tx fr bc dx – send from bay dx
	tx fr bcdx+1 – send from next bay dx
	tx fr mcdx+1 – send from next mcc dx
	tx fr mcdx+1 – send from next mcc dx to bay only
	voice set? – is there a voice set
	data set? – is there a data set
	other half? – does other half have a set
	dig bay test – digital bay test
	get jnc test – get junctor test
	8804 test – analog 8804 test
	no failures – analog no failures test
	alt dev – analog alt dev test
	alt dev lb – analog alt dev loopback test
	T1 chn LB – T1 channel loopback test

<b>Table 4-2 Terms Used In Monitor Diagnostics Display (continued)</b>	
<b>Term</b>	<b>Meaning</b>
	pldmdm ansr – pooled modem answer mode test
	pldmdm orig – pooled modem origination mode test
	retest prim – retest primary
	retest secon – retest secondary
	junc isol_? – has junctor been isolated
	alt device_? – enough alternate devices
	suspect junc – make junctor suspect
	50% junctors – enough junctors
DIAGSTAT	The current diagnostic state; one of the following:
	pass state – current test has passed
	isolated – fault detected, isolated
	unisolated – fault detected, unisolated
	state 1 through state 25
	<b>Note:</b> States 1 through 25 are dependent upon the device under test; refer to Practice 9109-096-353-NA, General Maintenance Information, for further details.
DIAGRSLT	Result of the most recent diagnostic test; one of the following:
	pass – test passed without errors
	fail – error(s) occurred
	inconcl – inconclusive; call processing aborted the test or the Bay failed to return a message
	dev na – device not available – being used by CP
TX LK-CH	Transmit link and channel
RX LK-CH	Receive link and channel

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### Monitor Logs

The user may monitor the progress of the SX-200 DIGITAL PABX maintenance logs as they occur. When the monitor logs process is running, the maintenance logs will be output to a device as well as being recorded on the system floppy disk. The output device may be either the maintenance terminal, or the system printer, as specified in CDE Form 34, Directed IO. If monitoring logs on the system printer port, the user may log out from the maintenance terminal without first stopping the monitor process. However, if the user is monitoring logs on the maintenance terminal, the monitor process must first be stopped before logging out.

To monitor logs, press the following softkeys:

MONITOR  
LOGS  
MAINT-PORT  
ENTER

To stop monitoring logs, press the following softkeys:

STOP  
LOGS  
ENTER

For further information on maintenance logs, see Part 6 of this Practice, and refer to Practice 9109-096-353-NA, General Maintenance Information.

### **Monitor SMDR**

The user may monitor the progress of the *SX-200* DIGITAL system SMDR reports as they occur. Unlike the MONITOR LOGS command, monitoring of SMDR may only be done at the maintenance terminal. It is not necessary to select a print device in this case, as monitoring will be output to the maintenance terminal automatically. This does not affect the spontaneous printing of SMDR data to the system printer port. To monitor SMDR reports at the maintenance terminal, press the following softkeys:

MONITOR  
SMDR  
ENTER

Refer to Practice 9109-094-221-NA, Station Message Detail Recording, for further information on SMDR.

### **Monitor DATA\_SMDR**

The user may monitor the progress of the *SX-200* DIGITAL system DATA\_SMDR reports as they occur. Unlike the MONITOR LOGS command, monitoring of DATA\_SMDR may only be done at the maintenance terminal. It is not necessary to select a print device in this case, as monitoring will be output to the maintenance terminal automatically. This does not affect the spontaneous printing of DATA\_SMDR data to the system printer port. To monitor DATA\_SMDR reports at the maintenance terminal, press the following softkeys:

MONITOR  
DATA\_SMDR  
ENTER

Refer to Practice 9109-096-221-NA, Station Message Detail Recording, for further information on DATA\_SMDR.

## Reset System

- 4.12 The Re-start command allows the maintenance user to reset the system. The purpose of this is to optimize the integrity of the system software. This should be done only during a period of low or no call processing traffic, as the system will be totally inoperative for a period of approximately 1 minute. To initiate a system reset, press the following softkeys:

```
RE_START
RESET_SYSTEM
ENTER
```

## Set Reset Time

- 4.13 The maintenance user may also program the system to reset in the event of a fault occurrence, at a predetermined time of day. This may be set for a particular day or daily. To program a system reset, press the following keys:

```
SET
RESET_TIME
DAY/TIME
(press one of the seven "day" softkeys or DAILY)
TIME
(enter the hour and minutes in 24 hour format – hours must be 01– 24)
ENTER
```

**Note:** The system will reset only if a fault occurs.

## Set Immediate Reset

- 4.14 The maintenance user may also program the system to reset after one or after 5 system software faults.

To program the system to reset immediately after a single software fault, press the following softkeys:

```
SET
RESET_TIME
IMMEDIATELY
ENTER
```

To program the system to reset after 51 such anomalies, press the following softkeys:

```
SET
RESET_TIME
AFTER_N_FLTS
ENTER
```

## Show Reset Time

- 4.15 The maintenance user may obtain a report indicating when, and under what conditions a system reset will occur. To obtain such a report, press the following softkeys:

```
SHOW
RESET_TIME
ENTER
```

## Set Alarm Thresholds

- 4.16 Alarm thresholds may be programmed by the maintenance user to facilitate the requirements of a particular system. Table 4-3 shows the default values of the alarm thresholds. Refer to Practice 9109-094-353-NA, General Maintenance Information, for further details on the alarms and alarm thresholds. To change the alarm thresholds for lines throughout the entire system, press the following softkeys:

```
SET
ALARM_THRESH
LINES
ENTER
SYSTEM
```

(enter the desired MINOR Alarm threshold percentage, or press RETURN to leave unchanged)

(enter the desired MAJOR Alarm threshold percentage, or press RETURN to leave unchanged)

(enter the desired CRITICAL Alarm threshold, or press RETURN to leave unchanged)

```
ENTER
CONFIRM
```

The procedure for changing alarm thresholds for trunks, DTMF receivers and PCM channels (junctors) is the same as that shown for lines. The only difference is that the TRUNKS, RECEIVERS or PCM-CHANNELS softkeys are used in place of the LINES softkey.

Alarm thresholds may be changed on a bay basis as well. The procedure is the same as that shown above, the only difference being that the BAY softkey is used in place of the SYSTEM softkey. DTMF receiver thresholds may be changed only in digital bays.

In all cases, the Alarm Threshold table is shown in the Applications area of the screen.

Table 4-3 Default Alarm Thresholds

ALARM CATEGORY (Peripheral Devices)	ALARM THRESHOLDS		
	Minor	Major	Critical
Lines	0%	20%	0
Trunks	0%	20%	0
DTMF Receivers	0%	20%	0
PCM Channels (Junctors)	0%	20%	0



## 5.

# REPORTS LEVEL FUNCTIONS

## Introduction

- 5.1 The Reports Level of operation is a conglomeration of static commands that are designed to display maintenance information. Types of reports available are: configuration, alarm status, circuit status, PCM path status and the displaying and clearing of device errors. To access the Reports Level commands, press the REPORTS softkey. All of the following operations are possible while in the Reports Level.

## Show Configuration

- 5.2 The Configuration report provides the maintenance user with information on the hardware which is currently installed in the system. The user may request a configuration report on a specific card slot, a specific extension number, or the entire system. The information provided includes:
- the physical location(s), in terms of bay number, slot number, and circuit (module) number
  - the type of card / module installed in a location
  - the type of card / module programmed for that location.

### Specific Card Slot

To obtain a configuration report on a specific card slot, press the following softkeys:

```
SHOW  
CONFIG  
BAY/SLOT/CCT
```

(enter the required bay, slot and circuit numbers, pressing the RETURN key after each one)  
ENTER

### Specific Extension

To obtain a configuration report on a specific extension number, press the following softkeys:

```
SHOW  
CONFIG  
EXT-NUM
```

(enter the required extension number, then press the RETURN key)  
ENTER

The system displays the Bay and Slot numbers at which this extension is terminated.

**Entire System**

To obtain a configuration report on the entire system, press the following softkeys:

SHOW  
 CONFIG  
 ALL  
 ENTER ( or MORE or CANCEL )

In all cases, the system outputs the configuration data in the Applications Area of the screen. In cases where the data requires more space than is available on the screen, the user is prompted to request more data via the MORE softkey, or to cancel the output via the CANCEL softkey.

**Table 5-1 Reports Level Functions**

LEVEL	COMMAND	PARAMETER	QUALIFIER	QUALIFIER	QUALIFIER	QUALIFIER
9-REPORTS	2-SHOW	1-CONFIG	1-BAY/SLOT/CCT			
			3-EXT-NUM [number]			
			4-ALL			
		2-ALARMS	2-DEVICE TYPE	1-LINES		
				2-TRUNKS		
				3-RECEIVERS		
				4-PCM-CHANNELS		
			4-ALL	0-MORE		
		3-STATUS	1-BAY/SLOT/CCT	DEVICE STATUS	See Note	
			2-SWID	1-SW_STATION	STATIONS/SETS See Note	
				2-SW_RECEIVER	RECEIVERS See Note	
				3-SW_CONSOLE	CONSOLES See Note	
				4-SW_LINE	SUPERSET® LWAS See Note	
				6-SW_DTMF_GEN	DTMF GENERATOR See Note	
				7-SW_SET	STATIONS/SETS See Note	
				9-SW_DATA_STN	STATIONS/SETS See Note	
				0-MORE_KEYS	1-SW_CO_TRUNK	TRUNKS See Note
					2-SW_DID_TRUNK	TRUNKS See Note
					3-SW_TIE_TRUNK	TRUNKS See Note
					4-SW_DISA_TRUNK	TRUNKS See Note
					6-SW_CAP	See Note
					7-SW_TRUNK_GRP	TRUNK GROUPS See Note
					8-SW_HUNT_GRP	HUNT GROUPS See Note
					0-MORE_KEYS	
			3-EXT-NUM [number]			
			4-ALL	1-CP_DWA		

**Table 5-1 Reports Level Functions  
(continued)**

LEVEL	COMMAND	PARAMETER	QUALIFIER	QUALIFIER	QUALIFIER	QUALIFIER
				2-CP_DWA_MEM		
				3-LINK STATUS		
				6-MT_DWA		
				7-MT_DWA_MEM		
				8-UP_1_PAGE		
				9-DOWN_1_PAGE		
		6-CHANNEL-MAP	1-LOGICAL	1-CHANNEL NUM		
			2-PHYSICAL	1-BAY_NUM		
				2-LINK_NUMBER		
		7-ERRORS	2-DEVICE_TYPE	1-SS3_SS4		
				2-DISK		
				3-DIGITAL_SETS		
				4-HDLC		
				6-DATASETS		
				7-CONSOLE		
				9-T1_TRUNK		
	3-CLEAR	7-ERRORS	1-BAY/SLOT/OCT			
			2-DEVICE_TYPE	1-SS3_SS4		
				2-DISK		
				3-DIGITAL_SETS		
				4-HDLC		
				6-DATASETS		
				7-CONSOLE		
				9-T1_TRUNK		
			3-EXT-NUM			
			4-ALL	8-CONFIRM		
	6-QUIT					

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**Note:** The following softkeys are presented when a SWID selection is made; 1-CP\_DWA, 2-CP\_DWA\_MEM, 6-MT\_DWA, 7-MT\_DWA\_MEM, 8-UP\_1\_PAGE, 9-DOWN\_1\_PAGE. Press CP\_DWA to view the device work area for the selected device.

## Show Alarms Report

- 5.3 The Alarms Manager is a software program which monitors the performance of the SX-200 DIGITAL PABX, compares it to a set of default thresholds and, if the system performance is below the specified level, causes an alarm to be raised.

There are four alarm categories:

1. Lines
2. Trunks
3. DTMF Receivers
4. PCM Channels (junctors).

There are four alarm levels:

1. NO ALARM
2. MINOR
3. MAJOR
4. CRITICAL

There are three alarm types:

1. **Bay Alarms** – these are the alarm levels of the categories specific to each separate bay in the system.
2. **System Alarms** – these are the alarm levels of the categories on a systemwide basis.
3. **Overall Alarm** – this is the overall system alarm level, taking into account all of the bay alarms and system alarms in all categories. It is displayed at all times above the upper right corner of the enclosed area of the maintenance display.

For more information on alarms, refer to Practice 9109-096-353-NA, General Maintenance Information.

### **Show Alarms All**

The user may obtain an alarm report on the entire system (i.e., all device types, in all bays of the system) by pressing the following softkeys:

```
SHOW
ALARMS
ALL
ENTER ( or MORE or CANCEL )
```

Enter MORE to step through displays of specific device type alarms (different device types are not summed together on one display).

### **Show Alarm – Device Type**

The user may obtain an alarm report on a specific device type (category) by pressing the following softkeys:

```
SHOW
ALARMS
DEVICE TYPE (LINES or TRUNKS or RECEIVERS or PCM-CHANNELS)
ENTER
```

In all cases, the system will output the alarm status data in the Applications Area of the screen. In cases where the data requires more space than is available on the screen, the user is prompted to request more data via the MORE softkey, or to cancel the output via the CANCEL softkey. An example of an alarm report is shown in Figure 5-1.

4:27 10-FEB-87					alarm status = MAJOR		
SX-200 DIGITAL Generic 1003 336P/D64.1				6-FEB-1987		Reports	
BAY# OR SYSTEM	NUMBER OF DEVICES	TOTAL DEVICES UNAVAIL	PERCENT UNAVAIL	ALARM LEVEL	ALARM THRESHOLDS		
					MINOR	MAJOR	CRITICAL
Bay# 1	13	1	7%	Minor	0%	20%	0
Bay# 2	2	1	50%	Major	0%	20%	0
Bay# 3	1	0	0%		0%	20%	0
Bay# 4	0	0	0%		0%	20%	0
System	16	2	12%	Minor	0%	20%	0
SET ALARM_THRESH LINES							
1-	2-	3-	4-	5- CANCEL			
6-	7-	8-	9-	0-			

(For definition of terms, see Table 5-2) Note: Alarm display differs slightly with earlier Generic releases.

**Figure 5-1 Example of LINE ALARM Status Display**

Table 5-2 summarizes the terms used in the alarm status report:

Table 5-2 Terms Used In The Alarm Status Report	
Term	Meaning
BAY# OR SYSTEM	The range of the specified alarm category; one of: Bay 0, Bay 1, Bay 2, Bay 3, Bay 4, Bay 5, Bay 6, Bay 7, or System; i.e., a specific bay, or the entire system.
NUMBER OF DEVICES	Total number of devices programmed in the specified category in the specified range; e.g., a total of 13 lines in Bay 1. Category is displayed on the command line.
TOTAL DEVICES UN-AVAIL	Total number of devices unavailable to Call Processing in the corresponding TOTAL.
PERCENT UNAVAIL-ABLE	The percentage of devices unavailable to Call Processing in the corresponding TOTAL.

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**Table 5-2 Terms Used In The Alarm Status Report  
(continued)**

Term	Meaning
ALARM LEVEL	The current alarm level in the specified range.
MINOR	The Minor Alarm threshold – a percentage of the total number of devices in the specified range.
MAJOR	The Major Alarm threshold – a percentage of the total number of devices in the specified range.
CRITICAL	The Critical Alarm threshold – the actual minimum number of devices in the specified range allowed before the system will reset.
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## Show Status

### Equipment Status Report

5.4 The equipment status report provides the maintenance user with information concerning the current Call Processing and Maintenance states of any device or range of devices. The information provided includes:

- physical location(s), in terms of bay number, slot number, circuit number, and sub-circuit number
- Software Identification ( SWID ) of device (where applicable)
- extension or trunk number (where applicable)
- programmed type of circuit
- maintenance status of the circuit
- software status of the circuit (where applicable)
- hardware status of the circuit (where applicable)
- background diagnostics status
- power-up diagnostics status
- PCM link and channel number used (where applicable).

An example of an Equipment Status Report is shown in Figure 5-2. The CP\_DWA and CP\_DWA\_MEM softkeys only appear if the device has such a work area.

**Status – Entire Bay**

To obtain an equipment status report on an entire bay, press the following softkeys:

SHOW  
STATUS  
BAY/SLOT/CCT (enter the required bay number, press the RETURN key, and enter only the RETURN key for the slot, circuit and sub-circuit prompts)  
ENTER

**Status – Specific Card Slot**

To obtain an equipment status report on a specific card slot, press the following softkeys:

SHOW  
STATUS  
BAY/SLOT/CCT (enter the required bay and slot numbers, pressing the RETURN key after each one; enter only the RETURN key for the circuit and sub-circuit prompts)  
ENTER

**Status – Specific Circuit (or Subcircuit)**

To obtain an equipment status report on a specific circuit, press the following softkeys:

SHOW  
STATUS  
BAY/SLOT/CCT (enter the required bay, slot and circuit numbers, pressing the RETURN key after each one; enter only the RETURN key for the sub-circuit prompt)  
ENTER

**Status – Specific Extension**

To obtain an equipment status report on a specific extension number, press the following softkeys:

SHOW  
STATUS  
EXT-NUM (enter the required extension number, then press the RETURN key)  
ENTER

4:27 10-FEB-87										alarm status = NO ALARM		
SX-200 DIGITAL Generic 1003 336P/D64.1							6-FEB-1987		System			
BB	SS	CC	SC	SOFTWARE_ID	EX/TK	TYPE	BG	PWR	MTSTAT	SWSTAT	HWSTAT	
1	1	5	0	station 0	1105	ons	on	off	avail	idle	idle	
1	1	6	0	station 1	1106	ons	on	off	avail	idle	idle	
1	1	1	0	co_trk 0	1	ls/gs	off	off	progr	bsout	down	
1	3	2	0	co_trk 1	2	s/gs	on	off	avail	idle	maint	
1	3	3	0	co_trk 2	3	ls/gs	on	off	avail	diag	idle	
1	3	4	0	co_trk 3	4	ls/gs	on	off	avail	idle	idle	
1	3	5	0	co_trk 4	5	ls/gs	on	off	avail	idle	idle	
1	3	6	0	co_trk 5	6	ls/gs	on	off	avail	idle	idle	
1	5	1	1	console 0	1511	cons	on	off	avail	idle	idle	
DEVICE STATUS												
1- CP_DWA			2-CP_DWA_MEM			3-			4-		5- CANCEL	
6-MT_DWA			7-MT_DWA_MEM			8-UP_1_PAGE			9-DOWN_1_PAGE		0-	
(For definition of terms, see Table 5-3 )												

**Figure 5-2 Example of EQUIPMENT STATUS Report**

Table 5-3 summarizes the terms used in the Equipment Status Report:

Table 5-3 Terms Used In The Equipment Status Report	
Term	Meaning
BB	The bay in which the device is located
SS	The card slot in which the device is located
CC	The circuit number of the device
SC	The sub-circuit number of the device (where applicable)
SOFTWARE_ID	Type of device installed and its software identification number ( SWID )
EX/TK	The extension or trunk number of the device (where applicable); a number up to five digits in length.
TYPE	The circuit type; one of the following:
	ons - ONS line circuit (digital bay)
	set - COV line circuit (digital bay)
	ops - OPS line circuit (digital bay)
	dnic - DNIC line circuit (digital bay)
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**Table 5-3 Terms Used In The Equipment Status Report  
(continued)**

Term	Meaning
	rcvr – DTMF Receiver module
	moh – Music on Hold module
	lsgs – CO trunk circuit (digital bay)
	cons – DLIC (digital line interface circuit) module
	T1 – T1 trunk circuit
	poolm – pooled modem
	dncon – DNIC console
	cutvr – cutover sensor
	ups – UPS sensor
	temp – temperature sensor
	lamp – ONS lamp test
	jnctr – junctor
	did – DID trunk
	e&m – E&M trunk
	pcm – pcm channel
	dsp – digital signal processor
	stn – ONS line circuit (analog bay)
	sset – COV line circuit (analog bay)
	cotrk – CO trunk circuit (analog bay)
BG	Background diagnostics enabled; either "on" or "off"
PWR	Boot diagnostics enabled; either "on" or "off"
MTSTAT	The current maintenance status; one of the following:
	avail – available to CP and maintenance
	progr – programmed in CDE but not installed
	unprog – installed but not programmed in CDE
	suspt – suspect – failed diagnostic test once
	bsout – busied-out by maintenance – failed diagnostic test at least twice, or busied-out by maintenance user
	fity0 faulty with no passes
	fity1 faulty with one pass
	fity2 faulty with two passes
	fity3 faulty with three passes
	fity4 faulty with four passes

**Table 5-3 Terms Used In The Equipment Status Report  
(continued)**

Term	Meaning
	flty5 faulty with five passes
	flty6 faulty with six passes
SWSTAT	The current call processing (CP) software status; for lines and trunks, one of the following:
	altms – alternate music
	acdwt – ACD wait
	bsout – busied-out
	bst – receiving busy tone
	cwait – using Auto Attendant overflow
	dlgrd – using Auto Attendant
	kspag – directed or broadcast paging
	idlks – receiving broadcast page
	bsgks – receiving directed page
	onstk – using ONS Voicemail feature
	COLre – CO line is reserved
	campd – camped on
	On dialg – dialing
	dnd – do not disturb
	error – receiving reorder tone
	hfi – handsfree idle
	hfree – handsfree ringing
	hfs – handsfree suspended
	hold – consultation hold
	idle – idle
	lockd – locked-out
	pagng – paging
	parkd – parked (held by attendant)
	ringbk – ringback
	ringng – ringing
	rs232 – data station is establishing RS-232 protocol
	stowd – stowed (hard or call hold)
	suspd – suspended
	talkg – talking

**Table 5-3 Terms Used In The Equipment Status Report  
(continued)**

Term	Meaning
	tkd – trunk dial
	wdtrx – data station waiting for dtrx response
	wfjct – waiting for call resources (receiver, junctor, channel)
	wflin – waiting for line
	The current call processing (CP) software status, for receivers and junctors; one of the following:
	free – ready for use by CP
	busy – currently in use by CP
	down – currently unavailable to CP
HWSTAT	The current hardware status; one of the following:
	idle – available to CP
	busy – busy
	down – card not present – unavailable to CP
	dwnld – downloading prompts to a <i>SUPERSET 4™</i> DN telephone
	maint – maintenance busy – busied-out by maintenance diagnostics
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**Show Status – SWID**

This operation enables a user to show software status by selection of a device type. To obtain an equipment status report on a software identifier, press the following softkeys;

SHOW  
 STATUS  
 SWID  
 (press one of the softkeys shown in Table 5-4)  
 ENTER

The system outputs the equipment status data in the Applications Area of the screen. Where the data requires more space than is available on the screen, the user is prompted to request more data via the 8-UP\_1\_PAGE or 9-DOWN\_1\_PAGE softkeys, or to cancel the output via the CANCEL softkey.

**Table 5-4 Software Identification ( SWID ) Types**

Softkey	Device Types
SW_STATION	single line port – analog or digital
SW_CO_TRUNK	CO trunk – 6 cct LS/GS or 4-cct CO
SW_RECEIVER	receivers show the 32 pseudo receivers and the “real” receivers on the receiver module(s) (Generic 1001 has 10 pseudo receivers)
SW_DID_TRUNK	DID trunks – 2 cct analog or 6 cct digital
SW_CONSOLE	console
SW_TIE_TRUNK	TIE trunk – 2 cct E&M TIE analog, 2 cct loop/tie analog, or E&M module
SW_LINE	<i>SUPERSET</i> line work areas
SW_DISA_TRUNK	DISA trunk – 4 cct analog or 6 cct LS/GS
SW_DTMF_GEN	DTMF generator
SW_CAP	call announce port
SW_SET	<i>SUPERSET 3™ / SUPERSET 4®,  SUPERSET 3™DN / SUPERSET 4™DN or,  SUPERSET 401™ / SUPERSET 410™ / SUPERSET 420™ /  SUPERSET 430™</i>
SW_TRUNK_GRP	trunk group
SW_DATA_STN	dataset – cartridge, standalone, or rackmount
SW_HUNT_GRP	hunt group

## Device Status Reports

- 5.5 Device Status Reports are provided following for devices that are programmed into the PABX. Devices may be specified by extension/trunk number, Bay/Slot/Circuit/Subcircuit (plid), or software identification (SWID).

The call processing device work area (CP\_DWA) gives an English format of the call processing device work area. To view the CP\_DWA for the device identified by the cursor on the Device Status Report, press Softkey 1:

CP\_DWA

The user may then view the CP\_DWA's of other active devices, by pressing displayed softkeys.

**Note:** Definitions and softkey functions that are displayed on the screen are explained (as necessary) in Practice 9109-096-350-NA, Troubleshooting. The information is primarily for Mitel engineering personnel.

## Monitor T1 Trunk Activity

- 5.6 The user may monitor the activity on the ST bus to and from the T1 Trunk module. This monitoring may only be done at the Maintenance Terminal; it is not necessary to select a print device, as the monitoring will be output to the Maintenance Terminal automatically. Four buses, DSTi, DSTo, CSTi, and CSTo may be monitored.

Through this feature, the user may also modify the data on selected trunks. The user is able to:

- Send a yellow alarm to the receiving end
- Put the T1 Trunk card into analog loopback mode
- Manually select the synchronization source for the T1 link
- Send data values down the selected trunk
- Change the transmit and receive gains
- Change the A B signaling bits
- Put selected trunks into digital loopback.

To monitor the T1 Trunk activity from the Maintenance Terminal, press the following softkeys when in MAINTENANCE mode:

```

REPORTS
SHOW
STATUS
BAY/SLOT/CIRCUIT
(enter PLID.....)
LINK_STATUS

```



To manually change the clock source while monitoring:

MANUAL

Enter the bay number of new source and press RETURN \*

Enter the slot number of new source and press RETURN \*

ENTER

\* These must be the locations of a functioning Digital Line Cord.

To return to the original clock source:

AUTO

ENTER

To start a loopback test:

LOOPBACK

INTERNAL/EXTERNAL/CLEAR (See notes)

ENTER

- Notes:**
1. INTERNAL LOOPBACK causes the DX to route transmit data signals back into the receive channels.
  2. EXTERNAL LOOPBACK causes the DX to route receive data signals back out to the transmit channels.
  3. CLEAR clears the loopback test that is currently in progress.
  4. If the T1 link is not in synchronization, or is transmitting a yellow alarm, or if the TX or RX pads are not set to zero, the data received is altered. Bit 0 changes due to the transmission of AB bits.

**Table 5-5 Softkey Definitions**

Softkey	Definition
TRUNK-NUM	Prompts for target trunk. Defaults to 01. Valid is 01-24.
CANCEL	Goes back to REPORTS LEVEL form. The default settings for all control signals will be set.
YELLOW	Toggles bit that forces the T1 module to send a yellow alarm to the far end or removes the yellow alarm condition (bipolar).
RETURN	Goes back to the SHOW STATUS summary form.
MANUAL	This softkey will allow the user to change the sync source. The user will be prompted for Bay/Slot.
AUTO	This softkey will restore the original synchronization mode.
SEND	Prompts user for data to be transmitted. Data is sent continuously down the channel currently selected. Valid input is 00-FF (hex).
TxPad	Increments transmit attenuation control bits.

**Table 5-5 Softkey Definitions  
(continued)**

<b>Softkey</b>	<b>Definition</b>
RxPad	Increments receive attenuation control bits.
Tx/AB_00	Transmits A = 0 , B = 0
Tx/AB_01	Transmits A = 0 , B = 1
Tx/AB_10	Transmits A = 1 , B = 0
Tx/AB_11	Transmits A = 1 , B = 1
LOOPBACK – INTERNAL	Analog loopback. Toggles the loopback relay for the card. Loops the signals back through the hardware in the card.
LOOPBACK – EXTERNAL	External loopback causes the DX to route receive data signals back out to the transmit channels. External loopback function sends PABX "A" "B" signaling bits, not incoming "A" "B" bits.
LOOPBACK_D	Digital loopback. Toggles the loopback bit for the selected channel. The DS1 channel is looped internally to replace the corresponding receive channel.
UPDATE	This softkey updates the values on the screen.

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The information in Table 5-6 is displayed for information only; it cannot be altered from the terminal.

**Table 5-6 Definition Of Maintenance Terminal Display**

<b>Display</b>	<b>Meaning</b>
DSTi	Data ST bus Input (32 channels 24 active).
DSTo	Data ST bus Output (32 channels 24 active).
CSTi	Control ST bus Input (32 channels 25 active).
CSTo	Control ST bus Output (32 channels 25 active).
SYNC	This indicates if there is synchronization to the RECEIVED DS1 link.
SLIP	This bit changes state once a slip condition occurs between the RECEIVED DS1 data and the ST-BUS data.
BPV	This bit changes state after 256 bipolar violations, other than the B8ZS code, within a sample period of 200 ms.
XS1	This EXTERNAL SCAN POINT bit contains the data sampled at the XS1 pin once per frame.

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**Table 5-6 Definition Of Maintenance Terminal Display  
(continued)**

Display	Meaning
RxYLW	This indicates that a yellow alarm is being received on the RECEIVED DS1 link.
XCTL	XCTL indicates if the link is active or not (act, inact).
B8ZS	B8ZS bit value in control register.
8KHZ	8KHZ bit value in control register. If 1 then the 8khz pin is low for received channels 1 to 15 and high for channel 16 to the S-bit.
TxYlw	This indicates if a yellow alarm is being sent down the link.
DAC	The current value being written to the DAC. The DAC is on the T1 Clock Interface Module. Its purpose is to provide the ability to adjust the system clock. This is accomplished by writing a 12 bit word to the DAC .
SRCE	This field gives the current SYNC source (Bay/slot).
MODE	<p>This is the current mode of operation. There are three modes: AUTO (AUTO), FREERUN (FREE), or MANUAL (MANU).</p> <p>AUTO – the T1 process is adjusting the system clock to lock on to the incoming 1.544 Mhz signal. The link the process looks at for an external source is based on the order of the links in the network synchronization form.</p> <p>FREERUN – the system clock is not being adjusted to lock on to the incoming 1.544 Mhz signal. The reason for this is there is nothing programmed in the network sync form or the links all exceed the error threshold.</p> <p>MANUAL – the T1 process is forced via maintenance to look at a particular link as an external source. The system clock is adjusted based on this and locks to this source. The T1 process will automatically switch external sources after 24 hours or if the error threshold has been exceeded.</p>
Tx	This is the current data sample for the transmit side of the channel being monitored.
Rx	This is the current data sample for the receive side of the channel being monitored.
TxA, TxB	These are the transmit A and B bits used for controlling channels on the DS1 link.
TxPD	The per channel transmit attenuation control bits.
RxA, RxB	These are the receive A and B bits used for monitoring channels on the DS1 link.
RxPD	The per channel receive attenuation control bits.
LPBK	This indicates if any loopbacks have been activated.
	<p>no – there are none</p> <p>Ext – External loopback has been activated for the card</p> <p>Int – Internal loopback has been activated for this card.</p> <p>dig – digital loopback has been activated for this channel (is not seen if the card is in analog loopback).</p>

## Data Fault Analysis Procedures

- 5.7 Generic information and procedures for analyzing datasets and data-related problems is provided here; refer to it for troubleshooting problems before referring to specific data device troubleshooting charts.

**Table 5-7 Possible Causes Of Data-related Errors**

ERROR	CALL STATE	POSSIBLE CAUSE				
		DATASET	CABLIN G	DX	DLC	DTE /DCE
CRCERR	ANY	Yes (DNIC/HDLC)	Yes	Yes	Yes (DNIC/HDLC)	No
RESETS	ANY	Yes	Yes	Yes	Yes	Yes
LINK FAILURES	CALL SETUP OR TALKING	Yes	Yes	Yes	Yes	No
LINK ABORTS	CALL SETUP OR TALKING	Yes	Yes	Yes	Yes	Yes
PARITY	ANY	Yes (UART)	No	No	No	Yes (Connectors)
OVERFLOW	TALKING	No	No	No	No	Yes
OVERRUN	TALKING	No	No	No	No	Yes
FRAMING	TALKING	No	No	No	No	Yes
NOSYNC	ANY	Yes	Yes	No	Yes	No

**CRC Error:** A CRC (Cyclic Redundancy Check) error will be logged whenever the HDLC chip reports a CRC ERROR, FIFO OVERFLOW, or FRAME ABORT. They are recorded on both the B and the D channel. The probable cause is a hit on the transmission line; the protocol usually recovers gracefully. If the errors become so bad that the protocol cannot continue to run, then a link reset will occur. If the link resets, the link reset may not be successful – if the dataset is on the B-channel it will return to the D-channel with a disconnect reason of link abort.

CRC errors happen on one end of a call if the dataset at the other end is unplugged. The connected dataset records a large number of CRC errors, followed by a link reset, and then a link abort.

**Link Resets:** A link reset occurs when the dataset sends a message, does not receive a response, retransmits the message more times, and still cannot get a response. At this point, the dataset will log a link reset, and then try to re-establish communication by sending SABMs (Set Asynchronous Balance Mode) to the far end. Link resets can occur on both B and D channels.

**Link Aborts:** A link abort occurs when the dataset, after sending a SABM 8 times, cannot get a valid response from the far end. Thus, a link abort often follows a link reset (specifically when the link reset happened because of many transmission line errors, set unplugged, or circuit switch path broken).

Link aborts can also occur just after the dataset is sent to the B-channel. The dataset will send up to 64 SABMs in an attempt to achieve communication; if it does not receive a valid response, a link abort will occur, and the dataset will return to the D channel. There will NOT be an associated link reset (because the link was never in a "normal" state).

**Link Failures:** There are two events which occur on the B-channel that can cause a link failure:

- If the dataset is connected on the B-channel, in "normal" mode (NOT go-ahead mode), and the dataset receives an idle "1"s pattern rather than flags for more than 0.5 second, the dataset will disconnect from the B-channel, the B-to-D reason being link failure.
- If the dataset is connected on the B-channel in go-ahead mode, and the dataset does NOT receive a go-ahead after transmitting flags, it will return to the D-channel, and report a link failure.

**Overflows:** Overflows occur when the device attached to the dataset sends data to the dataset faster than the dataset can send it off to the far end. Two scenarios are:

- Dataset A is at a high baud rate, dataset B is at a lower baud rate, and flow control is NOT enabled on the datasets. In this case, overflows will occur in dataset A. This should NEVER happen; software should not allow two datasets at different baud rates to communicate unless flow control is enabled.
- Dataset A and dataset B both have flow control enabled. The device attached to dataset A is transmitting a large amount of information. The device attached to dataset B flow-controls dataset B. Dataset B stores up as much data from A as it can, then tells A to stop transmitting. Dataset A sends a flow control character to the attached device, but the device ignores it and continues to transmit. Overflows occur. This can happen as a result of a defective attached device, an attached device not having flow control enabled, or the dataset using different flow control characters or kind of flow control (e.g., CTS) than the device is expecting.

**I/F Framing Errors:** Framing errors occur as a result of the device being at a different baud rate than the dataset. A common cause is the user changing his terminal baud rate during a session (or while idle, if the dataset is not programmed for autobaud operation). One possible scenario is:

- A user establishes a call at 1200 baud.
- The user decides that is too slow.
- The user then sets his terminal baud rate to 9600.

Framing errors occur and the user cannot communicate, because the dataset is still at 1200 baud. The only recovery is to disconnect the call and start over.

**NOSYNC Errors:** NOSYNC errors occur when the dataset has lost sync with the PABX; this usually occurs when a dataset has been powered off or a data connection has been broken.

**Power Up Self Test Causing the Dataset to be Busied Out:** If a dataset fails its power up self test, it will be busied out. Maintenance logs will have two log entries: the busied out log and the power up self test failure reason. If a new dataset is installed that passes the power up self test, the device will be returned to service, without an installer using a maintenance command.

## Error Reports

### Show Errors

- 5.8 The Error Reports provide the maintenance user with an up-to-date record of all the transmission checksum errors which have occurred since the system was initialized, or since they were last cleared (see Clearing Error).

To obtain an error report, press the following softkeys:

```
SHOW
ERRORS
DEVICE_TYPE
```

At this point softkeys are presented for device selection:

```
SS3_SS4
DISK
DIGITAL_SETS
HDLC
CONSOLE
DATASETS
T1_TRUNK
ENTER
```

The system outputs the error data in the Applications Area of the screen. In cases where the data requires more space than is available on the screen, the user is prompted to request more data via the MORE softkey, or to cancel the output via the CANCEL softkey. Examples of error reports are provided following.

**SUPERSET 3 and SUPERSET 4 Telephone Errors**

4:27 10-FEB-87		alarm status = NO ALARM		
PLID		EXT.#	ERRORS	
1	8 5 0	1861	2	
1	8 3 0	1811	4	
1	8 2 0	1851	1	
SHOW ERRORS SS3 SS4				
1-	2-	3-	4-	5- CANCEL
6-	7-	8-	9-	0-

**Figure 5-4 Example of SUPERSET 3 or SUPERSET 4 Error Report**

**Explanation of error types:**

**COV Errors:** The error counter is incremented whenever a COV line circuit is reset (*SUPERSET 3* or *SUPERSET 4* telephone). In most cases, this occurs when a telephone is unplugged, the system is reset, or a COV line card is plugged in. Noise on the tip/ring line or a bad telephone or COV circuit card can increment this error count.

Investigate if the error rate is greater than 25 errors per hour.

**Disk Errors**

4:27 10-FEB-87		alarm status = NO ALARM		
DISK	EQUIP ERRS	POSITION ERRS	DATA ERRS	WRITE ERRS
Disk Drive A	0	1	2	1
Disk Drive B	4	5	>255	3
SHOW ERRORS DISK				
1-	2-	3-	4-	5-CANCEL
6-	7-	8-	9-	0-

**Figure 5-5 Example of DISK Error Statistics Report****Explanation of error types:**

**Equipment Errors:** Whenever the system initiates a recalibrate sequence on a disk drive, it expects the disk drive heads to move to the first track on the disk. If this does not happen, it increments the equipment error counter for the disk, and retries the recalibration. If after two retries the heads are not over the first track, the disk drive is considered bad, the operation is aborted, and a disk failure log is generated.

**Position Errors:** Whenever the system tries to perform a read or write operation, it looks for the correct sector by scanning each sector header on the current cylinder for the correct cylinder#, head#, and sector#. If it does not find the cylinder # that it is looking for, the position error counter is incremented. The disks are then re-calibrated and the whole operation is tried again. If the disks are re-calibrated 5 times and the operation still fails, the disk drives are considered bad, the operation is aborted and a log is generated.

```
DISK failed at 0 0 3 0
NIL type test Alarm code = xx
```

**Data Errors:** Whenever the system performs a read operation, it calculates the CRC of the data being read. If the resulting CRC calculation does not correspond to the CRC byte read from the disk, the data error counter for the disk is incremented, and the read is retried. If after four retries the operation has not completed successfully, the disks are recalibrated and the operation is restarted for another five tries. If the disks are re-calibrated 5 times and the operation still fails, the disk drives are considered bad, the operation is aborted and a disk failed log is generated.

**Write Errors:** Whenever the system performs a write operation, it reads the sector back and compares the data with the data written. If this comparison does not match, the write error counter for this drive is incremented, and the write operation is retried. If after four retries the comparison has not been completed successfully, the disk drives are considered bad, and the operation is terminated and a disk failure log is generated.

**Number of Errors:** With respect to an acceptable number of errors, any value over zero shows that the system had trouble performing an operation and gives an indication to the maintenance person that either the drives or the disks may be degrading. Several disk errors are not a sign that the system is faulty, although any time a 'disk failed' log is generated, immediate action is required.

When disk errors occur, first change the disks. If the errors do not go away, change the drives. If changing the drives still does not get rid of the errors, the last recourse is to change the MCC.

**Note:** Changing the drive or the MCC may not be necessary since the software which controls the disk drives is written to handle occasional soft errors.

### Digital Set Errors

4:27 10-NOV-91		alarm status = NO ALARM				
PLID	EXT.#	DEVICE	NO_SYNC	RESETS	RETRANS	CHECKSUM
1861	1806	ss3dn	25	3	0	0
1871	1807	ss4dn	0	2	0	0
1811	1801	ss401	25	3	0	0
1831	1803	ss410	50	1	0	0
1891	1809	ss420	25	0	0	0
1841	1804	ss430	50	3	0	0
SHOW ERRORS DIGITAL_SETS						
1-	2-	3-	4-	5- CANCEL		
6-	7-	8-	9-	0-		

**Figure 5-6 Example of Digital Set Error Report**

### Explanation of error types:

**No Sync:** A synchronization signal is sent between digital circuit and set. The digital circuit monitors the physical line for the presence of this signal. Synchronization is lost when a set is unplugged or when a line is very noisy (external interference or bad connection). A loss of synchronization increments the 'no sync' counter; however maintenance reports are updated only after every 25 occurrences.

In normal operation, this counter will not exceed about 50 for the operating life of a set. A set will get about 25 occurrences each time the set is unplugged or the system is reset.

Investigate a set getting 50 or more 'no syncs' a day:

- check tip/ring connection (remove bridge taps, proximity to noise sources, loop length)
- swap set
- swap circuit card

**Link Reset:** A link reset will occur when communications between a digital set and circuit is torn down. In most cases, this is because a set was unplugged or the system was reset but can also occur due to a protocol violation.

In most cases, a set will get only one link reset during its life. In a 24 hour period, 20 or more link resets may affect set operation and the problem should be investigated.

**Retransmits:** The retransmit counter increments each time a digital circuit has to resend just sent information to a set. If the set has not responded to having received the just sent information, the circuit resends.

This problem can be caused by:

- a noisy line
- bad set
- bad circuit
- software error (protocol violation)

In most cases, a set will have no retransmits in a 24 hour period; however this counter can be influenced by the amount of traffic to the set. The more messages sent to a set, the greater the possibility that a message may not make it to that set and will have to be retransmitted. Investigate more than 50 retransmits in a 24 hour period, although the user will probably not observe any problem at this rate.

## HDLC Link Errors

HDLC LINK	TX_ERR	RX_ERR	OVRFLW	CRCERR	ABORTS	ODDPKT	RETRAN
Bay 3 to MC	0	0	0	0	0	0	0
MC to Bay 3	0	0	0	0	0	0	0
Bay 4 to MC	0	0	0	0	0	0	0
MC to Bay 4	0	0	0	0	0	0	0
Bay 5 to MC	0	0	0	0	0	0	0
MC to Bay 5	0	0	0	0	0	0	0
SHOW ERRORS HDLC							
1-	2-	3-	4-	5-CANCEL			
6-	7-	8-	9-	0-			

Figure 5-7 Example of HDLC Link Error Statistics Report

## Explanation of HDLC Link Error types:

HDLC Link errors are explained following:

ERROR	BAY x TO MC	MC TO BAY x	Error Rate Expected
TX_ERR	Transmitter underrun.	Transmitter underrun.	none
RX_ERR	Undefined error.	Undefined error.	none
OVRFLW	Bay HDLC receiver fifo overflowed.	Main HDLC receiver fifo overflowed.	none
CRCERR	Bay HDLC detected CRC error.	Main HDLC detected CRC error.	see note 1
ABORTS	Bay received HDLC ABORT sequence from main.	Main received HDLC ABORT sequence from main.	see note 1
ODDPKT	Bay received packet with odd number bytes.	Main received packet with odd number bytes.	see note 2
RETRAN	Bay retransmitted packet.	Main retransmitted packet.	see note 2

**Notes:** 1. Dependent upon message traffic on a main-bay link but should be low, less than 10.

2. Dependent upon message traffic on a main-bay link but should be low, generally less than 30 per 24 hours.

3. Possible faulty hardware – MCC, BCC, DIC, PCM cables; refer to 9109-096-350-NA, Troubleshooting.

## Console Errors

4:27 10-FEB-87		alarm status = NO ALARM				
PLID	EXT.#	DEVICE	NO_SYNC	RESETS	RETRANS	CHECKSUM
2311	2311	CONSOLE	4	4	0	
SHOW ERRORS CONSOLE						
1-	2-	3-	4-	5- CANCEL		
6-	7-	8-	9-	0-		

**Figure 5-8 Example of Console Error Report**

### Explanation of error types:

**No Sync:** A synchronization signal is sent between digital circuit and console. The digital circuit monitors the physical line for the presence of this signal. Synchronization is lost when a console is unplugged or when a line is very noisy (external interference or bad connection). A loss of synchronization increments the 'no sync' counter; however maintenance reports are updated only after 25 occurrences.

In normal operation, this counter will not exceed about 50 for the operating life of a console. A console will get about 25 occurrences each time the console is unplugged or the system is reset.

Investigate a console getting 50 or more 'no syncs' a day.

- check tip/ring connection (remove bridge taps, proximity to noise sources, loop length)
- swap console
- swap circuit card

**Link Reset:** A link reset will occur when communications between a digital console and circuit is torn down. In most cases, this is because a console was unplugged or the system was reset but can also occur due to a protocol violation.

In most cases, a console will get only one link reset during its life. In a 24 hour period, 20 or more link resets may affect console operation; investigate the problem.

**Retransmits:** The retransmit counter increments each time a digital circuit has to resend just sent information to a console. If the console has not responded to having received the just sent information, the circuit resends.

This problem can be caused by:

- a noisy line
- bad console
- bad circuit
- software error (protocol violation)

In most cases, a console will have no retransmits in a 24 hour period; however this counter can be influenced by the amount of traffic to the console. The more messages sent to a console, the greater the possibility that a message may not make it to that console and will have to be retransmitted. Investigate more than 50 retransmits in a 24 hour period, although the user will probably not observe any problem at this rate.

**Checksum:** Bad checksum in CONSOLE ROM will report error to maintenance.

### DATASET Errors

PLID	EXT.	FAILRS	ABORTS	CRCERR	RESETS	PARITY	OVRFLW	NOSYNC
3 3 1 0	3301	0	0	5	3	0	4	0
3 3 2 0	3302	1	0	2	1	0	0	0
<b>SHOW ERRORS DATASET</b>								
1-		2-		3-		4-		5- CANCEL
6-		7-		8-		9-		0-

**Figure 5-9 Example of DATASET Error Statistics Report**

### Explanation of error types:

**FAILRS:** The dataset sends flags requesting communication but does not receive acknowledgement from the Digital Line Card; the HDLC on the DLC is time-shared with up to 12 datasets, and sends "go-aheads" to each dataset when it is ready to communicate; if it is busy with one dataset for too long, other datasets will not receive "go-ahead".

This error can also apply to situations which involve link layer errors such as failing to achieve link reset after 64 tries.

Check the dataset and the Digital Line Card.

**ABORTS:** The link is up but the command – response exchange (Set Asynchronous Balance Mode – Unnumbered Acknowledgement) does not succeed. The SABM–UA could happen between the dataset and the PABX when they are programmed as DTRX, or between the two datasets.

This error can also apply to situations such as received idle HDLC link when flags were expected.

Check the dataset and the Digital Line Card.

**CRCERR:** number of retransmissions on the link; this value is set to zero when DNIC synchronization is lost

The line is noisy or of poor quality.

**RESETS:** number of times the link initiated link reset; this value is set to zero when DNIC synchronization is lost. This number is also incremented by link aborts and link failures.

Check the dataset and the Digital Line Card.

**PARITY:** number of bytes received from the attached device with parity errors; this value is set to zero when DNIC synchronization is lost

Check that the DTE device and the dataset have the same parity settings.

**OVRFLW:** number of buffer overflows in the following cases; overflows can be caused because the dataset cannot flow control the DTE device.

**DATASET 2100 Series:** (Sync mode) number of overflows of PLL buffer

**DATASET 2100 Series:** (Async\_mode) overflows on receive information from the locally attached device

**DATASET 1100 Series:** (Async\_mode) overflows on receive information from the locally attached device

**Note:** DATASET Error values are set to zero when DNIC synchronization is lost.

**NOSYNC:** This occurs when there has been loss of synchronization between the dataset and the system

The most common cause is a disconnected dataset.

## T1 Trunk Errors

4:27 10-FEB-87		alarm status = NO ALARM				
PLID	HOUR	SLIPS	FRAME	BIPOLAR	STATUS	STATE
1600	0	0	0	0		
1600	1	0	0	0		
1600	2	0	0	0		
1600	3	0	0	0		
1600	4	0	0	0		
1600	5	0	0	0	clear	active
1600	6	0	0	0		
1600	7	0	0	0		
1600	8	0	0	0		
1600	9	0	0	0		
1600	10	0	0	0		
1600	11	0	0	0		
SHOW ERRORS T1_TRUNK						
1-	2-	3-	4-	5- CANCEL		
6-	7-	8-	9-	0-		

Figure 5-10 Example of T1 Trunk Error Statistics Report

**Explanation of error types:**

**HOUR** – data is accumulated hourly

**SLIPS** – number of data slips due to internal and external timing clocks

**FRAME** – number of framing errors

**BIPOLAR** – number of bipolar violations

**STATUS** – appears only for the current hour, and shows current link status. Valid values are:

clear – when there is no alarm condition on the link

active – not currently used

yellow – receiving a yellow alarm

red – link is in a red alarm condition

shrt term – this link is the current sync source and is using the short term formula to adjust the system clock

long term – this link is the current sync source and is using the long term formula to adjust the system clock

**STATE** – appears for the current hour only, and shows the current link state. Valid values are:

no sync – the status of the link is red because it is not in sync

no power – the status of the link is red because it has a power fault

active – there is no alarm on the link

inactive – there is an alarm condition on the link

## Clear Error Counter

### For Specific Devices

5.9 To clear the Error Counter for a specific device, press the following softkeys:

CLEAR  
ERRORS  
DEVICE\_TYPE

The following softkeys are presented for device selection:

SS3\_SS4  
DISK  
DIGITAL\_SETS  
HDLC  
CONSOLE  
DATASETS  
T1\_TRUNK  
ENTER

**Note:** T1 Trunk errors are tracked on a 24 hour basis. Every hour that the T1 Trunk operates it generates a new report. The error count is a series of 24 one-hour reports, that is updated every hour; the oldest entry is deleted.

If CDE Form 42, T1 Link Descriptors, is changed or a new card is plugged in, the counter is cleared.

### For Specific Circuits

To clear the Error Counter for a specific circuit, press the following softkeys:

CLEAR  
ERRORS  
BAY/SLOT/CCT (enter the required bay, slot, circuit and sub-circuit  
numbers, pressing the RETURN key after each one)  
ENTER

### For Specific Extensions

To clear the counter for a specific extension, press the following softkeys:

CLEAR  
ERRORS  
EXT-NUM  
(enter the required extension number, then press the RETURN key)  
ENTER

### For All Devices

To clear all error counters, press the following softkeys:

CLEAR  
ERRORS  
ALL  
ENTER  
CONFIRM  
ENTER

The user may verify the error counter clearing via the "SHOW ERRORS" command, which operates in the Reports Level.

### Show Channel Map

- 5.10 The Channel Map Report provides the maintenance user with the current status of the system's PCM links. The user may choose between either PHYSICAL or LOGICAL channels. Physical links will show what bay the link is connected to if it is used for voice connection. To obtain a channel map report, press the following softkeys:

SHOW  
CHANNEL-MAP  
PHYSICAL  
LINK-NUMBER or BAY NUMBER  
(enter the desired LINK or BAY number, followed by the RETURN key)  
ENTER

or

SHOW  
CHANNEL-MAP  
LOGICAL  
CHANNEL-NUM  
(enter the desired CHANNEL number, followed by the RETURN key or simply press the RETURN key to view all busy channels)  
ENTER

The system outputs the Channel Map Report in the Applications area of the screen. In cases where the data requires more space than is available on the screen, the user is prompted to request more data via the MORE softkey, or to cancel output via the CANCEL softkey. An example of a Physical Channel Map Report is shown in Figure 5-11. Table 5-8 gives a summary of the terms used in the Channel Map Report.

4:27 10-FEB-87 alarm status = NO ALARM

Channel #	Rx Status	Tx Status	Channel #	Rx Status	Tx Status
0	os_msg	os_msg	1	free	free
2	free	free	3	free	free
4	free	free	5	free	free
6	free	free	7	free	free
8	free	free	9	free	free
10	free	free	11	free	free
12	free	free	13	free	free
14	free	free	15	free	free

Link number 2 is connected to bay 3

SHOW CHANNEL-MAP PHYSICAL LINK-NUMBER 02

1-	2-	3-	4-	5- CANCEL
6-	7-	8-	9-	0- MORE

Figure 5-11 Example of PHYSICAL CHANNEL MAP Report

Table 5-8 Terms Used In The Channel Map Report

Term	Meaning
channel	- Channel number
Rx	- Receive channel
Tx	- Transmit channel
free	- ready for use by CP
cp_busy	- currently in use by CP
down	- currently unavailable to CP
mt_busy	- being tested by maintenance
b_syout	- busied out by maintenance
music	- music on hold
ringbk	- ringback
tone a	- channel connected to tone a
tone b	- channel connected to tone b
tone c	- channel connected to tone c
misc	- channel connected to misc tone
faulty	- failed test, unavailable to CP
os_msg	- channel used by operating system

## 6.

## MAINTENANCE LOG FUNCTIONS

### Introduction

- 6.1 The purpose of the Maintenance Log is to record all maintenance-related information, including anything which affects the functioning or the capacity of the system. Typical maintenance log entries would be circuits failing diagnostics, cards being unplugged, and alarm level changes. The user may read, delete and print log entries, as well as set a variety of printing options. For the READ, PRINT and DELETE commands, the following qualifiers apply:

**ALL** – causes all log entries to be read, printed or deleted.

**NEWEST** – causes the most recent user-defined number of log entries to be read, printed, or deleted.

**OLDEST** – causes the oldest user-defined number of log entries to be read, printed, or deleted.

For further information on the Maintenance Log, refer to Practice 9109-096-353-NA, General Maintenance Information, and to Practice 9109-096-350-NA, Troubleshooting. To access the logs level commands, press the LOGS softkey. All of the following operations are possible while in the Logs Level. Table 6-1 offers a quick reference for log operations.

### Reading Log Entries

**Note:** Logs cannot be read and printed concurrently.

#### All Log Entries

To read all of the maintenance log entries, press the following softkeys:

READ  
ALL  
ENTER

#### Newest Log Entries

To read the newest user-defined number of maintenance log entries, press the following softkeys:

READ  
NEWEST  
(enter the number of log entries to be read)  
ENTER

**Oldest Log Entries**

To read the oldest user-defined number of maintenance log entries, press the following softkeys:

READ  
 OLDEST  
 (enter the number of log entries to be read)  
 ENTER

In all cases, the system will output the requested number of log entries into the Applications Area of the screen. In cases where the log data requires more space than is available on the screen, the user is prompted to request more log data via the MORE softkey, or to cancel the output via the CANCEL softkey. An example of reading logs is shown in Figure 6-1.

**Table 6-1 Logs Level Functions**

LEVEL	COMMAND	PARAMETER	QUALIFIER	QUALIFIER	QUALIFIER	QUALIFIER
7-LOGS	1-SET	4-AUTOPRINT	1-ON			
			2-OFF			
	2-READ	1-NEWEST [number]				
		2-OLDEST [number]				
		4-ALL				
	3-PRINT	9-TRACE_INFO				
		1-NEWEST [number]				
		2-OLDEST [number]				
	4-DELETE	4-ALL				
		1-NEWEST [number]				
		2-OLDEST [number]				
	4-ALL	8-CONFIRM				
		9-TRACE_INFO				
	6-QUIT					
	9-STOP					

**Note:** TRACE\_INFO is a diagnostic tool used in the event of a System Reset with Generic 1003 and Generic 1004; it provides information to help correct the fault. Contact Mitel Field Service.

4:27 10-FEB-87		alarm status = MINOR		
SX-200 DIGITAL Generic 1003 336P/D64.1		6-FEB-1987		Logs
1987-JAN-21 15:33:01		ONS card failed at 02 01 01 00 ext = 2101 OFF hook too long Alarm Code = 101		
1987-JAN-21 11:11:19		OV card failed at 03 03 01 00 ext = 3301 SUPERSET unplugged Alarm Code = 105		
1987-JAN-21 09:23:2		Tot alarm went from No Alarm to MINOR Alarm level change due to Bay 03 trunks		
1987-JAN-21 09:23:25		trunk card failed at 03 09 01 00 trk = 01 Can't seize trunk Alarm Code = 111		
READ LOGS ALL				
1-	2-	3-	4-	5-CANCEL
6-	7-	8-	9-	0-MORE

**Figure 6-1 Example of LOGS READ Display**

## Deleting Log Entries

### All Log Entries

6.2 To delete all of the maintenance log entries, press the following softkeys:

DELETE  
ALL  
ENTER  
CONFIRM  
ENTER

### Newest Log Entries

To delete the newest user-defined number of maintenance log entries, press the following softkeys:

DELETE  
NEWEST  
(enter the number of log entries to be deleted)  
ENTER

### **Oldest Log Entries**

To delete the oldest user-defined number of maintenance log entries, press the following softkeys:

DELETE  
OLDEST  
(enter the number of log entries to be deleted)  
ENTER

In all cases, the system will echo the command into the Applications Area of the screen. The user may verify that the particular log entries have been deleted, using the READ command.

### **Printing Logs on System Printer**

**Note:** Logs cannot be read and printed concurrently.

#### **All Log Entries**

- 6.3 To print all of the maintenance log entries onto the printer, which is defined during Customer Data Entry, press the following softkeys:

PRINT  
ALL  
ENTER

#### **Newest Log Entries**

To print the newest user-defined number of maintenance log entries, press the following softkeys:

PRINT  
NEWEST  
(enter the number of log entries to be printed)  
ENTER

#### **Oldest Log Entries**

To print the oldest user-defined number of maintenance log entries, press the following softkeys:

PRINT  
OLDEST  
(enter the number of log entries to be printed)  
ENTER

In all cases, the system echos the command into the Applications Area of the screen.

**Setting Print Device**

Log entries are produced at the device named in CDE Form 34, DIRECTED IO. See Practice 9109-096-210-NA, Customer Data Entry, for details.

**Setting Automatic Printing**

Maintenance log entries may be printed without the need of a maintenance user to explicitly request printing using the "PRINT" command. This is accomplished by automatic printing. Requesting automatic printing eliminates the danger of losing maintenance log information due to overflow. When the maintenance log contains 75% new (unprinted) log entries, the new entries are automatically printed. Once this initial 75 % is printed, logs are printed frequently thereafter (usually four at a time). When the logs are deleted, the system accumulates 75 % of entries, then prints them out followed by groups of four, until the logs are deleted again. The maintenance log contains a maximum of 96 log entries.

To initiate the automatic printing of logs, press the following softkeys:

SET  
AUTOPRINT  
ON  
ENTER

The system echos the command into the Applications Area of the screen.

To stop automatic printing of logs, press the following softkeys:

STOP  
ENTER



## 7.

## DIAGNOSTIC FUNCTIONS

### Introduction

- 7.1 The Diagnostics Level of operation is a conglomeration of active testing-related commands that are designed to assist the maintenance user in ensuring that the SX-200 DIGITAL PABX is operating at peak performance. The available commands allow the user to enable, schedule and initiate diagnostic testing, and to take equipment out of service, and return it to service. All operations available in diagnostics are shown in Table 7-1.

Four types of diagnostics are available to the maintenance user:

- **PROM-Based Diagnostics** – are run only on system initialization and are not user-controlled. These are the only tests that verify the Main Control and Peripheral Control cards.
- **Power-up Diagnostics** – if enabled, run once, starting at system initialization. Default is disabled.
- **Background Diagnostics** – if enabled, start running after power-up diagnostics have completed, and run continuously. Default is enabled.
- **Directed Diagnostics** – tests initiated by the maintenance user from the maintenance terminal, console, or butt set.

Power-up, background, and directed diagnostics are capable of testing the following devices:

- ONS line circuits
- CO trunk circuits
- DTMF receiver circuits (in digital bays only)
- Analog junctor circuits (in analog bays only)
- Console interface (in digital bays only)
- PCM channels
- T1 trunk circuits
- E&M trunks
- COV line circuits
- DID trunks
- OPS line circuits
- DNIC line circuits
- Printer port and printer PLID (or system printer)
- Digital Signal Processor

**Note:** The DEVICETYPE softkey must be used to test enable/disable diagnostics for the analog junctors and PCM channels. Refer to Practice 9109-096-353-NA, General Maintenance Information, for further information.

The user may check the status of the Power-up and Background diagnostics via the SHOW STATUS command for a specified group of devices).

## The Maintenance Manager

7.2 The Maintenance Manager is a software program which manages the running of diagnostics on the SX-200 DIGITAL PABX. Its duties include the scheduling of tests, the invoking of tests, the logging of errors, and the removal of faulty devices from service. The Maintenance Manager tests devices one at a time from one of six prioritized queues. The priority scheme of the queues is as follows, in ascending order:

- Background diagnostic queue
- Power-up diagnostic queue
- Power-up diagnostic retry queue
- Diagnostic second-chance queue
- Diagnostic second-chance retry queue
- User (directed diagnostic) queue.

For further information on diagnostics, refer to Practice 9109-096-353-NA, General Maintenance Information. To access the diagnostic level commands, press the DIAGNOSTICS softkey. All of the operations described in the following paragraphs are possible while in the Diagnostics Level.

### Enable Power-up Diagnostics

#### For an Entire Bay

.7.3 The user may enable power-up diagnostics for an entire bay by pressing the following softkeys:

```
MORE_KEYS
ENABLE-DIAG
POWER-UP
BAY/SLOT/CCT
(enter the required bay number then press the RETURN key four times)
ENTER
```

#### For an Entire Peripheral Card

The user may enable power-up diagnostics for an entire peripheral card by pressing the following softkeys:

MORE\_KEYS  
 ENABLE-DIAG  
 POWER-UP  
 BAY/SLOT/CCT  
 (enter the required bay; press the RETURN key)  
 (enter the required card slot number; press the RETURN key three times)  
 ENTER

#### For a Specific Circuit

The user may enable power-up diagnostics for a specific circuit by pressing the following softkeys:

MORE\_KEYS  
 ENABLE-DIAG  
 POWER-UP  
 BAY/SLOT/CCT  
 (enter the required bay, slot, circuit, and sub-circuit numbers, pressing the RETURN key after each)  
 ENTER

**Table 7-1 Diagnostics Level Functions**

LEVEL	COMMAND	SUBCOMMAND	PARAMETER	QUALIFIER	QUALIFIER	QUALIFIER
3-DIAGNOSTICS	1-TEST	1-BAY/SLOT/CCT				
		2-DEVICE_TYPE	1-ONS			
			2-LS/GS-TRUNK			
			3-RECEIVERS			
			4-JUNCTOR			
			7-CONSOLE			
			8-DSP			
			9-EM			
			0-MORE_KEYS	1-COV		
				2-LINK/CHANNEL		
			3-DID			
			4-OPS			
			6-DNIC			
			7-PRINTER_PLID			
			8-PRINTER_PORT			
			9-T1_TRUNK			
			0-MORE_KEYS			
		2-CLR_FEATURE	3-EXT_NUM			
		1-FORWARD	1-BAY/SLOT/CCT			
			3-EXT_NUM			
	2-DO_N_DISTURB		1-BAY/SLOT/CCT			
		3-EXT_NUM				
	3-CALL_BACK	1-BAY/SLOT/CCT				

**Table 7-1 Diagnostics Level Functions  
(continued)**

LEVEL	COMMAND	SUBCOMMAND	PARAMETER	QUALIFIER	QUALIFIER	QUALIFIER
			3-EXT_NUM			
		4-ALL	1-BAY/SLOT/CCT			
			3-EXT_NUM			
	6-QUIT					
	8-STOP_TEST	6-PRINTERS				
	0-MORE_KEYS	2-ENABLE_DIAG	1-BACKGROUND	1-BAY/SLOT/CCT		
				2-DEVICE_TYPE		
					1-ONS	
					2-LS/GS-TRUNK	
					3-RECEIVERS	
					4-JUNCTOR	
					7-CONSOLE	
					8-DSP	
					9-EM	
					0-MORE_KEYS	1-COV
						2-LINK/CHANNEL
						3-DID
						4-OPS
						6-DNIC
						8-T1_TRUNK
						0-MORE_KEYS
				3-EXT_NUM		
3-DIAGNOSTICS	0-MORE_KEYS	2-ENABLE-DIAG	2-POWER-UP	1-BAY/SLOT/CCT		
				2-DEVICE_TYPE	1-ONS	
					2-LS/GS-TRUNK	
					3-RECEIVERS	
					4-JUNCTOR	
					7-CONSOLE	
					8-DSP	
					9-EM	
					0-MORE_KEYS	1-COV
						2-LINK/CHANNEL
						3-DID
						4-OPS
						6-DNIC
						8-T1_TRUNK
						0-MORE_KEYS
				3-EXT_NUM		
		3-BUSY-OUT	1-BAY/SLOT/CCT			
			2-DEVICE_TYPE	2-LINK/CHANNEL		
			3-EXT_NUM			
			4-JUNCTOR			
		6-QUIT				
		7-DISABLE-DIAG	1-BACKGROUND	1-BAY/SLOT/CCT		

Table 7-1 Diagnostics Level Functions (continued)						
LEVEL	COMMAND	SUBCOMMAND	PARAMETER	QUALIFIER	QUALIFIER	QUALIFIER
				2-DEVICE_TYPE	1-ONS	
					1-LS/GS-TRUNK	
					3-RECEIVERS	
					4-JUNCTOR	
					7-CONSOLE	
					8-DSP	
					9-EM	
					0-MORE_KEYS	1-COV
						2-LINK/CHANNEL
						3-DID
						4-OPS
						6-DNIC
						9-T1_TRUNK
						0-MORE_KEYS
				3-EXT-NUM		
		7-DISABLE-DIAG	2-POWER-UP	1-BAY/SLOT/CCT		
				2-DEVICE_TYPE	1-ONS	
					2-LS/GS-TRUNK	
					3-RECEIVERS	
					4-JUNCTOR	
					7-CONSOLE	
					8-DSP	
					9-EM	
					0-MORE_KEYS	1-COV
						2-LINK/CHANNEL
						3-DID
						4-OPS
						6-DNIC
						9-T1_TRUNK
						0-MORE_KEYS
				3-EXT-NUM		
		8-RET-TO-SVC	1-BAY/SLOT/CCT			
				2-DEVICE_TYPE	2-LINK/CHANNEL	
				3-EXT-NUM		
				4-JUNCTOR		
		9-DISC_TRUNK	1-BAY/SLOT/CCT			

**For a Specific Extension**

To enable power-up diagnostics for a specific extension number, press the following softkeys:

MORE\_KEYS  
ENABLE-DIAG

POWER-UP  
 EXT-NUM  
 (enter the required extension number, then press the RETURN key)  
 ENTER

**For a Specific Device Type**

To enable power-up diagnostics for a specific device type, press the following softkeys:

MORE\_KEYS  
 ENABLE-DIAG  
 POWER-UP  
 DEVICE TYPE  
 (press one of the softkeys shown in Table 7-2)  
 ENTER

<b>Table 7-2 Device Types</b>	
<b>Softkey</b>	<b>Meaning</b>
ONS	ONS line card
LS/GS TRUNK	LS/GS trunk card
RECEIVERS	DTMF receiver module
JUNCTOR	Junctors
CONSOLE	Attendant console
DSP	Digital signal processor
EM	E&M trunk module
COV	COV line card
DID	DID trunk card
OPS	OPS line card
DNIC	Digital line card
LINK/CHANNEL	PCM Channels
T1_TRUNK	T1 trunk card

In all cases, the system echoes the command into the Applications Area of the screen. The user may verify that the particular power-up diagnostics have been enabled via the SHOW STATUS command.

## Disable Power-up Diagnostics

### For an Entire Bay

To disable power-up diagnostics for an entire bay, press the following softkeys:

```
MORE_KEYS
DISABLE-DIAG
POWER-UP
BAY/SLOT/CCT
(enter the required bay number, then press the RETURN key four times)
ENTER
```

### For an Entire Peripheral Card

To disable power-up diagnostics for an entire peripheral card, press the following keys:

```
MORE_KEYS
DISABLE-DIAG
POWER-UP
BAY/SLOT/CCT
(enter the required bay; press the RETURN key)
(enter the required card slot number; press the RETURN key three times)
ENTER
```

### For a Specific Circuit

To disable power-up diagnostics for a specific circuit, press the following softkeys:

```
MORE_KEYS
DISABLE-DIAG
POWER-UP
BAY/SLOT/CCT
(enter the required bay, slot, circuit and sub-circuit numbers, pressing the
RETURN key after each)
ENTER
```

### For a Specific Extension

To disable power-up diagnostics for a specific extension number, press the following softkeys:

```
MORE_KEYS
DISABLE-DIAG
POWER-UP
EXT-NUM
(enter the required extension number, then press the RETURN key)
ENTER
```

### **For a Specific Device Type**

To disable power-up diagnostics for a specific device type, press the following softkeys:

```
MORE_KEYS
DISABLE-DIAG
POWER-UP
DEVICE TYPE
    (press one of the softkeys shown in Table 7-2)
ENTER
```

In all cases, the system will echo the command into the Applications Area of the screen. The user may verify that the particular power-up diagnostics have been disabled via the SHOW STATUS command.

## **Enable Background Diagnostics**

### **For an Entire Bay**

7.4 To enable background diagnostics for an entire bay, press the following softkeys:

```
MORE_KEYS
ENABLE-DIAG
BACKGROUND
BAY/SLOT/CCT
    (enter the required bay number; then press the RETURN key four times)
ENTER
```

### **For an Entire Peripheral Card**

To enable background diagnostics for an entire peripheral card, press the following keys:

```
MORE_KEYS
ENABLE-DIAG
BACKGROUND
BAY/SLOT/CCT
    (enter the required bay; press the RETURN key; enter the required card slot
    number; press the RETURN key three times)
ENTER
```

### **For a Specific Circuit**

To enable background diagnostics for a specific circuit, press the following softkeys:

```
MORE_KEYS
ENABLE-DIAG
BACKGROUND
BAY/SLOT/CCT
```

(enter the required bay, slot, circuit and sub-circuit numbers, pressing the RETURN key after each)  
ENTER

### **For a Specific Extension**

To enable background diagnostics for a specific extension number, press the following softkeys:

MORE\_KEYS  
ENABLE-DIAG  
BACKGROUND  
EXT-NUM  
(enter the required extension number, then press the RETURN key)  
ENTER

### **For a Specific Device Type**

To enable background diagnostics for a specific device type, press the following softkeys:

MORE\_KEYS  
ENABLE-DIAG  
BACKGROUND  
DEVICE TYPE  
(press one of the softkeys shown in Table 7-2)  
ENTER

In all cases, the system will echo the command into the Applications Area of the screen. The user may verify that the particular background diagnostics have been enabled via the SHOW STATUS command.

## **Disable Background Diagnostics**

### **For an Entire Bay**

7.5 To disable background diagnostics for an entire bay, press the following softkeys:

MORE\_KEYS  
DISABLE-DIAG  
BACKGROUND  
BAY/SLOT/CCT  
(enter the required bay number, then press the RETURN key four times)  
ENTER

### **For an Entire Peripheral Card**

To disable background diagnostics for an entire peripheral card, press the following keys:

MORE\_KEYS  
DISABLE-DIAG  
BACKGROUND  
BAY/SLOT/CCT  
(enter the required bay; press the RETURN key; enter the required card slot  
number; press the RETURN key three times)  
ENTER

#### **For a Specific Circuit**

To disable background diagnostics for a specific circuit, press the following softkeys:

MORE\_KEYS  
DISABLE-DIAG  
BACKGROUND  
BAY/SLOT/CCT  
(enter the required bay, slot, circuit and sub-circuit numbers, pressing the  
RETURN key after each)  
ENTER

#### **For a Specific Extension**

To disable background diagnostics for a specific extension number, press the following  
softkeys:

MORE\_KEYS  
DISABLE-DIAG  
BACKGROUND  
EXT-NUM  
(enter the required extension number, then press the RETURN key)  
ENTER

#### **For a Specific Device Type**

To disable background diagnostics for a specific device type, press the following  
softkeys:

MORE\_KEYS  
DISABLE-DIAG  
BACKGROUND  
DEVICE TYPE  
(press one of the softkeys shown in Table 7-2 )  
ENTER

In all cases, the system will echo the command into the Applications Area of the screen.  
The user may verify that the particular background diagnostics have been disabled via  
the SHOW STATUS command.

## Directed Testing

- 7.6 Directed diagnostics consist of exactly the same tests as the power-up and background diagnostics, but are initiated by the user from the maintenance terminal, and have priority over power-up and background diagnostics. Directed tests also differ from power-up and background tests in that they return immediate responses to the user via the maintenance terminal.

### On a Specific Circuit

To run a directed test on a specific circuit, press the following softkeys:

```
TEST
BAY/SLOT/CCT
(enter the required bay, slot, circuit and sub-circuit numbers, pressing the
RETURN key after each)
ENTER
```

### On a Specific Extension

To run a directed test on a specific extension number, press the following softkeys:

```
TEST
EXT-NUM
(enter the required extension number, then press the RETURN key)
ENTER
```

### On a Specific Device Type

To run a directed test on a specific device type, press the following softkeys:

```
TEST
DEVICE TYPE (see note)
(press one of the softkeys shown in Table 7-2)
ENTER
```

**Note:** Testing can be performed on system printer. Selection of DEVICE TYPE will be followed by entering one of the softkeys in Table 7-2 and two printer related softkeys; PRINTER PLID and PRINTER PORT.

In all cases, the system will output the test results in the Applications Area of the screen.

To stop a directed test, press the following softkey:

```
STOP_TEST
ENTER
```

### Range Testing

It is possible for the maintenance user to test a range of devices using wild card characters. To test an entire bay, press the following softkeys:

TEST  
BAY/SLOT/CCT  
(enter the required bay number)  
(answer the slot, circuit and sub-circuit prompts by pressing the RETURN key)  
ENTER

To test an entire card, specify the bay and the slot, but answer the circuit and sub-circuit prompts by pressing only the RETURN key.

## Busy Out Equipment

7.7 Peripheral circuits may be placed in a state such that they are accessible only through maintenance. While in this state, the device will appear busy when requested by Call Processing. The following circuit types can be busied out in this manner:

- ONS lines
- LS/GS Trunks
- CO trunks
- E&M Trunks
- DTMF receivers
- DID Trunks
- Analog junctors
- 8 Station Lines
- *SUPERSET* Lines
- PCM Channels

### Specific Circuits

To busy out a specific circuit, press the following softkeys:

MORE\_KEYS  
BUSY-OUT  
BAY/SLOT/CCT  
(enter the required bay, slot, circuit and sub-circuit numbers, pressing the RETURN key after each)  
ENTER

### Specific Extensions

To busy out a specific extension number, press the following softkeys:

MORE\_KEYS  
BUSY-OUT  
EXT-NUM

(enter the required extension number, then press the RETURN key)  
ENTER

### Specific Link/Channels

To busy out a specific Link/Channel, press the following softkeys:

MORE\_KEYS

BUSY\_OUT

DEVICE\_TYPE

LINK/CHANNEL

(enter the required link number and channel number pressing the RETURN key after each)

ENTER

**Note:** On System Reset as replacement of a card, any circuit that had been busied out, will remain busied out. The exception is DTMF receiver modules, which reboots or powers up to the idle state.

### Specific Junctors

To busy out a specific analog junctor, found in 456- and 480-port systems, press the following softkeys:

MORE\_KEYS

BUSY\_OUT

DEVICE\_TYPE

JUNCTOR

(enter the required junctor number, then press the RETURN key)

BAY\_NUM

(enter the required bay number, then press the RETURN key)

ENTER

In either case, the system will echo the command into the Applications Area of the screen. The user may verify that the particular circuit or extension number has been busied-out via the SHOW STATUS command.

In the event that a circuit is in use by call processing when the maintenance user tries to busy it out, the circuit will not be busied-out until the extension goes on-hook. This, however, does not apply to junctors or PCM channels. The user must wait for these to become idle before they are busied-out.

## Return Busy Equipment to Service

### Specific Circuits

7.8 To return a specific circuit to service, press the following softkeys:

MORE\_KEYS

RET-TO-SVC

BAY/SLOT/CCT

(enter the required bay, slot, circuit and sub-circuit numbers, pressing the RETURN key after each)

ENTER

### **Specific Extensions**

To return a specific extension number to service, press the following softkeys:

MORE\_KEYS

RET-TO-SVC

EXT-NUM

(enter the required extension number, then press the RETURN key)

ENTER

### **Specific Link/Channels**

To return a specific Link/Channel to service, press the following softkeys:

MORE\_KEYS

RET-TO-SVC

DEVICE\_TYPE

LINK/CHANNEL

(enter the required link number and channel number pressing the RETURN key after each)

ENTER

### **Specific Junctors**

To return a specific junctor to service, press the following softkeys:

MORE\_KEYS

RET-TO-SVC

DEVICE\_TYPE

JUNCTOR

(enter the required junctor number, then press the RETURN key)

BAY\_NUM

(enter the required bay number, then press the RETURN key)

ENTER

### **Forced Trunk Disconnect**

To force release a locked-up trunk, press the following softkeys:

MORE\_KEYS

DISC\_TRUNK

BAY/SLOT/CCT

(enter the required bay, slot, and circuit numbers, pressing the RETURN key after each)

ENTER

**Clear Extension Features – From Remote Terminal**

The Maintenance Terminal can be used to clear CALL FORWARDING, DO NOT DISTURB, and CALL BACK features that are active on an extension (previously this could only be done from an Attendant console). This allows all features on a card in a PABX to be de-programmed from a remote maintenance terminal without requiring a local Attendant console. Only *SUPERSET* telephones and industry standard sets may be cleared from the maintenance terminal.

The extension to be cleared may be identified by either extension number of Bay/Slot/Circuit; standard error messages are returned if invalid values are entered. If the identification or extension number entered is not that of an extension, the following message is displayed: Device type must be a *SUPERSET* telephone or industry standard telephone set.

Enter this application from the maintenance diagnostic menu, as follows:

PRESS SOFTKEY 2 CLR-FEATURE

The screen displays 4 softkey prompts:

1-FORWARD  
2-DO-N-DISTURB  
3-CALL-BACK  
4-ALL

Select the feature (or ALL features) to be cleared, by pressing the softkey.

The screen displays 2 softkey prompts:

1-BAY/SLOT/CCT  
3-EXT-NUM

Enter bay, slot, circuit, and sub-circuit numbers (sub-circuit is not used, but is part of standard prompt format) or enter the extension number, when prompted.

When all information has been entered, the screen displays the 0-ENTER softkey prompt and all the entered parameters.

Press 0-ENTER to clear the specified telephone set.

**Note:** Softkey 5-CANCEL is also available with these prompts.



## 8.

## OTHER MAINTENANCE TERMINAL APPLICATIONS

### Customer Data Entry (CDE)

- 8.1 The RS-232 Maintenance Terminal is also the main device used for the programming of customer data. At the start of the login procedure, the user is queried to start either a Maintenance session or a CDE session (see paragraph 2.4 ). Only a VT100 compatible terminal may be used for CDE. For further information on CDE, refer to Practice 9109-096-210-NA, Customer Data Entry.

### Traffic Measurement

- 8.2 Traffic Measurement is a separate level in Maintenance. All of the information in Part 3 (Command Input) of this Practice applies to Traffic Measurement as well. Refer to Practice 9109-096-450-NA, Traffic Measurement, for command descriptions and further information. Table 8-1 contains the operations available in Traffic Measurement Functions.

**Table 8-1 Traffic Measurement Functions**

LEVEL	COMMAND	PARAMETER	QUALIFIER	QUALIFIER	QUALIFIER	QUALIFIER
5-TRAFFIC_MEAS	1-SET	1-UNITS	1-CCS			
			2-ERLANGS			
		2-PERIOD [number]				
		3-DURATION [number]				
		4-AUTOPRINT	1-ON			
			2-OFF			
		7-START_TIME [hh:mm]	1-PM			
		8-CONDENSED	1-ON			
			2-OFF			
	2-SHOW	3-STATUS				
	3-PRINT					
	4-READ					
	6-QUIT					
	9-STOP	1-TRAFFRPT				
		3-PRINT				



# Appendix A.

## MAINTENANCE TERMINAL ERROR MESSAGES

Table A-1 lists status and error messages which may appear at the Maintenance Terminal during a maintenance session:

<b>Table A-1 Maintenance Terminal Error Messages</b>	
<b>Message</b>	<b>Meaning</b>
ACD reports already in progress. STOP first.	In traffic measurement, parameters cannot be changed without stopping the data collection procedure first.
A specific value cannot follow the default value "XX".	If the user has entered a default value for the BAY/SLOT/CIRCUIT prompt, a specific value cannot follow.
An invalid or incorrect password was entered.	Displayed in SET PASSWORD when the old password does not match that stored in the system, or when the new passwords contain invalid characters (i.e., has characters other than ['A'..'Z', 'a'..'z', 0..9]).
Busy out sequence initiated—check device status for success/failure.	Use SHOW STATUS command to verify busy-out status.
Cannot busy/unbusy pooled modem when using extension number.	Access the pooled modem by Bay/Slot/Circuit.
Cannot test pooled modem by ext number.	Access the pooled modem by Bay/Slot/Circuit.
Cannot use extension number to enable/disable diagnostics for pooled modem.	Access the pooled modem by Bay/Slot/Circuit.
Card not installed.	No card is installed at the specified location. Use SHOW CONFIG command to check the state of the card.
Change terminal speed and press RETURN when ready.	An instruction message rather than an error message; appears when changing the speed of the maintenance port while on the maintenance terminal.
Circuit "XX" does not exist on this card OR card not programmed.	Use SHOW CONFIG command to verify installed cards.
Clearing of T1 Trunk errors is not permitted.	The user attempted to clear T1 errors; this is not permitted.
Copy successful. If upgrading then RESET —else press CANCEL to continue.	COPY DATABASE has been successfully completed. If copying database to a different version of software, the user is required to reset the system.
Critical Disk Shortage.	Database file on disk has less than 1K of disk space left. Do a copy DB to recover free space.

**Table A-1 Maintenance Terminal Error Messages  
(continued)**

<b>Message</b>	<b>Meaning</b>
Data value %d outside of valid range (0-255).	Enter new value within range of 0 - 255.
Database Corrupt in: templates.	The verification of the database has failed. The template section may be corrupted.
Database Corrupt in: static section.	The verification of the database has failed. The static section may be corrupted.
Database Corrupt in: b-tree.	The verification of the database has failed. The b-tree section (ARS or Account codes) may be corrupted.
Note: <b>If more than one section is corrupted, one of these may be displayed instead:</b>	<ul style="list-style-type: none"> <li>- Database Corrupt in: templates and static section.</li> <li>- Database Corrupt in: templates and b-tree.</li> <li>- Database Corrupt in: static section and b-tree.</li> <li>- Database Corrupt in: templates, static section, and b-tree.</li> </ul>
Device is currently in use.	Wait until device is idle (device is locked up).
Device not programmed.	An attempt was made to RET-TO-SVC or BUSY-OUT a device by specifying a PLID which is not programmed.
Disk busy—Please try again later.	The user has tried to READ, PRINT, or DELETE logs and the disk is busy.
Disks are not responding.	System may be too busy to handle the COPY DATABASE sequence - try when the system is less busy. May be communication problem with diskette - check the connections to the disk drive. Verify that there is a diskette in the drive. Repeated failure indicates a problem - refer to Practice 9109-096-350-NA, Troubleshooting.
Disks corrupt. Insert backups and RESET.	The disks in the system are corrupt. The original disks should be reinserted.
Disk IO failure - database may be corrupted.	Disk access has failed, perhaps corrupting the database. One of the following is likely: - disk drive door is open - there is no diskette installed - the diskette has a write protect sticker - a disk read or write failed.
Disk is write-protected - data was not written to disk.	Disks inserted are write protected. Remove copy protect tab, or insert new diskettes as required.
Disks mismatched. Reinsert disks properly and press CANCEL.	After the 'Insert new disks, close doors and press CONTINUE' prompt the disks are checked to make sure that they are a compatible pair. If for some reason they are not compatible, this message is displayed. Verify new diskettes have been inserted. Verify disk drive doors are closed. Verify new diskettes are in appropriate disk drives.
Disks mismatched. Insert original disks and press CANCEL.	After the 'Disks mismatched. Reinsert disks properly and press CANCEL' prompt the disks are not compatible, the original disks must be reinserted and the copy operation is aborted. This error message may also appear after a successful copy, if the original disks are inserted incorrectly.

**Table A-1 Maintenance Terminal Error Messages  
(continued)**

Message	Meaning
Error initializing new disks. Insert original disks and press CANCEL.	Verify new diskettes have system software. New diskettes may be corrupted. Insert original diskettes as required.
Error reading load tag. Press CANCEL to continue.	The load tag was not successfully read. The original disks should be reinserted and the copy is aborted.
Error updating disk database. Insert original disks and press CANCEL.	At the start of the COPY DATABASE sequence, the database is updated before it is read. This may indicate failure of this stage. If not, new diskette may be corrupted, or may not have system software, or database is corrupted.
Error writing load tags. Press CANCEL to continue.	The load tags were not successfully copied. The copy operation is aborted. The original disks should be reinserted.
Error writing system type. Press CANCEL to continue.	The system type was not successfully copied. The copy operation is aborted. The original disks should be inserted.
Illegal operation. Copying to different configuration. Insert originals.	Disks of a different configuration have been inserted following "Insert new disks, close doors and press CONTINUE". Insert original disks and press CANCEL; copy operation is then aborted.
Illegal operation. Copying to different stream. Insert originals.	Disks of a different stream have been inserted following "Insert new disks, close doors and press CONTINUE". Insert original disks and press CANCEL; copy operation is then aborted.
Invalid data station specified.	The user has tried to SHOW DEVICE DATASTN_PLID and specifies a PLID which is not a data station.
Invalid day for the month specified. Date not set.	Valid month entries are dependent upon the Roman calendar. For example, an attempt may have been made to set the date to the 30th of February.
Invalid parameter "XX". TIME (or DATE) not set.	Time may be set to 00:00–23:59, date may be set to 01–31 for days, 01–12 for months, 00–99 for years. Valid month entries are dependent upon the Roman calendar.
Invalid qualifier.	The qualifier specified is invalid for this device type.
Logical channel specified is not in use.	The user has tried to SHOW CHANNEL-MAP LOGICAL CHANNEL NUM ### which is idle. This function shows only those channels which are in use.
MONITOR LOGS already in use	A second attempt was made to monitor logs. Monitor logs was already in progress.
Must specify at least a bay number in Bay/Slot/Cct.	When entering bay number for junctor diagnostics, a specific value must be used.
Must specify at least a link number.	The user has tried to BUSY-OUT or RET-TO-SVC a pcm channel and uses a wild card for the link parameter.
NO CONSOLE programmed.	Program a console first.
No Data Sets programmed.	Program a data set first.
No Digital Sets programmed.	Program a digital telephone set first.

**Table A-1 Maintenance Terminal Error Messages  
(continued)**

<b>Message</b>	<b>Meaning</b>
No errors found within specified range.	The user attempted to SHOW ERRORS and the devices specified (SS3_SS4, DISK, DIGITAL_SETS, HDLC, DATASETS, CONSOLE, T1_TRUNK) have no errors. Note: This function always gives the T1 Trunk error form, even though there are no errors.
No loopbacks are presently set.	An analog loopback test has been started after clear loopbacks (internal or external).
No programmed devices within specified range.	There are no programmed devices within the specified range. Use SHOW CONFIG command to check range.
No disks in drives, please insert original and press CANCEL.	If there are no disks in the drives or the door was left open.
No wild cards allowed for this function.	The user has specified wild cards in a PLID parameter when trying to BUSY-OUT or RET-TO-SVC.
Not original disks. Please insert originals and press CANCEL.	The original disks should be reinserted. This message will be printed as long as the original disks are not reinserted.
Please wait, accessing disk...	This is a status message only. The system needs time to access the disk.
Original disks reinserted or backups left in.	This is a status message only printed after a successful copy sequence. The original disks were reinserted or disks of the same load version as the originals were inserted at the appropriate time.
PRINTER_PLID is invalid as a printer device.	The user has tried to SUSPEND_PRTR or RESUME_PRTR. The specified PLID is not a printer PLID.
Read failure, resetting system.	During COPY operation, the disks are read to determine their identity. This may indicate failure of this stage.
Reading database, please wait...	This is a status message only. Database is being read from disk to system RAM as part of the COPY DATABASE command.
Reading disks, please wait...	This is a status message only. The disks are being read to determine their identity and compatibility. i.e., 64.8.
Serious Disk Shortage.	Database file on disk has only 4K of disk space left. Do a copy DB to recover free space.
Stop of print pending or no print currently in progress.	There was no PRINT process running when STOP PRINT was entered.
System busy, please try again later.	Copy database is inhibited for several minutes following a system reset; maximum time is approximately eight minutes.
The access code "XXX" does not exist.	The specified extension number does not exist. Use SHOW STATUS command to check the status code.
The Bay/Slot/Circuit - XXXXXX used is inappropriate.	The user attempted to clear errors through Bay/Slot/Circuit of an inappropriate device.

<b>Table A-1 Maintenance Terminal Error Messages (continued)</b>	
<b>Message</b>	<b>Meaning</b>
The extension number "XXXX" is not a SUPERSET telephone, CONSOLE, or DATASET.	The user has specified an extension number when he tries to CLEAR ERRORS. Errors are only compiled for these types of devices.
The hour value "XX" is out of range. Start time not set.	Used in traffic measurement for invalid values in the SET START TIME command.
The link "X" cannot be tested.	The user has tried to test or enable diagnostics on a pcm link which is not used as a telephony link. Links 0, 1, 14 and 15 are not available for testing.
The minor threshold may not be greater than the major threshold.	Assign a higher value to the major threshold or else assign a lower threshold to the minor threshold – SET Alarm threshold.
The minute value "XX" is not a multiple of ten. Start time not set.	Used in ACD Report traffic measurement for an invalid minute value in the SET START TIME command.
The minute value "XX" is out of range. Start time not set.	Used in traffic measurement for invalid values in the SET START TIME command.
The value "X" is invalid for BAY_NUM.	The user has tried to enable or disable diagnostics on junctors and the bay specified is not an analog bay.
The value "XX" is invalid for JUNCTOR.	The user has tried to enable or disable diagnostics on junctors and has specified a junctor outside the valid range (0-31).
The value "XX" is outside the valid range for SUBCIRCUIT.	The specified sub-circuit number is invalid for this particular device type. Use SHOW STATUS command to verify card type and number of programmed circuits.
There are no logs currently on the disk.	There are no logs on the diskette to READ or PRINT.
This function is not available for this device.	The feature requested is not available for this device.
This function is not available for this console.	The feature requested is not available for this console.
This function is not available for this device.	The user has tried to BUSY-OUT or RET-TO-SVC the console.
This function is not available on the console.	The user has tried to perform a command which is not available when logged into maintenance from the console.
TIMEOUT PERIOD EXPIRED. Press Return to login.	After being prompted for the username, the user has 10 seconds to begin entering characters.
Traffic measurement already in progress. STOP first.	In traffic measurement, the following parameters can not be changed while traffic measurement is collecting data: PERIOD, DURATION, and START TIME.
Trunk value "XX" outside of valid trunk range (1-24).	The user requested to monitor the LINK_STATUS of a trunk which was outside the valid range of 24 circuits for the T1_Trunk card.

**Table A-1 Maintenance Terminal Error Messages  
(continued)**

<b>Message</b>	<b>Meaning</b>
Unable to print. Maintenance print already in progress.	There can be only one PRINT or READ occurring at one time. If required, enter STOP PRINT command to initiate a second PRINT.
Unable to read the disk.	Occurs in conjunction with the READ PRINT and ALARMS commands. Verify there is a diskette alarm present. Ensure disk drive door is closed.
Unable to update disk.	When doing operation with the logs, i.e., READ, PRINT or even the ALARMS command from the console, the diskette is first updated. This message indicates failure of this stage. Check for presence of a diskette in the drive. Ensure the disk drive door is closed.
Universal Card. Module "X" in Bay Slot Module is out of range (1-4).	The user has chosen a Universal Card but the module number is out of range (i.e., not between 1 and 4).
Universal Card. Sub_circuit "X" does not exist on module.	The user has chosen a Universal Card; the module number is valid and exists but the sub-circuit number specified does not.
Unrecognized qualifier %s. All others ignored.	The qualifier in "Test" command is unrecognized.
Upgrade disks in drives, resetting system.	This is a status message only printed after a successful copy sequence. Upgrade disks were left in the disk drives.
Value cannot be greater than 100.	Assign a new value that is less than 100 for alarm threshold.
Value must be less than 256.	Whenever there is a prompt for "Number of Entries", up to three digits may be entered but only values up to 255 are acceptable.
Verifying database, please wait...	This is a status message only. The database in RAM and on disk is compared. If any differences are found the database is said to be corrupt and the copy operation is aborted.
Warning. Invalid qualifier found. %s will be ignored.	The qualifier specified during set time will be ignored.
Warning. Sub_circuit field ignored for this card.	Sub-circuit parameter was entered, but was not required. For information only.
Writing database, please wait...	This is a status message only. Database is being written from system RAM to disk as part of the COPY DATABASE command.
Wrong bay type for specified device.	An incompatible bay number is given for the device selected (i.e., Bay 0 is selected for receivers).

9109-096-353-NA

Issue 1

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**SX-200<sup>®</sup> DIGITAL PABX**

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# General Maintenance Information

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## 1.

## GENERAL

### Introduction

- 1.1 This Practice describes the maintenance philosophy, features, and facilities of the *SX-200*® DIGITAL Private Automatic Branch Exchange (PABX). Included are the use of diagnostic tests, maintenance aids, local and remote terminals, and other tools available to assist maintenance users in ensuring a continued high standard of efficiency and performance. Further details concerning *SX-200* DIGITAL PABX maintenance may be found in the Practices listed in Table 1-1.

Table 1-1 <i>SX-200</i> DIGITAL PABX Practices	
9109-096-100-NA	General Description
9109-096-105-NA	Features Description
9109-096-180-NA	Engineering Information
9109-096-350-NA	Troubleshooting
9109-096-351-NA	RS-232 Maintenance Terminal

### Reason for Issue

- 1.2 This Practice forms part of the MITEL® Standard Practices issued to provide technical information for the *SX-200* DIGITAL PABX. Some features, such as T1 Trunks, Automatic Call Distribution (ACD), modem pooling, and 672-port configuration, are not available with Generic 1001 or Generic 1002.

Features not supported in Generic1005 FPKG or Generic 1005 LIT96 1 are: Automatic Call Distribution (ACD), Data Communications features, Automatic Number Identification/Dialed Number Identification Service, Application Platform Package, and Call Centre Manager (CCM).



## 2.

## MAINTENANCE TOOLS

### The Maintenance Terminal

2.1 The RS-232 ASCII Maintenance Terminal is the primary maintenance tool for the SX-200 DIGITAL PABX. It is connected by means of a standard 25-pin RS-232 cable. One end of the cable is plugged into the main RS-232 communication port of the terminal; the other end is plugged into the RS-232 Maintenance Connector port on the system Maintenance Panel. With the SX-200 FD system the maintenance terminal can be connected to all nodes. A wide range of commands are available at the maintenance terminal to help the user locate and replace faulty equipment. For further information, refer to Practice 9109-096-351-NA, RS-232 Maintenance Terminal.

**Notes:** 1. The "REMOTE" and "LOCAL" connectors may not be used concurrently.

2. The maintenance terminal user must "LOGOUT" after every session.

3. Maintenance terminals connected to peripheral nodes are for "SERVICE ONLY" no permanent connections should be maintained.

The SX-200 DIGITAL Attendant Console may be used as an alternate maintenance workstation. All of the commands available at the maintenance terminal are available at the attendant console.

### Control Cabinet Maintenance Panels

2.2 Located at the front of the control equipment cabinet is the control maintenance panel. This provides maintenance personnel with access to the system through the maintenance ports and test line connectors. Also housed on the control maintenance panel are the Power Fail Transfer control switches, and the power ON/OFF switch and LED power indicator for Bay 3 (480-Port Configuration only).

**Maintenance Port.** These connectors are provided to allow the maintenance person a port to connect an RS-232 ASCII terminal to the system for maintenance or programming purposes. The terminal may be connected either directly to the system (using the LOCAL port), or indirectly, via a modem (using the REMOTE port). Note that only one of the Maintenance Ports may be used at any point in time. Note that the Remote Maintenance port is located on the Universal cabinet's rear panel. With the SX-200 FD the maintenance ports are located on the rear of the control node (See Figure 2-1), and the front of the peripheral node (See Figure 2-2). Refer to Practice 9109-096-351-NA, RS-232 Maintenance Terminal, for further information.

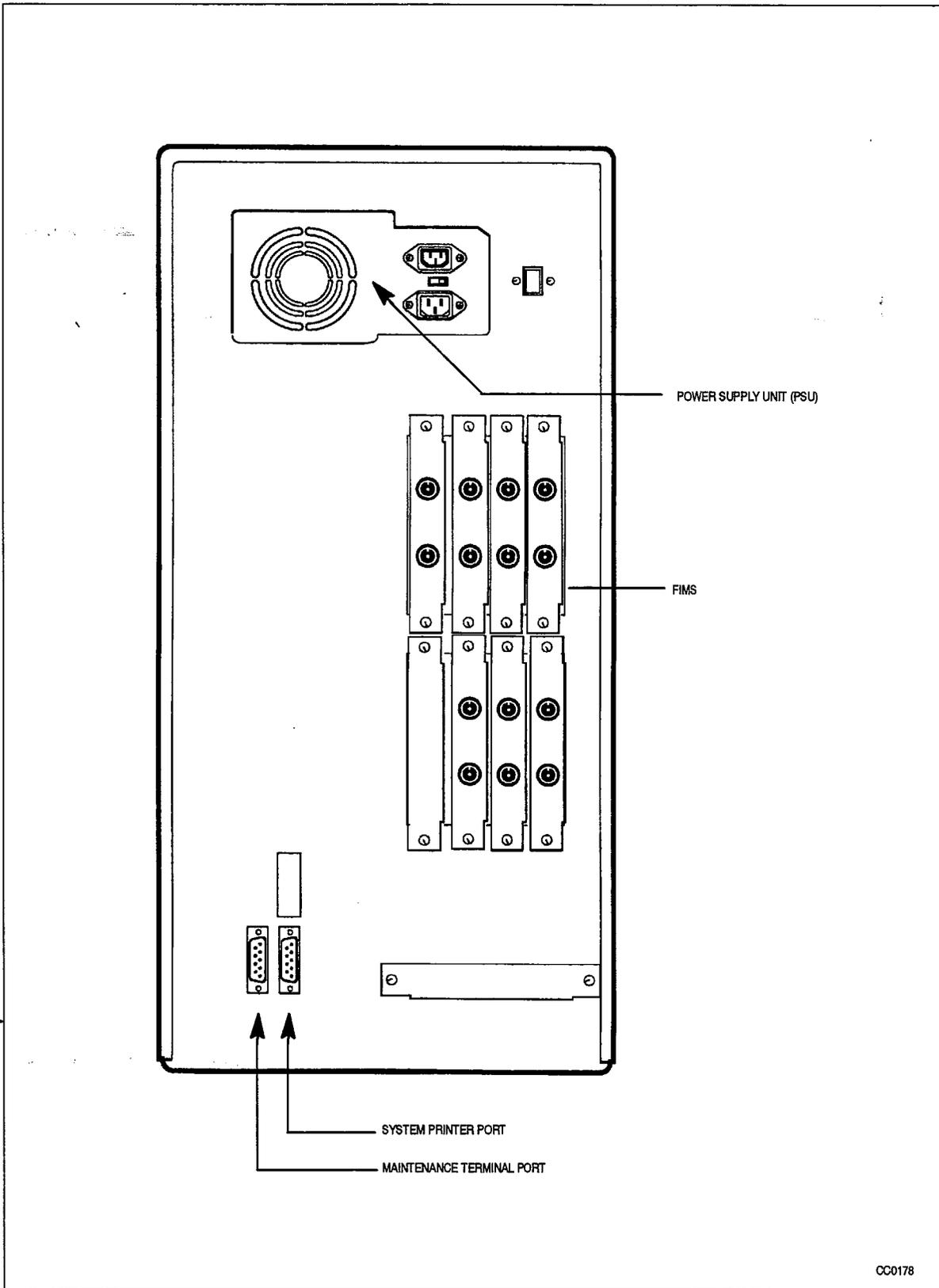
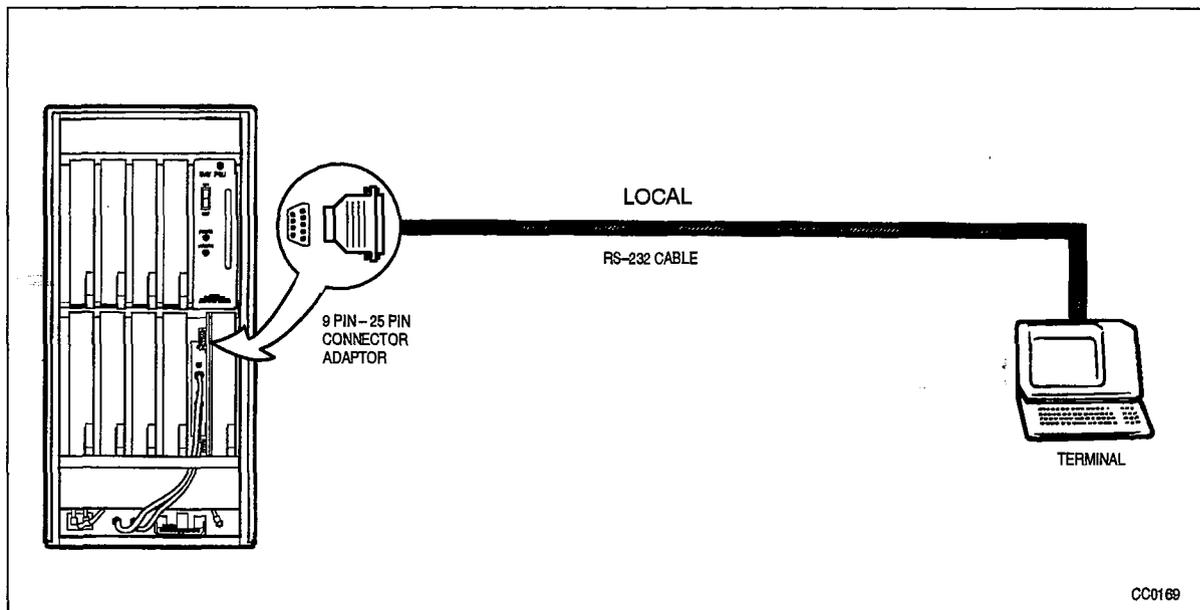


Figure 2-1 Rear of the Control Node



**Figure 2-2 Maintenance Terminal Connection to Peripheral Cabinet (Bay)**

**Power Fail Transfer Control Switches.** These switches allow the maintenance person to determine the type of failure that will cause a power fail transfer to occur (refer to Practice 9109-096-105-NA, Features Description, for information on power fail transfer). These switches apply only to 480-port configurations with a welded Control Cabinet. There are three options: transfer on power supply failure, transfer on common control failure, or transfer on either power supply or common control failure. These options are selected by switching the POWER SUPPLY and COMMON CONTROL switches to the ENABLE and DISABLE positions as required. The MASTER SWITCH allows the maintenance person to manually force a power fail transfer, by switching to the TRANSFER position. For normal system operation, this switch should always be in the NORMAL position. On the *SX-200* FD, transfer switches are on the optional System Fail Transfer (SFT) unit (refer to Practice 9101-096-201-NA, or the manufacturer's instructions).

**Maintenance Console.** This connector allows the maintenance person to connect an Attendant Console directly to the maintenance panel for maintenance or programming purposes, instead of using an RS-232 ASCII terminal. To allow operation of the console, there is one console connection available at the default console position located in bay 2, slot 3, circuit 1 in a 480 port, 336 port, or 456 port system, or at bay 1, slot 5, circuits 1 and 2 in a 672 port system.

**Note:** There are two console types; the LCD Console interfaces to a Console Module on a Universal Card, while the *SUPERCONSOLE 1000™* Attendant Console interfaces to a Digital Line Card. When connecting a console to a maintenance panel, make sure that the console matches the type of card that is installed in the default position.

**Test Line Connectors.** These connectors allow the maintenance person to access individual lines, trunks and receivers for testing purposes. The test line also has the capability of removing circuits from service, and accessing speech paths and the

system printer. To facilitate operation of the test line, there must be an ONS line card installed in bay 2, slot 1; in CDE, Bay 2, Slot 1, Circuit 1, must be programmed as the test line. Refer to Part 7 of this Practice for further information on the test line. There are no Test Line Connectors on a 672 Port Maintenance Panel, or on some other panels. In these instances, the connection must be made at the MDF.

### Peripheral Cabinet Maintenance Panel

2.3 Located at the top of the welded peripheral equipment cabinet is the peripheral maintenance panel. This provides maintenance personnel with access to the power fail transfer switches for the peripheral equipment cabinet. These switches allow the maintenance person to determine the type of failure that will cause a power fail transfer in the peripheral equipment cabinet. There are three options: transfer on power supply failure, transfer on common control failure, or transfer on either power supply or common control failure. These options are selected by switching the POWER SUPPLY and COMMON CONTROL switches to the ENABLE and DISABLE positions as required. The MASTER SWITCH allows the maintenance person to manually force a power fail transfer, by switching to the TRANSFER position. For normal system operation, this switch should always be in the NORMAL position.

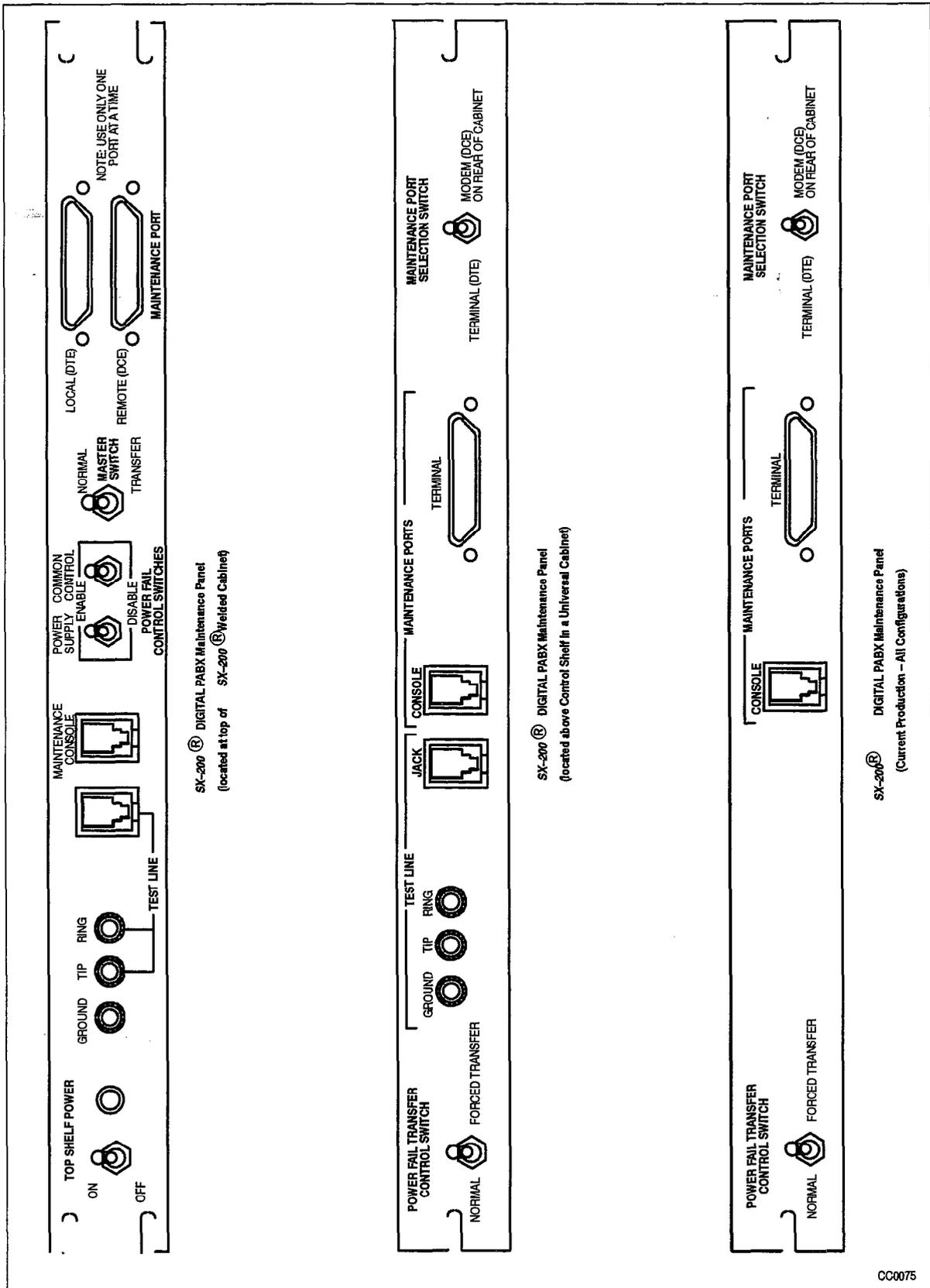
**Important:** The switches labeled MAINTENANCE CONSOLE, CONSOLE NO. 1 and CONSOLE NO. 2 must always be in the DISABLE position.

- The 672 port peripheral cabinet does not have a maintenance panel.

### System Maintenance Log

2.4 The system maintenance log is a floppy-disk-based record of maintenance-related information. Any event which has the potential of affecting the functioning or the capacity of the system is entered into this log. There are three types of log reports possible:

- **Fault report** – A report is generated whenever Call Processing or the maintenance system detects an error or an abnormal condition.
- **Reset report** – A report is generated whenever a bay or the Main Controller is reset.
- **Alarm level change report** – A report is generated whenever a change in the overall system alarm level occurs.



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Figure 2-3 SX-200 DIGITAL PABX Maintenance Panels

**General Maintenance Information**

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## 3.

# ALARMS

### General

- 3.1 Alarms are the means through which the *SX-200* DIGITAL PABX is able to determine its own functional state. The Alarm Manager software program monitors the performance of all peripheral devices in the system, and compiles up-to-date statistics on anomalies. The level of alarm is determined by the actual or potential effect on service that the anomalies cause.

### Alarm Levels

- 3.2 There are four distinct levels of alarm defined for the *SX-200* DIGITAL maintenance system. These levels are intended to give the maintenance person up-to-date information on the severity of existing anomalies. The four alarm levels are:
- **NO ALARM** – This indicates that the system is functioning properly.
  - **MINOR** – This indicates that there are problems affecting the system in small proportion.
  - **MAJOR** – This indicates that there are problems causing a serious degradation of service.
  - **CRITICAL** – This indicates that there has been a very serious loss of call processing capability; an automatic power fail transfer (PFT) is invoked and the system is reset.

### Alarm Categories

- 3.3 There are four basic alarm categories, all relating to peripheral equipment. All problems affecting system performance will fall into one or more of these categories. Failure of other system components will indirectly cause failure of peripheral equipment. The categories are:
- Lines
  - Trunks
  - DTMF Receivers
  - PCM Channels (junctors).

## Alarm Types

- 3.4 Since the *SX-200* DIGITAL PABX is modular in design, the Alarm Manager keeps alarm statistics in a modular fashion. For this reason, the alarms are divided into three types:
- **Bay Alarms** – These are the alarm levels of the categories specific to each separate bay in the system. In the *SX-200* FD the “peripheral nodes” are equivalent to “bays” in maintenance.
  - **System Alarms** – These are the alarm levels of the categories on a systemwide basis.
  - **Overall Alarm** – This is the overall system alarm level, taking into account all of the bay alarms and system alarms in all categories. This is the alarm that is displayed on the upper right corner of the console

## Alarm Thresholds

- 3.5 For each alarm category, the thresholds represent the alarm level trip points; the precise divisions between the alarm levels. The thresholds are simple percentages, indicating availability; the number of working devices is compared to the number of programmed devices. The critical alarm threshold, however, is not a percentage, but rather a precise numerical value. When the number of available devices falls below this number, a Critical Alarm is raised. The thresholds are programmable (refer to Practice 9109-096-351-NA, RS-232 Maintenance Terminal); the default values are specified in Table 3-1.

<b>Table 3-1 Alarm Thresholds</b>			
<b>ALARM CATEGORY (Peripheral Devices)</b>	<b>ALARM THRESHOLDS</b>		
	<b>MINOR</b>	<b>MAJOR</b>	<b>CRITICAL</b>
Lines	0%	20%	0
Trunks	0%	10%	0
DTMF Receivers	0%	25%	0
PCM Channels (Junctors)	10%	25%	0

## Alarm Totals

- 3.6 The Alarm Manager keeps a record of the total numbers of the various devices that should be available to Call Processing, as well as the actual number that are available. Alarm totals are maintained for each of the alarm categories in each bay, as well as for the entire system. These totals are compared to the alarm thresholds, to determine the level of alarm that is raised.

## 4.

## THE MAINTENANCE MANAGER

### General

- 4.1 The Maintenance Manager is the central maintenance software program in the SX-200 DIGITAL PABX system software. Its responsibility includes the receiving of requests to run diagnostic tests, managing the test schedules (queues), and initiating testing.

### Diagnostic Test Queues

- 4.2 Diagnostic tests are grouped into three different categories: Power-up, Background, and Directed. To reflect this, the test schedules (queues) are prioritized along the same categories. Table 4-1 describes the queues in ascending order of priority. When the Maintenance Manager schedules a device for a particular type of diagnostic test, it places the device in the appropriate diagnostic test queue. When the maintenance person disables a diagnostic test type via the maintenance interface, the corresponding test requests are removed from the associated test queue. The priority scheme is designed to ensure that testing requested by the maintenance person via the maintenance terminal is handled immediately.

Table 4-1 Diagnostic Test Queues

Diagnostic Test Queue	Priority	Description
Background Queue	6	This queue has the lowest priority; any device with background diagnostics enabled will normally be tested once during each pass through the system. <b>Note:</b> Background Diagnostics can be manually disabled.
Power-up Queue	5	If a device has power-up diagnostics enabled, and is both programmed and installed, it will be put on this queue. <b>Note:</b> Power-up Diagnostics must be manually enabled.
Power-up Retry Queue	4	If a device could not be tested when on the Power-up Queue, it is placed on this higher priority queue to be tested as soon as possible.
Fault Isolation Queue	3	If a previously healthy device fails a test, it will be flagged "SUSPECT" and tested again from this queue. If it fails here, it is removed from service.
Fault Isolation Retry Queue	2	If a device could not be tested when on the Fault Isolation queue, it is placed on this higher priority queue to be tested as soon as possible.
Directed Test (User) Queue	1	This is the highest priority test queue. Devices in this queue are tested immediately; results are reported to initiating user port.

## Testing

- 4.3 The Maintenance Manager controls the entire test sequence on any device under test; the general test sequence for any peripheral device is:
1. The Maintenance Manager locates a device with diagnostic test requests pending on the highest priority test queue.
  2. The device is requested from Call Processing for testing. If the device is idle, the request is granted.
  3. Any resources required to perform tests on the device are allocated.
  4. The series of tests for the particular device is invoked.
  5. When testing has been completed, the status of the device is updated.
  6. If the device status has changed, this is logged into the Maintenance log, and the alarm levels are updated.
  7. Resources required for testing are released.
  8. The device is then returned to Call Processing, providing all tests passed. If any of the tests failed, the device will be retested; failure in this case results in the device being removed from service.

When the Maintenance Manager has control of a device for testing purposes, it must follow a set of "guidelines" designed to make diagnostic testing both transparent to system users, and efficient. These include:

- (a) If Call Processing requires a device while it is being tested, the Maintenance Manager immediately aborts the test and releases the device.
- (b) When a device fails a diagnostic test, it is tested a second time to verify the fault. If it fails again, it is removed from service.
- (c) When a device fails diagnostic tests, and is subsequently removed from service, it remains out of service until it passes seven successive diagnostic tests.
- (d) If a device scheduled for power-up or fault-isolation diagnostic testing cannot be tested, it is rescheduled for testing on a higher priority test queue, and retried at 5 minute intervals.
- (e) Each device may have background and/or power-up diagnostics selectively disabled by the maintenance person via the maintenance interface.

## Fault Recovery

- 4.4 Once a device fails diagnostic testing, it is removed from active service; it can no longer be used by Call Processing. The three different circumstances through which the device can be returned to active service are:

1. The most common method should be through the troubleshooting procedures outlined in Practice 9109-096-350-NA, Troubleshooting. This entails repairing or replacing the affected card. When re-installed, the device is automatically tested, and if it passes, is returned to service.
2. The maintenance person has the option of returning a faulty device to service, if desired. This is done via the maintenance interface (terminal, console, or test line) – see Practice 9109-096-351-NA, RS-232 Maintenance Terminal.
3. When a device fails diagnostic testing and is subsequently removed from service, the Maintenance Manager continues testing it. If a device passes seven consecutive tests after being removed from service, it is returned to service.

### The Maintenance Database

- 4.5 All cards that are programmed via Customer Data Entry (CDE) have associated with them an up-to-date status record located in system DRAM memory. These are known as the Maintenance Device Work Areas (DWA), and aid the system in determining the state of every device in the system at any point in time. Table 4-2 describes the information stored in the device work areas.

<b>Table 4-2 The Maintenance Device Work Area</b>	
<b>DWA Entry</b>	<b>Description</b>
Physical Location	The physical location (bay, slot, circuit, subcircuit) of the device.
Card Type	The type of card programmed in the specified location; i.e., ONS Line Card, DTMF Receiver Module, etc.
Card Status	The status of the card; one of: instld – the correct card type is installed unplug – the card is programmed, but is either unplugged or not installed wrong – an incorrect card type is installed.
Test Request Pending Counter	The number of outstanding requests for diagnostics tests for the card, on each of the six test queues.
Test Request Pending Flag	For each circuit on the card, and for each test queue, this indicates outstanding test requests.
Circuit Status	The status of the circuit, one of: avail – available to CP and maintenance progr – programmed in CDE but not installed unprog – installed but not programmed in CDE suspt – suspect – failed diagnostic test once fity0 – faulty
Page 1 of 2	

<b>Table 4-2 The Maintenance Device Work Area (continued)</b>	
<b>DWA Entry</b>	<b>Description</b>
	fity1 – faulty with one pass fity2 – faulty with two passes fity3 – faulty with three passes fity4 – faulty with four passes fity5 – faulty with five passes fity6 – faulty with six passes bsout – forced busy, busied-out
Power-up Enable	Indicates for each circuit on the card, if power-up diagnostics are enabled.
Background Enable	Indicates for each circuit on the card, if background diagnostics are enabled.
Page 2 of 2	

### Maintenance Device Work Area

4.6 When a card is first programmed, a maintenance device work area is assigned for it, which can be accessed by two softkeys: MT\_DWA and MT\_DWA\_MEM.

**MT\_DWA** – gives an English format of the status of the diagnostics of the maintenance work area

**MT\_DWA\_MEM** – is a hexadecimal memory dump of the contents of the maintenance device work area

Figure 4-1 shows a typical display of a Maintenance Device Work Area. Definitions of the terms used in the screen display follow Figure 4-1.

10:04 AM 23-APR-90

alarm status = NO ALARM

CARD DATA	DEV	STATUS	BGR	PWR	BGR	SYS	PUP	FIS	PRT	FRT	USR
DEV PLID: 2150	1	AVAIL	ON	OFF	1	0	0	0	0	0	0
CARD TYPE: ONS	2	AVAIL	ON	OFF	1	0	0	0	0	0	0
CARDSTAT: INSTLD	3	AVAIL	ON	OFF	1	0	0	0	0	0	0
NUM CCTS: 12	4	AVAIL	ON	OFF	1	0	0	0	0	0	0
	5	AVAIL	ON	OFF	1	0	0	0	0	0	0
DEV SWID: MT CARD 19	6	AVAIL	ON	OFF	1	0	0	0	0	0	0
DWA ADD: 1336C0	7	AVAIL	ON	OFF	1	0	0	0	0	0	0
DISK ADD: 0E49 01A6	8	AVAIL	ON	OFF	1	0	0	0	0	0	0
					CARD REQ: 12	0	0	0	0	0	0
MTCE WORK AREA											
1-	2-	3-	4-	5- CANCEL							
6-	7-	8-	9- MORE_DEVICES				0- RETURN				

Figure 4-1 Maintenance Device Work Area

- DEV PLID Bay / Slot / Circuit / Subcircuit
- CARDTYPE Type of card
- CARDSTAT status of the card
- NUM CCTS number of circuits on the card
- DEV SWID software identity of the device
- DWA ADD device work area address
- DISK ADD device disk address
  
- DEV device identification
- STATUS device status
- BGR background diagnostics on / off
- PWR power up diagnostics on / off
- BGR number of background tests pending
- SYS number of system tests pending
- PUP number of power up tests pending
- FIS number of fault isolation tests pending
- PRT number of power up diagnostic retries
- FRT number of fault diagnostic retries
- USR number of user specified diagnostic retries
- CARD REQ number of requests for this card

General Maintenance Information

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## 5.

## DIAGNOSTIC TESTS

### General

- 5.1- For each physical device in the SX-200 DIGITAL PABX there is a special set of diagnostic tests specifically designed to test the device as thoroughly as possible. If faults are detected, broader ranges of tests may be run in an attempt to isolate the fault to the board level, and to ensure that isolated faults are not merely side effects of other problems. The diagnostics are divided into four different functional groups. This is necessary to facilitate the different characteristics of the various devices in the system. For example, a line circuit may be tested at any time; whereas the system RAM or the CPU may not, as the system software requires them at all times. Note that cards in the analog bays may be tested only indirectly, by testing the voice paths that they are connected to. Table 5-1 describes the four types of diagnostic tests. Table 5-2 shows which devices are tested by each of the four types of diagnostics.

<b>Table 5-1 Diagnostic Types</b>	
<b>Diagnostic Type</b>	<b>Description</b>
PROM-Based	These are the only tests that thoroughly verify the Main Control Card and Peripheral Control Card. They can be initiated only by resetting the system.
Power-up	If enabled (by default they are disabled) run once, starting at system initialization, or when the card is installed. These tests can be enabled from the maintenance terminal or the console.
Background	If enabled (by default they are enabled), start running after power-up diagnostics have completed, and run continuously. These tests can be enabled from the maintenance terminal or the console.
Directed	These are tests initiated by the maintenance user from the maintenance terminal, console, or test line.
Power-up, Background, and Directed diagnostics are actually the same set of tests; the difference lies only in the manner in which they are invoked.	

<b>Table 5-2 Diagnostic Coverage</b>			
<b>Device Type</b>	<b>Power-up</b>	<b>Background</b>	<b>Directed</b>
PROM			
ONS Line (digital)	yes	yes	yes
COV Line (digital)	yes	yes	yes
OPS Line (digital)	yes	yes	yes
LS/GS Trunk (digital)	yes	yes	yes
DID Trunk (digital)	yes	yes	yes
E&M Trunk Module (digital)	yes	yes	yes
Digital Line Card (DNIC)	yes	yes	yes
DTMF Receiver Module	yes	yes	yes
Console Module	yes	yes	yes
Music/Pager Module (cannot be tested, as the device is always busy)			
System Printer			yes
Analog Voice Paths (Junctors)	yes	yes	yes
Main Control Card			
Digital Signal Processor (DSP)	yes	yes	yes
Bay Control Card			
Analog Bay Control Cards			
8-Station Line (analog)	yes	yes	yes
<i>SUPERSET</i> <sup>™</sup> Line (analog)	yes	yes	yes
CO Trunk (analog)	yes	yes	yes
DID Trunk (analog)	yes	yes	yes
E&M Trunk (analog)	yes	yes	yes
Tie Trunk (analog)	yes	yes	yes
T1 Trunk	yes	yes	yes
PCM Channels (DX)	yes	yes	yes
Datasets	yes		
Digital <i>SUPERSET</i> Telephones	yes		

## Main Control Card Tests

- 5.2 Due to the nature of the Main Control Card, it is not possible to thoroughly test it in the on-line environment. Therefore, most testing is performed only on initialization (i.e., power-up and reset). These tests reside in the Main Control Card's onboard EPROM, and test virtually all of the card's main functional blocks. If any of the tests should fail, a unique error code will be displayed on the dual 7-segment display status indicators located on the front panel of the card. These codes are shown in Table 7-1.

The following tests are performed on the Main Control Card:

- Processor Viability Test
- PROM Checksum Test
- Dynamic RAM Chip Select Independence Test
- Dynamic RAM Data Bit Independence Test
- Memory Address Line Independence Test
- Memory Address Space Independence Test
- DMA Controller Test.

## Bay Control Card Tests

- 5.3 Like the Main Control Card, it is not possible to thoroughly test the Bay Control Card in the on-line environment. Therefore, most testing is performed only on initialization (power up and reset). The tests reside in the Bay Control Card's on-board EPROM, and test most of the card's functional blocks. If any of the tests should fail, the alarm LED on the card's front panel will flash.

The following tests are performed on the Bay Control Card:

- Processor Viability Test
- PROM Checksum Test
- Dynamic RAM Chip Select Independence Test
- Dynamic RAM Data Bit Independence Test
- Memory Address Line Independence Test
- Memory Address Space Independence Test.

## Peripheral Control Complex Tests

- 5.4 The Peripheral Control Complex consists of one Peripheral Control (PCC) Card, one Digital Interface (DIC) Card, and one Scanner card. Like the Main Control Card, it is not possible to thoroughly test the Peripheral Control Card, in the on-line environment. Therefore, testing is performed only on initialization (i.e., power-up and reset). These tests reside in the onboard EPROM on both the DIC card and the PCC,

and test most of the functionality of the DIC and PCC cards, along with indirect testing of the Scanner card. If any of the tests should fail, a unique error code will be displayed on the dual 7-segment display status indicators located on the front panel of the Scanner card. These codes are shown in Table 7-4 and Table 7-5.

## Peripheral Device Tests

5.5 There is a unique sequence of tests specifically designed for each type of peripheral device in the system. These test sequences include some device-specific tests along with some common tests. The test sequences are described in Table 5-3 through Table 5-18. The actual tests are described in the following paragraphs. Refer to Practice 9109-096-125-NA, Circuit Card Description, for information on peripheral circuit hardware.

**AC CODEC loopback test:** This test verifies the CODEC encode, decode and filter functions as well as the PCM paths from the DX Matrix. Since this test will always follow the dc CODEC test, failure of the test will isolate the fault.

**AC hybrid loopback test:** This test is similar to the ac CODEC loopback test, but carries the test further, to the hybrid. Again, if this test fails, the fault is isolated to the device under test.

**ACDC loopback test:** This is the digital CODEC loopback test, used to determine if the PCM path and the digital signal processor are functioning from the Main Control DX module to the bay. After the dc CODEC test is performed, this test is called without involving the CODEC so the only difference between the two tests is the connections in the DX chip. Failure of this test will not isolate the fault to the CODEC under test.

**Alternate device available:** This test is for isolation of the fault responsible for the failure of the analog 8804 loopback test. This routine tries to get alternate devices from every card in the bay. An incomplete test will result if less than half the devices are available.

**Alternate device loopback:** This routine runs the analog 8804 loopback test on the alternate devices.

**Analog 8804 loopback test:** This test sends a tone down the first junctor, through an 8804, and tries to receive the tone on the second junctor.

**Analog no failures:** Any jectors involved in analog 8804 loopback test failures now undergo alternate device tests.

**Check ADC ref voltage:** This test verifies the operation of the Analog-to-Digital converter by checking the level on the PCM Encoder/Decoder (CODEC) reference source. All digital lines and trunks, with the exception the Digital Line Card, undergo this test.

**Check for a data set:** This function checks for a DNIC data set connected to the device under test. This software test, providing information about the device, is an aid when deciding what hardware tests are to be done.

**Check for a voice set:** This function checks for a DNIC voice set connected to the device under test. This software test, providing information about the device, is an aid when deciding what hardware tests are to be done.

**Check if other half has a set:** This function checks for a DNIC voice/data set connected to the other half of the circuit of the device under test. This software test, providing information about the device, is an aid when deciding what hardware tests are to be done.

**Conference test:** A three party conference is attempted. The test is a pass if the attempt is successful, otherwise a failure of the device is indicated.

**Console status:** This test verifies the operation of the console. It consists of a status message being sent from the console to the Maintenance Manager. If the test fails, the fault cannot be isolated to the console.

**Dataset loopback:** This routine performs a dataset data loopback by forming a loopback path from the dataset UART transmitter back to the UART receiver. Once the path is formed, a block of data is sent to the dataset and the set should send the block back. The test passes if the data received is the same as the data sent. This loopback test is done over the D Channel.

**DC CODEC test:** This test verifies the operation of the PCM paths from the DX Matrix to the CODEC on the peripheral card and back again. It also verifies the integrity of a tone transmitted from the Main Control Card's digital signal processor (DSP) along these paths. If the test fails, it is not possible for the system to isolate the fault completely.

**Digital bay type test:** Used to decide which set of diagnostics to run, if this routine returns a pass, digital bay diagnostics are run. Analog bay diagnostics are run if a fail is returned.

**DNIC set bphone:** This test sends `bphone_test_request` messages to a DNIC voice set. The set verifies the BPHONE chip interface by ensuring one can read and write to/from some of the internal chip registers, and replies back with a pass/fail message. Failure of the test will isolate the fault to the set itself.

**DNIC set eprom checksum:** This test sends `eprom_checksum_request` messages to a DNIC voice/data set. The set performs a checksum test and replies back with a pass or fail message. Failure of the test will isolate the fault to the set itself.

**DNIC set transducer earpiece:** This test sends a `transducer_register_contents` message to a Digital *SUPERSET* telephone. The set replies back with the contents of the transducer control register. The contents are compared to what is expected to be for the earpiece field, in the call processing work area and a pass or fail is determined. Failure of the test will isolate the fault to the set.

**DNIC set transducer microphone:** This test sends a `transducer_register_contents` message to a Digital *SUPERSET* telephone. The set replies back with the contents of the transducer control register. The contents are compared to what is expected to be for the microphone field, in the call processing work area and a pass or fail is determined. Failure of the test will isolate the fault to the set itself.

**DNIC set transducer mouthpiece:** This test sends a `transducer_register_contents` message to a Digital *SUPERSET* telephone. The set replies back with the contents of the transducer control register. The contents are compared to what is expected to be for the mouthpiece field, in the call processing work area and a pass or fail is determined. Failure of the test will isolate the fault to the set.

**DNIC set transducer speaker:** This test sends a `transducer_register_contents` message to a Digital *SUPERSET* telephone. The set replies back with the contents of the transducer control register. The contents are compared to what is expected to be for the speaker field, in the call processing work area and a pass or fail is determined. Failure of the test will isolate the fault to the set.

**Get free junctor test:** This function attempts to get a junctor for use by the analog 8804 test.

**Junctor AC CODEC loopback:** This test, performed on analog bays, if present, is similar to the Junctor dc CODEC loopback test, but verifies the DIC CODEC encode, decode and filter functions as well. Since this test will always succeed the Junctor dc CODEC loopback test, failure of the test will isolate the fault to the DIC CODEC.

**Junctor DC CODEC loopback:** This test, performed on analog bays, if present, is similar to the dc CODEC test: it verifies the operation of the PCM paths from the Main Controller Card to the Peripheral Control Card, to the CODEC on the DIC Card, and back again, using a tone transmitted from the tone generator. If the test fails, it is not possible for the system to isolate the fault.

**Modem pooling test:** The first part of this test verifies that the Digital Line Card, the ONS Card, and the DATASET 2100 are each functional; it also determines the mode of the modem. The second part of the test is to make a call through the ONS card to the modem (ANSWER ONLY mode) to detect answer tone and to terminate the call successfully, or to make a similar call through the DLC to the modem (ORIGINATE ONLY mode) to detect answer tone and to terminate the call successfully. If the modem is BOTHWAY, these two parts of the second test are performed to verify bothway operation.

**Junctor test:** If analog bays are present, this test verifies the operation of the analog junctors. This is done by ensuring that the junctor can independently be forced to high state, low state and ground state. If the test fails, the fault is isolated to the junctor under test.

**Receiver test:** The digital signal processor sends digit tones to the receivers and verifies that the receiver correctly detects the digits.

**Switch hook test:** This tests the ability of a line card to detect an off-hook for the device under test.

**Test DNIC input:** This test is used to loop the data internally at DNIC input. Failure of the test will isolate the fault to the card but will not isolate it to the particular DNIC chip on the card.

**Test DNIC output:** This test is used to loop the data internally at DNIC output. Failure of this test will isolate the fault to the particular DNIC chip under test on the card.

**Tone detection test:** This test generates a test tone of 440 Hz, and loops it back to the digital signal processor. The energy level of the tone must fall in a particular range to pass this test. Failure of the test indicates a faulty device.

**Tone generation test:** This test collects two consecutive samples from the digital signal processor for a test tone of 440 Hz. The validity of the two samples is checked to determine a pass or fail. Failure of the test indicates a faulty device.

**Test T1 channel:** This test is used to loop back one T1 trunk channel and check if everything is OK. Failure of the test will isolate the fault to this particular channel.

**Pooled modem answer mode test:** See Modem Pooling Test.

**Pooled modem originate mode test:** See Modem Pooling Test.

**Table 5-3 OPS Line Card Initialization**

Diagnostic State	Test Name	Circuit State if Test Passes	Circuit State if Test Fails
State 1	adc reference test	state 2	device failure unisolated
State 2	digital CODEC test	state 3	device failure unisolated
State 3	digital CODEC loopback test	state 4	device failure unisolated
State 4	analog CODEC loopback test	state 5	device failure isolated
State 5	hookswitch test	passed	device failure isolated
State 6	message lamp test	passed	device failure isolated

**Table 5-4 ONS Circuit Lamp Test Initialization**

Diagnostic State	Test Name	Circuit State if Test Passes	Circuit State if Test Fails
State 1	message lamp test	device passed	device failure isolated

**Table 5-5 CO Trunk Card Initialization**

<b>Diagnostic State</b>	<b>Test Name</b>	<b>Circuit State If Test Passes</b>	<b>Circuit State If Test Fails</b>
State 1	digital bay test	state 2	state 10
State 2	adc reference test	state 3	device failure unisolated
State 3	digital CODEC test	state 4	device failure unisolated
State 4	digital CODEC loopback test	state 5	device failure isolated
State 5	analog CODEC loopback test	state 6	device failure isolated
State 6	hybrid loopback test	device passed	device failure isolated
State 9	get junctor test	state 10	state 22
State 10	junctor dc CODEC test	state 11	state 13
State 11	junctor ac CODEC test	state 12	state 13
State 12	junctor test	state 14	state 13
State 13	make junctor suspect	state 9	state 9
State 14	analog DSP test	state 9	state 15
State 15	retest primary	state 15	state 16
State 16	retest secondary	state 16	state 17
State 17	has junctor been isolated	state 18	device failure isolated
State 18	analog alternate device test	state 19	state 20
State 19	analog alt dev loopback test	device failure isolated	state 18
State 20	enough alt devices	state 21	device failure isolated
State 21	make junctor suspect	device passed	device passed
State 22	enough juncctors	device passed	device passed

Table 5-6 DID Trunk Card Initialization

Diagnostic State	Test Name	Circuit State If Test Passes	Circuit State If Test Fails
State 1	adc reference test	state 2	device failure unisolated
State 2	digital CODEC test	state 3	device failure unisolated
State 3	digital CODEC loopback test	state 4	device failure isolated
State 4	analog CODEC loopback test	device passed	device failure isolated

Table 5-7 Receiver Module Initialization

Diagnostic State	Test Name	Circuit State If Test Passes	Circuit State If Test Fails
State 1	digital CODEC test	state 2	device failure unisolated
State 2	digital CODEC loopback test	state 3	device failure unisolated
State 3	analog CODEC loopback test	state 4	device failure isolated
State 4	dtmf receiver test	device passed	device failure isolated

Table 5-8 Console Circuit Initialization

Diagnostic State	Test Name	Circuit State If Test Passes	Circuit State If Test Fails
State 1	console test	device passed	device failure unisolated
State 2	console dc CODEC test	state 3	device failure unisolated
State 3	console ac CODEC testtest	device passed	device failure isolated

**Table 5-9 Junctor Initialization**

Diagnostic State	Test Name	Circuit State If Test Passes	Circuit State If Test Fails
State 1	digital bay test	test incomplete	state 2
State 2	junctor dc CODEC test	state 3	chan failure isolated
State 3	junctor ac CODEC test	state 4	chan failure isolated
State 4	junctor test	state 5	chan failure unisolated
State 5	analog alternate device test	state 6	state 7
State 6	analog alternate device loopback for junctor	channel passed	state 5
State 7	enough alternate devices for junctor test	channel failure isolated	test incomplete

**Table 5-10 PCM Testing in COMBO Bays**

Diagnostic State	Test Name	Circuit State If Test Passes	Circuit State If Test Fails
State 1	full pcm loopback	state 2	state 14
State 2	is link shared	state 3	state 4
State 3	read next bay dx	state 4	channel isolated to bay
State 4	read next MCC dx	state 5	channel isolated to MCC
State 5	read next MCC dx	state 6	channel isolated to MCC
State 6	send from next MCC dx	state 7	channel isolated to MCC
State 7	send from next MCC dx	state 23	channel isolated to MCC
State 14	read next MCC dx	channel isolated to MCC	state 17
State 15	read bay dx	state 16	state 20
State 16	send from bay dx	channel isolated to bay	state 18

**Table 5-10 PCM Testing in COMBO Bays  
(continued)**

<b>Diagnostic State</b>	<b>Test Name</b>	<b>Circuit State If Test Passes</b>	<b>Circuit State If Test Fails</b>
State 17	send from next MCC dx	channel isolated to MCC	state 15
State 18	is link shared	state 19	channel failure unisolated
State 19	send from next bay dx	channel isolated to bay	channel failure unisolated
State 20	is link shared	state 21	state 22
State 21	read next bay dx	channel isolated to bay	state 22
State 22	send from next MCC dx to bay only	channel isolated to MCC	channel failure unisolated
State 23	send from bay dx	state 24	channel isolated to bay
State 24	is link shared	state 25	channel passed
State 25	send from next bay dx	channel passed	channel isolated to bay

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**Table 5-11 Main Control Card Initialization**

<b>Diagnostic State</b>	<b>Test Name</b>	<b>Circuit State If Test Passes</b>	<b>Circuit State If Test Fails</b>
State 1	DSP conference test	state 2	device failure isolated
State 2	DSP tone detector test	state 3	device failure isolated
State 3	DSP tone generator test	device passed	device failure isolated

**Table 5-12 COV Card Initialization**

<b>Diagnostic State</b>	<b>Test Name</b>	<b>Circuit State If Test Passes</b>	<b>Circuit State If Test Fails</b>
State 1	digital bay test	state 2	state 10
State 2	digital CODEC test	state 3	device failure unisolated
State 3	digital CODEC loopback test	state 4	device failure unisolated
State 4	analog CODEC loopback test	device passed	device failure isolated
State 9	get junctor test	state 10	state 22
State 10	junctor dc CODEC test	state 11	state 13
State 11	junctor ac CODEC test	state 12	state 13
State 12	junctor test	state 14	state 13
State 13	make junctor suspect	state 9	state 9
State 14	analog DSP test	state 9	state 15
State 15	retest primary	state 15	state 16
State 16	retest secondary	state 16	state 17
State 17	has junctor been isolated	state 18	device failure isolated
State 18	analog alternate device test	state 19	state 20
State 19	analog alternate device loopback test	device failure isolated	state 18
State 20	enough alternate devices	state 21	device failure isolated
State 21	make junctor suspect	device passed	device passed
State 22	enough juncctors	device passed	device passed

**Table 5-13 E&M Trunk Module Initialization**

<b>Diagnostic State</b>	<b>Test Name</b>	<b>Circuit State If Test Passes</b>	<b>Circuit State If Test Fails</b>
State 1	digital CODEC test	state 2	device failure unisolated
State 2	digital CODEC loopback test	state 3	device failure unisolated
State 3	analog CODEC loopback test	device passed	device failure isolated

Table 5-14 DID Card Initialization

Diagnostic State	Test Name	Circuit State If Test Passes	Circuit State If Test Fails
State 1	digital bay test	state 2	state 10
State 9	get junctor test	state 10	state 22
State 10	junctor dc CODEC test	state 11	state 13
State 11	junctor ac CODEC test	state 12	state 13
State 12	junctor test	state 14	state 13
State 13	make junctor suspect	state 9	state 9
State 14	analog DSP test	state 9	state 15
State 15	retest primary	state 15	state 16
State 16	retest secondary	state 16	state 17
State 17	has junctor been isolated	state 18	device failure isolated
State 18	analog alternate device test	state 19	state 20
State 19	analog alternate device loopback test	device failure isolated	state 18
State 20	enough alternate devices	state 21	device failure isolated
State 21	make junctor suspect	device passed	device passed
State 22	enough junctors	device passed	device passed

**Table 5-15 Digital Line Card Initialization**

Diagnostic State	Test Name	Circuit State If Test Passes	Circuit State If Test Fails
State 1	does other half have a set?	state 2	state 11
State 2	is there a voice set?	state 3	state 6
State 3	digital set EPROM checksum test	state 4	device failure isolated
State 4	digital set Bphone test	state 5	device failure isolated
State 5	digital set transducer earpiece test	state 12	device failure isolated
State 6	is there a data set?	state 7	device failure isolated
State 7	digital set EPROM checksum test	state 10	device failure isolated
State 8	does other half have a set?	device passed	state 9
State 9	DNIC output loopback test	device passed	device failure isolated
State 10	dataset data loopback test	device passed	device failure isolated
State 11	DNIC input loopback test	state 2	device failure isolated
State 12	digital set transducer speaker test	state 13	device failure isolated
State 13	digital set transducer microphone test	state 14	device failure isolated
State 14	digital set transducer mouthpiece test	device passed	device failure isolated

**Note:** States 1, 2, 6 and 8 are Software tests, used to find which device (data/voice) is connected, and are helpful when planning which tests to execute.

**Table 5-16 SUPERCONSOLE 1000 Initialization**

Diagnostic State	Test Name	Circuit State If Test Passes	Circuit State If Test Fails
State 1	digital set EPROM checksum test	state 4	device failure unisolated
State 2	digital set Bphone test	state 5	device failure unisolated

Table 5-17 T1 Trunk Card

Diagnostic State	Test Name	Circuit State If Test Passes	Circuit State If Test Fails
State 1	T1 channel loopback test	device passed	device failure isolated

Table 5-18 Pooled Modem Initialization

Diagnostic State	Test Name	Circuit State If Test Passes	Circuit State If Test Fails
State 1	is there a data set	state 2	state 6
State 2	DNIC set eeprom checksum test	state 3	device failure isolated
State 3	Dataset data loopback test	state 4	device failure isolated
State 4	pooled modem answer mode test	state 5	device failure unisolated
State 5	pooled modem origination mode test	state 6	device failure unisolated
State 6	DNIC input loopback test	state 7	device failure unisolated
State 7	DNIC output loopback test	device passed	device failure isolated



## 6.

### TEST LINE

#### General

- 6.1- The test line interface is designed to provide the maintenance person with a portable, inexpensive and readily available tool for diagnosing system failures and performing maintenance functions. A powerful subset of the maintenance functionality available via the maintenance terminal is available at the test line interface. In addition, the maintenance person can place calls without having a permanently wired extension on the premises.

#### Connection to Test Line

- 6.2 Connection points for the test line may be provided on the maintenance panel on the Control cabinet (See Figure 2-3); either an RJ-11 jack type connector or a pair of "banana jacks" may be used. These connectors are hardwired directly from the maintenance panel to the port located in Bay 2, Slot 1, Circuit 1 of the control cabinet. The system accepts either rotary dial or DTMF dialing through this interface.

Test line connections have been removed from maintenance panels currently being manufactured; connection to the programmed test line must be made at the MDF.

On 672-port systems there are no test line connectors on the maintenance panel; connection to the programmed test line must be made at the MDF.

#### Programming

- 6.3 Before the test line package may be used, an access code must first be programmed through Customer Data Entry (CDE). Information on programming may be found in Practice 9109-096-210-NA, Customer Data Entry. The user must first call up Form 02 (Feature Access Codes). Once in this form, the user must assign an access code to Feature Number 18 (Maintenance Function - Test Line); this must not conflict with existing access codes or with the system numbering plan.

#### Test Line Access

- 6.4 To access test line, connect a telephone to one of the test line connections. Lift the handset, wait for dial tone and enter the following:
- The test line access code; as specified in CDE
  - One of the valid test line command codes (see Table 6-1)
  - If required, enter the circuit location number or junctor number.

**Note:** When CDE or maintenance is accessed via the maintenance terminal or Attendant Console, the test line cannot be accessed. In these cases, the user will receive busy tone upon dialing the test line access code. Also, after accessing the test line, if no action is taken for 90 seconds, the test line session will be automatically terminated.

### Commands Available

6.5 Although the complete set of maintenance commands are not provided, the available test line commands permit the maintenance person to perform most maintenance functions. For a complete list of the available commands, see Table 6-1. The tones are described below.

### Command Input

6.6 Commands are entered on the test line by dialing command codes using the DTMF keypad or rotary dial of the set being used. These command codes are listed in Table 6-1.

Table 6-1 Test Line Command Codes		
Numeric	Alpha	Command Codes Description
22	BC	Busyout Channel (Remove Channel)
23	CD	Copy Database
25	BJ	Busyout Junctor
26	BO	Busy-Out device
35	DL	Dump Logs
38	DT	Direct Trunk select
72	RC	Return Channel
73	SD	Stop Dump Logs
75	RJ	Return Junctor to service
77	RS	Return device to Service
78	ST	Stop Test Printers
82	T3	Test Channel
83	TD	Test Device
85	TJ	Test Junctor
872	TPB	Test Printer Bay_Slot_Circuit
873	TPE	Test Printer Extension_Number
877	TPP	Test Printer Port

## Test Line Indicator LEDs

- 6.7 The test line software uses the dual 7-segment display status indicators on the Main Control card as status indicators. When the user enters the test line access code on the test line set, the LEDs go blank, indicating that the system is waiting for command input. After the user enters a command sequence, the LEDs will display the results of the action performed. See Table 6-2.

Status Code	Meaning
PA	The attempted operation was successful (pass).
FA*	The attempted operation was unsuccessful (fail).*
(blank)	System is waiting for command input.
II	Test was inconclusive.
EE	Fatal disk error; refer to Practice 9109-096-350-NA, Troubleshooting.
E5	Invalid command or device location entered; only those commands in Table 6-1 are acceptable.
CC	Diskette information has been loaded into RAM; insert new diskette.
bb	Device was busy. Try again later.
7E	An invalid physical location number was entered. Enter bay number (e.g., 02), slot number (e.g., 04), and circuit number (e.g., 06).
FF	Unknown error. Attempt operation again – ensure correct use of command codes (see Table 6-1).
1E	Error in acquiring the software ID of the testline. Attempt operation again – ensure correct use of command codes (see Table 6-1). Use maintenance terminal or console if necessary.
2E	Possible software error. Attempt operation again – ensure correct use of command codes (see Table 6-1). Use maintenance terminal or console if necessary.

\* Failure of any of the test line command sequences will necessitate the use of the more sophisticated maintenance tools available from the maintenance terminal or console. Refer to Practice 9109-096-351-NA, RS-232 Maintenance Terminal.

## Test Line Tones

- 6.8 The test line software uses some of the existing system-generated tones as audible status indicators. Approximately 10 seconds after the user enters the test line access code on the test line set, a short ring burst, followed by dial tone is heard, indicating that the system is waiting for command input. After the user enters a command sequence, the returned tone will indicate the result of the action performed. See Table 6-3 for a complete list of the tones.

<b>Table 6-3 Test Line Status Tones</b>	
<b>Tone Type</b>	<b>Meaning</b>
Dial tone	System is waiting for command input.
Camp-on tone (single beep)	The attempted operation was successful (Pass).
Reorder tone*	The attempted operation* was unsuccessful (fail).
Trunk camp-on tone (double beep)	Test was inconclusive.
Ringback tone (continuous)	Diskette information has been loaded into RAM; insert new diskette.
Ringback tone (single beep)	Initial maintenance access.
Busy Tone	Device was busy. Try again later.
Silence	Test line software is being read from disk.

\* Failure of any of the test line command sequences will necessitate the use of the more sophisticated maintenance tools available from the maintenance terminal or console. Refer to Practice 9109-096-351-NA, RS-232 Maintenance Terminal.

## Specifying Equipment

6.9 Many of the test line command sequences require the maintenance person to specify a circuit or junctor as part of the command input. Circuits are specified using their physical location numbers (bay, slot, circuit, subcircuit). For example, a receiver circuit at location Bay 2, Slot 3, Circuit 3, Subcircuit 4 would be specified as "02 03 03 04". A line circuit at location Bay 2, Slot 1, Circuit 6 would be specified as "02 01 06 00". Note that circuits with no subcircuit number (i.e., lines and trunks) must be specified with "00" as the subcircuit.

Junctors are specified using their assigned junctor numbers and the required bay number. The junctor number is a 2-digit number from 00 to 31; the analog bay number is a 2-digit number from 03 to 05. For example, Junctor 5 in Bay 3 would be specified as "05 03".

Channels are specified using the required Link and Channel number. The link number is a 2-digit number. Note that Link 0, 1, 14 or 15 cannot be tested. The Channel number is a 2-digit number from 00 to 31. Channel 30 on Link 9 is specified as "09 30".

## Normal Extension Calls

6.10 The test line has access to normal extension facilities, and is subject to Class Of Service (COS) and Class Of Restriction (COR) restrictions. It is not necessary to enter the test line access code or a special command code to make normal extension calls.

### Busyout Channel Command (BC)

- 6.11 This command allows the maintenance person to busy out any channel on the system. To do this, enter the test line access code, followed by the Busyout Channel code (22), followed by the Link/Channel number. "PA" on the status indicator and a single beep tone indicates the successful operation. "FA" and reorder tone indicates failure. See Table 6-2.

### Copy Database Command (CD)

- 6.12 This command allows the maintenance person to copy the database from the system floppy diskette onto another system floppy diskette. To copy the database, do the following:
1. Enter the test line access code.
  2. Enter the Copy Database code (23) – silence will be heard.
  3. Wait until ringback tone is heard, and the status indicators read "CC".
  4. Remove the original diskette – ringback continues.
  5. Enter "1" to begin copying to the new diskette – silence will be heard.
  6. If the disks are not properly inserted or do not match the status indicator will display "E.6". Dial tone will be heard. The disks must be reinserted properly and enter "1" to continue the copy operation – silence will be heard.
  7. Wait for "CC" to appear on the status indicators and a single beep tone – indicates copy successful.
  8. Enter any digit to continue normal operation – both diskettes now have the same database.
  9. Wait for "PA" to appear on the status indicators and a single beep tone – indicates copy operation has completed.
  10. If the upgrade disks were left in the system will reset itself.

### Busy-Out Junctor Command (BJ)

- 6.13 This command allows the maintenance person to remove from service any analog junctor in the system. To do this, enter the test line access code, followed by the Busy-Out Junctor code (25), followed by the junctor number, and the bay number. "bb" on the status indicators and a single beep tone will indicate that the junctor was busied-out. "FA" and reorder tone indicate failure – see Table 6-2.

### **Busy-Out Command (BO)**

- 6.14 This command allows the maintenance person to busy-out any peripheral device in the system except consoles and the test line circuit. To do this, enter the test line access code, followed by the Busy-Out device code (26), followed by the physical location number of the device. If the device was in use (busy) at the time of access, the status indicators will read "PA" and the trunk will be busied as soon as it reaches the idle state. If the operation succeeds, the status indicators will read "PA" and a single beep tone will be heard. "FA" and reorder tone indicate failure – see Table 6-2.

### **Dump Logs Command (DL)**

- 6.15 This command allows the maintenance person to print the system maintenance log on to the system printer. To print (dump) the logs, enter the test line access code, followed by the Dump Logs code (35). "PA" on the status indicators and a single beep tone indicate that the system has started sending the logs to the printer. "FA" and reorder tone indicate failure – see Table 6-2.

### **Direct Trunk Select Command (DT)**

- 6.16 This command allows the maintenance person to directly select any trunk in the system from the test line. To select a trunk, enter the test line access code, followed by the direct trunk select code (38), followed by the physical location number of the required trunk. If the trunk is not busy and is in working order, the status indicators will revert to whatever was present before the testline was accessed and dial tone will be heard. The trunk is then ready for use.

If the trunk is in use (busy) at the time of access, it is not selected; if the trunk is not functional, the status indicators will read "FA".

### **Return Channel Command (RC)**

- 6.17 This command allows the maintenance person to return to service any channel on the system. To do this, enter the test line access code, followed by the Return Channel code (72), followed by the Link/Channel number. "PA" on the status indicator and a single beep tone indicates the successful operation of the channel being returned to service. "FA" and reorder tone indicates failure. See Table 6-2.

### **Stop Dump Logs Command (SD)**

- 6.18 This command allows the maintenance person to stop print the system maintenance log on to the system printer. To stop print (dump) the logs, enter the test line access code, followed by the Stop Dump Logs code (73). "PA" on the status indicator and a single beep tone indicates that the system has stopped sending the logs to the printer. "FA" and reorder tone indicates failure. See Table 6-2.

### **Return Junctor To Service Command (RJ)**

- 6.19 This command allows the maintenance person to return to service any analog junctor that was previously removed from service via maintenance. To do this, enter the test line access code, followed by the Return Junctor to service code (75), followed by the junctor number and the bay number. "PA" on the status indicators and a single beep tone indicate that the junctor was returned to service. "FA" and reorder tone indicate failure – see Table 6–2.

### **Return Device To Service Command (RS)**

- 6.20 This command allows the maintenance person to return to service any peripheral device that was previously removed from service via maintenance. To do this, enter the test line access code, followed by the Return Device to Service code (77), followed by the physical location number of the device. "PA" on the status indicators and a single beep tone will indicate that the device was returned to service. "FA" and reorder tone indicate failure – see Table 6–2.

### **Stop Test Printers Command (ST)**

- 6.21 This command allows the maintenance person to stop test the printers on the system. To do this, enter the test line access code, followed by the Stop Test Printers code (78). "PA" on the status indicator and a single beep tone indicates that the system has stopped testing the printers. "FA" and reorder tone indicates failure. See Table 6–2.

### **Test Channel Command (TC)**

- 6.22 This command allows the maintenance person to test any channel on the system. To do this, enter the test line access code, followed by the Test Channel code (82), followed by the Link/Channel number. "PA" on the status indicator and a single beep tone indicates that the test passed. "FA" and reorder tone indicates that the test failed. See Table 6–2.

### **Test Device Command (TD)**

- 6.23 This command allows the maintenance person to test any peripheral circuit in the digital bays. To test a device, enter the test line access code, followed by the Test Device code (83), followed by the physical location number of the device. "PA" on the status indicators and a single beep tone indicate that the test passed. "FA" and reorder tone indicate that the test failed.

### **Test Junctor Command (TJ)**

- 6.24 This command allows the maintenance person to test any of the analog junctors in any bay in the system. To test a junctor, enter the test line access code, followed by the Test Junctor code (85), followed by the junctor number and the bay number. If the junctor was in use (busy) at the time of access, the status indicators will read "bb"; attempt the test later. "PA" on the status indicators and a single beep tone indicate that the test passed. "FA" and reorder tone indicate that the test failed.

### **Test Printer Bay\_Slot\_Circuit Command (TPB)**

- 6.25 This command allows the maintenance person to test any printer on the system, other than the system printer using the physical location number of the printer port. To do this, enter the test line access code, followed by the Test Printer Bay\_Slot\_Circuit code (872), followed by the physical location number of the printer port. The printer should then print two full pages of all the printable characters. "PA" on the status indicators and a single beep tone indicates that the system has started sending test data to the printer. "FA" and reorder tone indicates that the test failed. See Table 6-2.

### **Test Printer Extension\_Number Command (TPE)**

- 6.26 This command allows the maintenance person to test any printer on the system, other than the system printer using the extension number of the printer port. To do this, enter the test line access code, followed by the Test Printer Extension\_number code (873), followed by the extension number of the printer port. The printer should then print two full pages of all the printable characters. "PA" on the status indicators and a single beep tone indicates that the system has started sending test data to the printer. "FA" and reorder tone indicate that the test failed. See Table 6-2.

### **Test Printer Port Command (TPP)**

- 6.27 This command allows the maintenance person to test the system printer. To do this, enter the test line access code, followed by the Test Printer Port code (877). The printer should then print two full pages of all the printable characters. "PA" on the status indicators and a single beep tone indicate that the system has started sending test data to the printer. "FA" and reorder tone indicates that the test failed. See Table 6-2.

## 7.

## MAINTENANCE CONTROLS AND INDICATORS

### General

- 7.1 The following paragraphs describe the maintenance controls and indicators found on the components of the *SX-200* DIGITAL Private Automatic Branch Exchange. Most of the indicators are software-controlled, and provide maintenance personnel with information on the current status of the *SX-200* DIGITAL PABX.

### Maintenance Panels

- 7.2 Most of the *SX-200* DIGITAL PABX maintenance functionality is accessed through the maintenance panels. The maintenance panels are described in detail in Part 3 of this Practice; further functionality is described in Practice 9109-096-351-NA, RS-232 Maintenance Terminal.

### Main Control Card

- 7.3 The Main Control Card contains status LEDs, two 7-segment LED status indicators, and two pushbuttons; these controls and indicators are labelled clearly on the MCC front panel (See Figure 7-1). The functions of the controls and indicators are described in the following paragraphs.

**System Reset Button.** As the name suggests, this is the manual system reset button. When pressed, the system will cease all activity, run all initialization tests, and reload the software from the floppy diskette.

**Note:** Never do this while the *SX-200* DIGITAL PABX is handling traffic, as all calls will immediately be dropped, and the system will switch to Power Fail Transfer mode.

**Plane Transfer Button.** This is similar in function to the system reset button. When pressed, the system will cease all activity and run a checksum test on the software; if this fails, the software will be reloaded from the floppy diskette. Otherwise, the system will reinitialize.

**Note:** Never do this while the *SX-200* DIGITAL PABX is handling traffic, as all calls will immediately be dropped, and the system will switch to Power Fail Transfer mode.

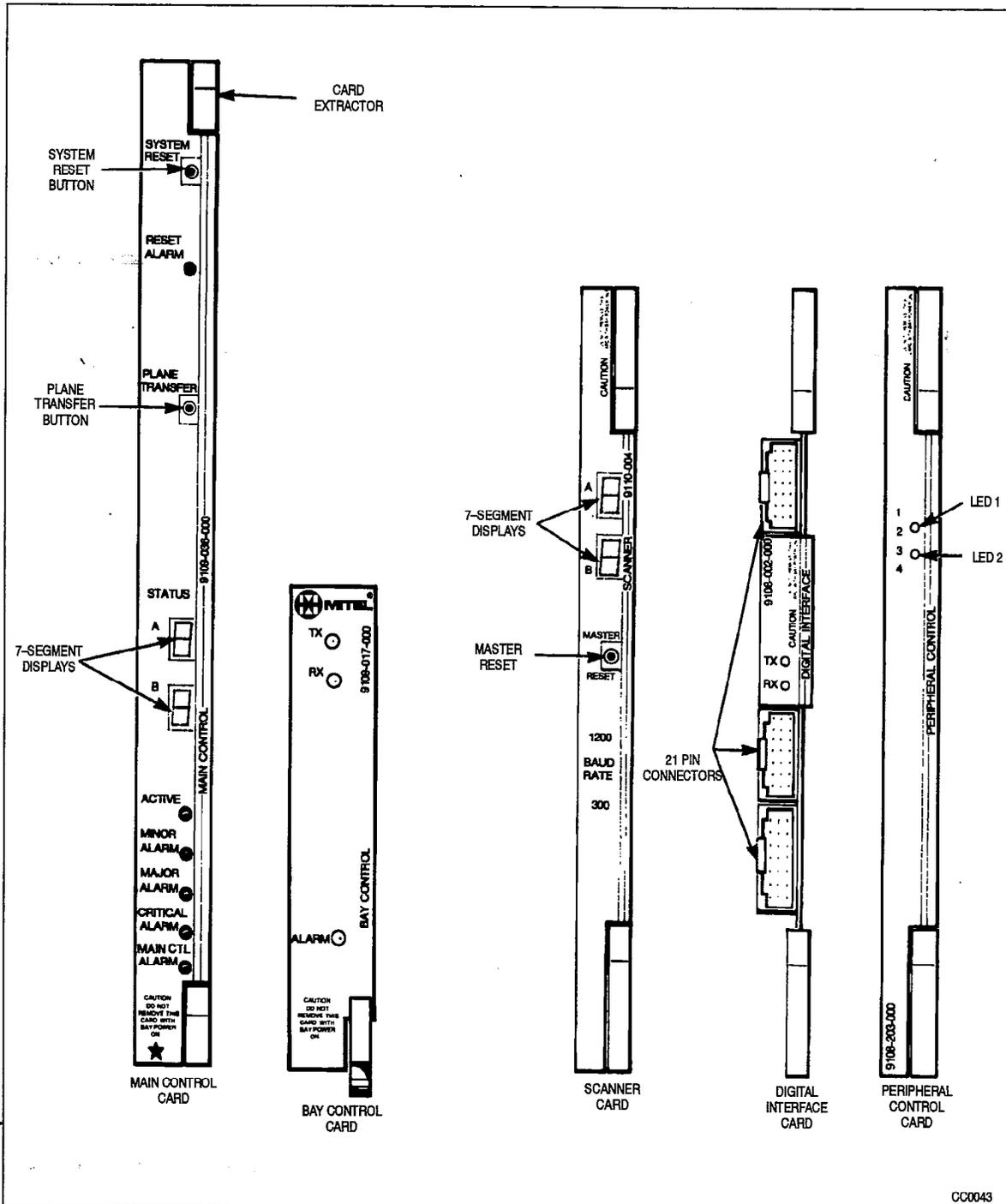


Figure 7-1 Control Card Front Panels

**Seven-Segment Display Status Indicators.** The Main Control card status indicators consist of two 7-segment display LEDs, arranged vertically, as shown in Figure 7-1. The top display LED is the most significant while the lower display LED is the least significant. The function of the Main Control card status indicators depends upon the software currently being executed. At system initialization, they indicate the status of the Main Control card tests; this is summarized in Table 7-1. When the maintenance person is accessing the test line facility, the status indicators are totally dedicated to this

function; refer to Part 7 of this Practice for further details on the test line. Problems with the system floppy disk drive will be indicated by error codes on the displays (See Table 7-2). Finally, the status indicators will show the physical location of the most recent card to have a problem entered into the Maintenance Log. The card's bay number (top) and slot number (bottom) will be displayed. During normal operation when no applications are using the status indicators, a pair of horizontal dashes will be displayed. The 7-segment displays on the MCC do not clear after reading logs of the problem area. Once the logs have been read in Maintenance, the display is cleared of the previous problem areas.

**Table 7-1 Main Control Card Test Status Codes**

Test Name	Test Code	Error Code
Bus Error Vector/Stack Test	0	E0
Processor Viability Test	1	E1
PROM Checksum Test	2	E2
RAM Load Checksum Test	3	E3
Limited RAM Test	4	E4
DMA Controller Test/PFS OK*	5	E5
RAM Chip Select Test	6	E6
RAM Data Bit Indep. Test	7	E7
Memory Address Test	8	E8
Memory Space Test	9	E9
** Booting System Software	b or b.	Eb or Eb.
Parity Test	P	EP
Top of RAM determined and displayed	1. or 2. or 2. or 2. or 4. 0 0 5 C 0	
Main load being read in from disk	L	E (flashing) L
Huffman encoded load being decoded	H	E (flashing) H
Main load running	- -	

\* Power Supply Power Fail Sense can cause this test to fail.

\*\* Upon test failure, test error codes will be flashed for 1 second, after which testing will begin again from test # 1.

**Reset Alarm LED.** This indicator will light when the system has been reset.

**Active LED.** This green LED serves as an indication of the health of the system. A steady 1 second pulse cycle indicates that the system is up and running. If the LED remains constantly on or off, it indicates that the system is not running; in this case consult Practice 9109-096-350-NA, Troubleshooting.

**Alarm Status LEDs.** The bottom three LEDs on the main control card are the alarm status LEDs; only one of these LEDs may be on at any one time. They indicate the overall system alarm level; one of: MINOR ALARM, MAJOR ALARM, CRITICAL ALARM or no alarm. If none of the alarm status LEDs are on, the system should be in perfect working order. Refer to Part 3. of this Practice for further information on alarms.

## Bay Control Card

- 7.4 The Bay Control card has three status LEDs, labelled Tx, Rx and ALARM. The "Tx" and "Rx" LEDs indicate communication (transmit and receive) with the Main Control card. The ALARM LED has two functions. A flashing ALARM LED indicates a failure on the Bay Control card. A permanently lit ALARM LED indicates that the Bay Control card is waiting for, or has lost communication with the Main Control card. See Table 7-3 for a summary of the Bay Control card status LED states.

## Peripheral Control Card

- 7.5 The Peripheral Control card (PCC) has two status LEDs, labelled "1" and "2", located on the card's front panel (See Figure 7-1). These LEDs are used along with the Scanner card's 7-segment display status indicators during the Peripheral Control card initialization sequence. Table 7-4 summarizes the functions of the PCC LEDs.

## Digital Interface Card

- 7.6 The Digital Interface Card (DIC) has two status LEDs, labelled "Tx" and "Rx", located on the card's front panel (See Figure 7-1). These LEDs have two different functions. During DIC initialization, they are used along with the Scanner card's 7-segment display status indicators to display initialization status. Table 7-5 summarizes the LED information for this case. During peripheral bay loading, they are used to indicate message traffic between the main control and the peripheral control. In this case, the Tx LED indicates message information is being transmitted from the peripheral control to the main control. Similarly, the Rx LED indicates message information being transmitted from the main control to the peripheral control.

## Fiber Interface Module

- 7.7 The Fiber Interface Module (FIM) has two status LEDs, labelled "Tx" and "Rx," located on the card's front panel (See Figure 7-2). The two LED indicators show the status of the local and remote clocks. Table 7-6, summarizes what it means when the LED is; flashing, on, or off. The maintenance port is located at the rear of the Control Node (See Figure 7-3).

<b>Table 7-2 Diskette Error Codes</b>	
<b>Error Code</b>	<b>Meaning</b>
E.1	New diskette has been inserted. Updates pending on original.
E.2	New diskette has been inserted.
E.3	Disk drive is empty, updates pending on original diskette.
E.4	Disk drive is empty.
E.5	Diskette write protected.
E.6	Diskettes not matched.
E.7	System type read failure.
E.8	No decryption module.
E.F	Disk operation failed – disks corrupted

<b>Table 7-3 Bay Control Card Status Leds</b>			
<b>Tx LED</b>	<b>Rx LED</b>	<b>Alarm LED</b>	<b>Meaning</b>
on	on	on	Bay Control card is either waiting for, or has lost communication with the Main Control card. If this state persists for more that a few seconds, there is no communication.
flashing	flashing	on	Bay Control card is being downloaded by the Main Control card.
flashing	flashing	off	Bay Control card is up and running and communicating to the Main Control card.
off	off	off	This is the normal operating condition of the Bay Control card when the PABX is idle and diagnostics are off.
-	-	flashing	There is a failure on the Bay Control card.

**Table 7-4 Peripheral Control Card Test Status Indicators**

Test Name	Test Pass	Test Pass	Test Fail	Test Fail
	PCC LEDs	Scanner LEDs	PCC LEDs	Scanner LEDs
PCC PROM Checksum Test	LED 1 on	00	LED 1 on	E2
*PCC RAM Checksum Test	LED 1 on	00	LED 1 on	—
PCC RAM Test	LED 2 on	00	LED 2 on	E1
** DIC tests pass	both off	bb	—	—
** Ready for bay downloading	both off	0A AA	—	—
Bay in Cutover	both off	C0	—	—
** Download done	both off	b3 b4	—	—
Failure in Bay			flashing	—

\* The "PCC RAM Test" is run only if this test fails; hence there is no "test fail" error code.

\*\* 0A indicates that Bay 3 is ready for downloading; AA indicates that Bays 4 and 5 are ready. Similarly, b3 indicates Bay 3 has finished loading; b4 indicates Bays 4 and 5 have finished.

**Table 7-5 Digital Interface Card Test Status Indicators**

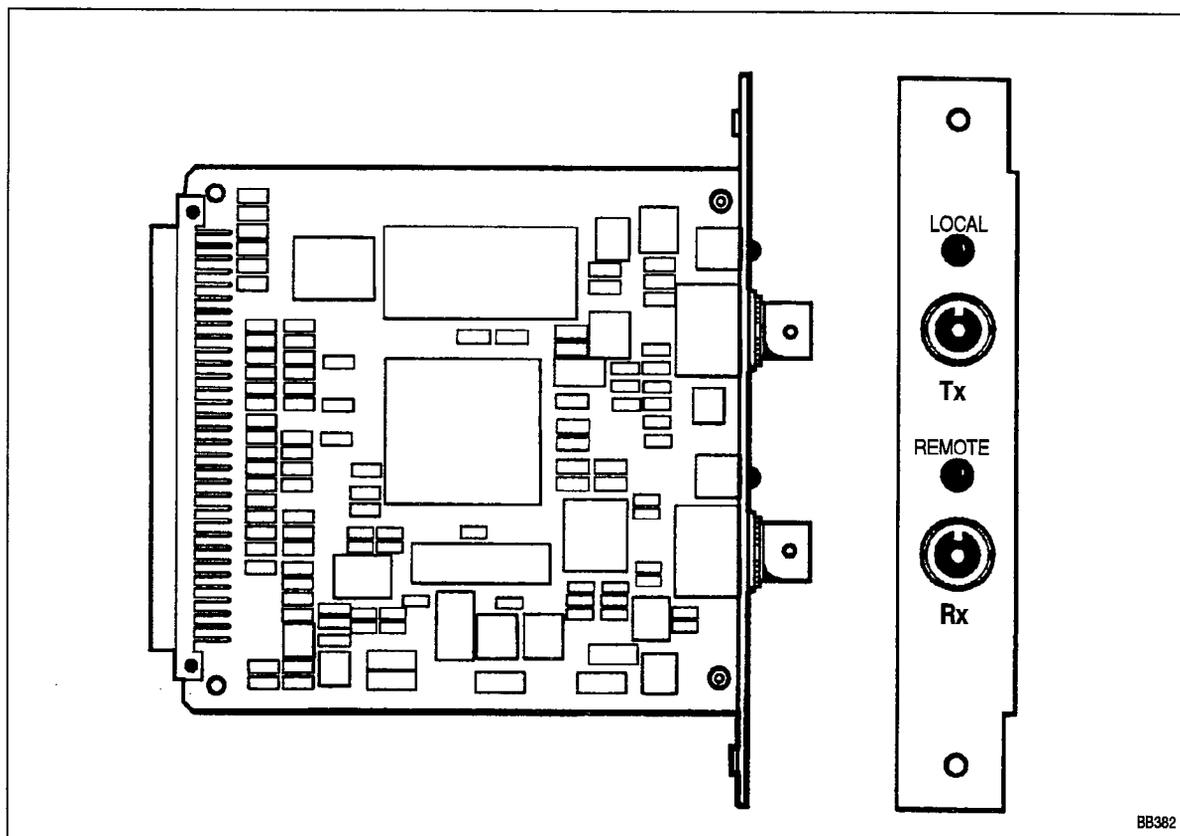
Test Name	Test Pass	Test Pass	Test Fail	Test Fail
	DIC LEDs	Scanner LEDs	DIC LEDs	Scanner LEDs
DIC to PCC Link Test	both off	03	Rx on	**
DIC RAM Test	both off	05	Rx on	**
DIC PROM Checksum Test	both off	07	Rx on	**
DX Connect Memory Test	both off	0b	Rx on	**
DIC HDLC Test	both off	10	Rx on	**
DIC Hardware Timer Test	both off	13	Rx on	**
* all tests passed	both off	14	—	—
* waiting for download	both off	bb	—	—

\* Due to the speed of the testing, if all tests pass, the scanner card LEDs will appear to display "bb" immediately.

\*\* Indeterminate

Table 7-6 SX-200 FD Bay Control Card FIM Status LEDs		
FIM LED	LED STATUS	Meaning
LOCAL	on	Local Receiver in sync. (normal operation)
	off	No power to FIM
	flashing	Local Receiver not in sync (not connected / wrong connection)
REMOTE	on	Remote Receiver in sync. (normal operation)
	off	No power to FIM
	flashing	Remote Receiver not in sync (not connected / wrong connection)

**Note:** FIM status LEDs are located on the Fiber Interface Modules of the SX-200 FD System. The status indicated applies to the FIMs in both the control and peripheral nodes (See Figure 7-3).



**Figure 7-2 Fiber Interface Module**

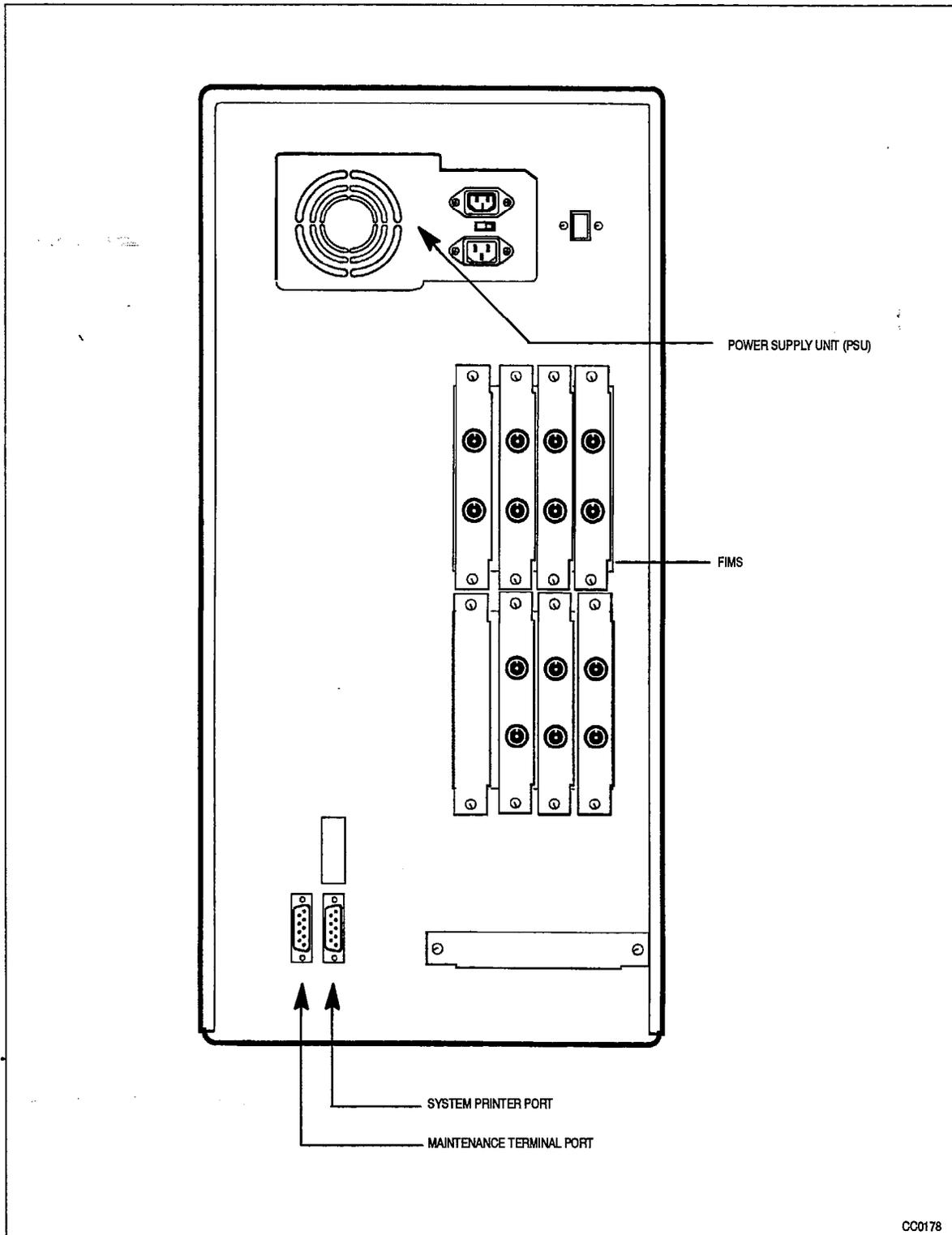


Figure 7-3 SX-200 FD Control Cabinet Rear View

## Scanner Card

- 7.8 On the Scanner card, there are two 7-segment display status indicators, a pushbutton, and eight DIP switches. All of these controls and indicators are labelled clearly on the Scanner card's front panel (See Figure 7-1). The functions of the controls and indicators are described in the following paragraphs.

**Master Reset Pushbutton.** Pressing the master reset pushbutton on the Bay 3 scanner card will cause all activity in Bay 3 to cease, all PROM-based tests on the Bay 3 peripheral control complex to run, and the peripheral software to be reloaded into Bay 3. Pressing the master reset pushbutton on the Bay 4 scanner card will cause all activity in Bays 4 and 5 to cease, all PROM-based tests on the Bay 4 and 5 control cards to run, and the peripheral software to be reloaded into Bay 4.

**Note:** Never do this while the *SX-200* DIGITAL PABX is handling traffic, as all calls in the affected bay(s) will immediately be dropped.

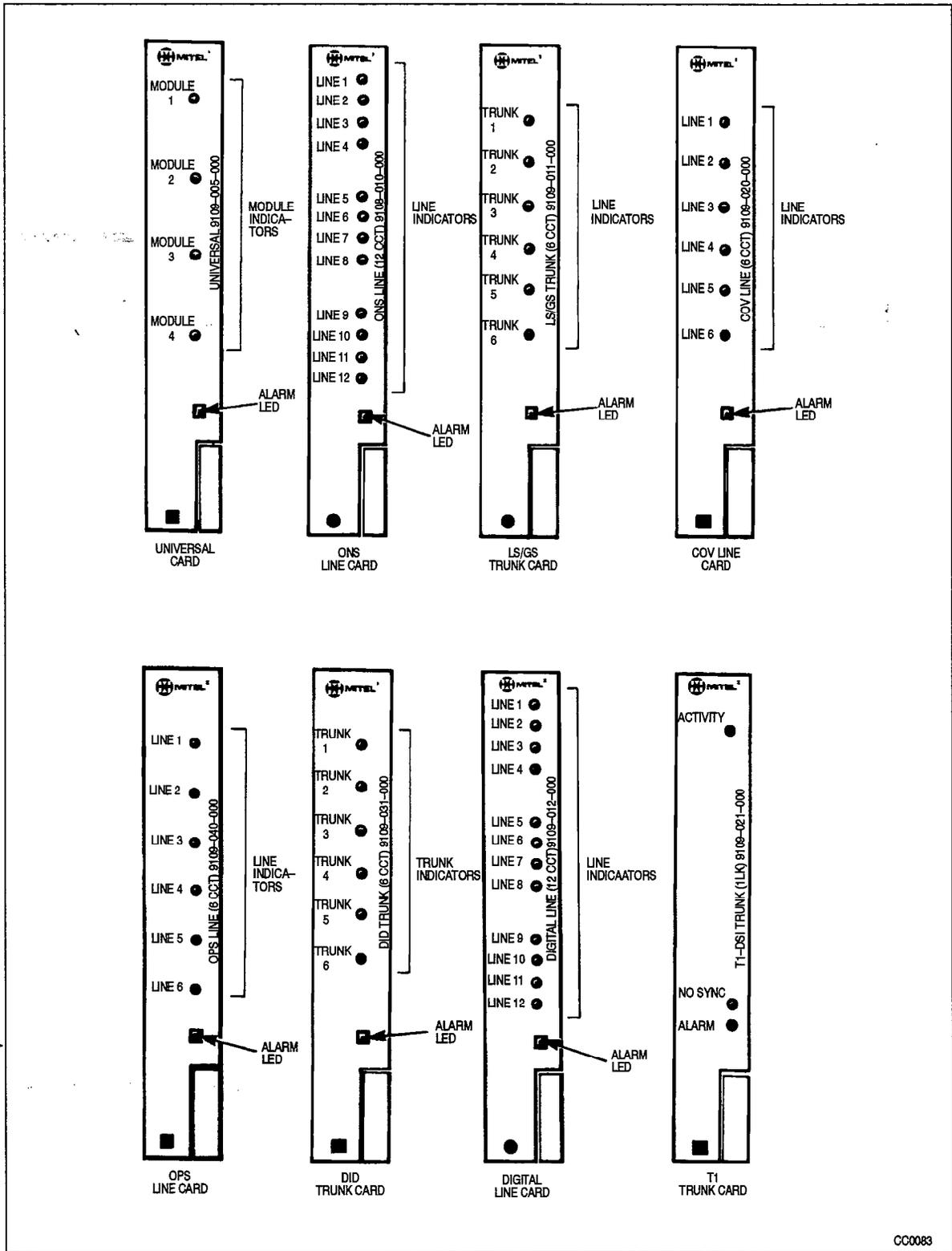
**Seven-Segment Display Status Indicators.** The Scanner card 7-segment display LEDs, arranged vertically, as shown in Figure 7-1. The top display LED is the most significant while the lower display LED is the least significant. The function of the displays depends upon the software currently being executed. At system initialization, they indicate the status of the Peripheral Control card and Digital Interface Card PROM-based tests; these are summarized in Table 7-4 and Table 7-5.

**DIP Switches.** These have no functionality.

## Peripheral Circuit Cards

- 7.9 **Analog Cards.** Analog line and trunk peripheral cards have a small red LED associated with each circuit. When a circuit is involved in a call, its associated LED will be on; when it is not in use, the LED will be off. Line circuit LEDs will flash at a rate of 10 pulses per second when the circuit is receiving dial pulses.

**Digital Cards.** Digital card LEDs have all of the functionality of the analog card LEDs, but with several enhancements. When a digital circuit is removed from service by the maintenance system, the associated LED will flash with a period of 1/2 second on and 1/2 second off. Each digital peripheral card has an alarm LED located at the bottom of the card's front panel. If any circuit on the card has a known fault or if a card is installed in an unprogrammed or incorrect card slot, the alarm LED will flash with a period of 1/2 second on and 1/2 second off (See Figure 7-4.)



CC0083

Figure 7-4 Peripheral Card Front Panels

## Attendant Console

- 7.10 The SX-200 DIGITAL PABX Attendant Console function LEDs (see Figure 7-5) are used as maintenance indicators during the console initialization sequence. Table 7-7 and Table 7-8 describe the console maintenance indicators.

Table 7-7 Attendant Console Maintenance Led Indicators	
Test Name	Test Fail Indication
Console RAM Test	HOLD 1 LED flashes.
Console EPROM Test	HOLD 2 LED flashes.
Console IRQ Test	HOLD 3 LED flashes.
Console LED Test	Any of the console LEDs fail to go on, and stay on for 2 seconds.

Table 7-8 Attendant Console LCD Display Messages	
Message	Meaning
CONSOLE HARDWARE FAILURE      123456789 ERROR CODE 1 PLEASE NOTE DETAILS ON REPAIR TAG	Console power-up tests failed.
WAITING FOR SYNCHRONIZATION      123456789 PLEASE WAIT	Power is available, but there is no synchronization to the line.
WAITING FOR COMMUNICATION      123456789 PLEASE WAIT	Console is synchronized, but no messages are being received from the system.

**Note:** In all cases, refer to Practice 9109-096-350-NA, Troubleshooting.

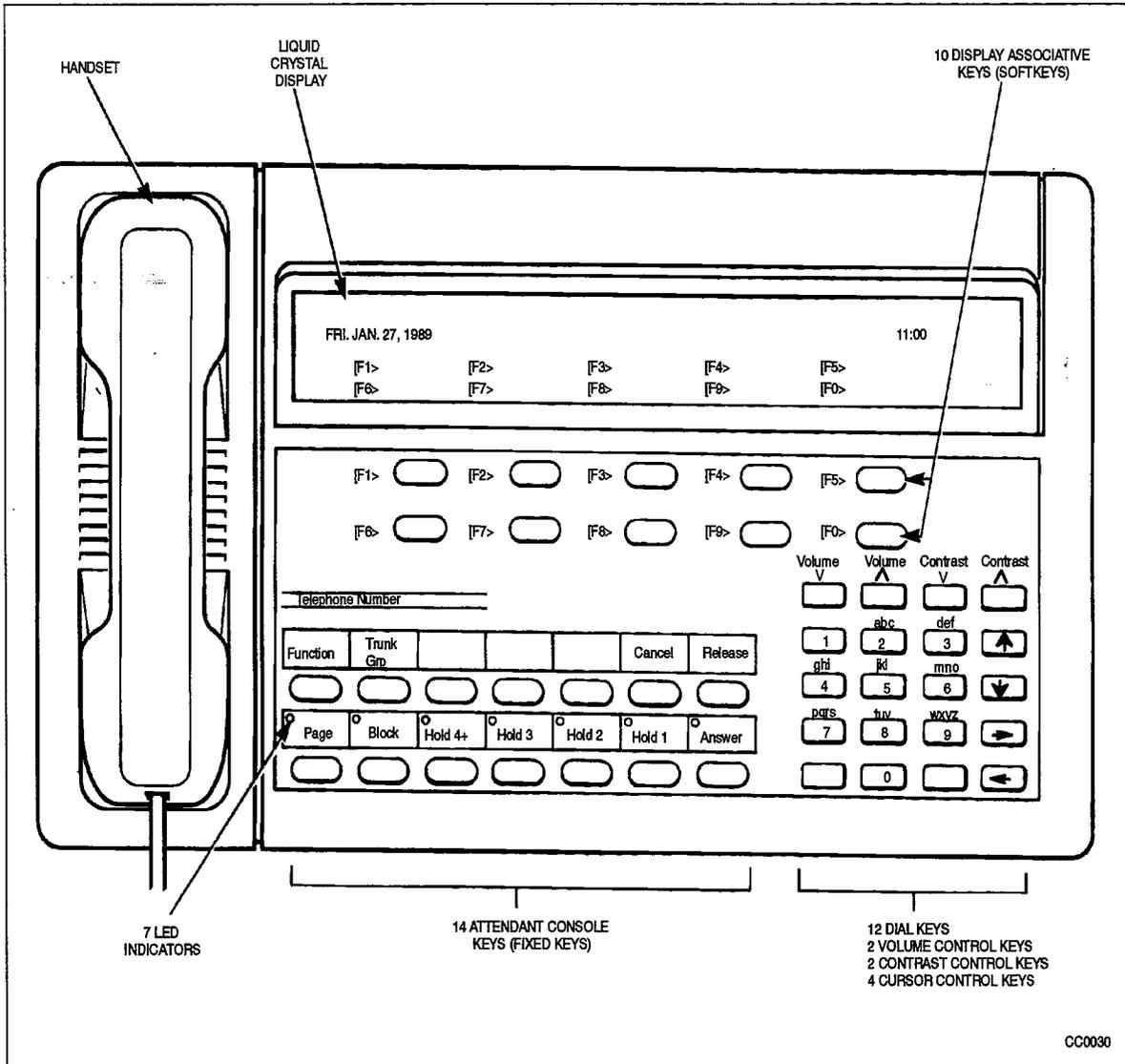


Figure 7-5 Attendant Console Keyboard

**Power Supplies**

**7.11 Rear Door Power Supplies.** Any SX-200 DIGITAL PABX cabinet that includes analog bays includes a rear door power supply (see Figure 7-8). The ac Power LED indicates the presence of ac power connected to the power supply. The CONVERTER INPUT LED indicates the presence of transformed power at the DC converter input. The EQUIPMENT SHELF POWER ON LED indicates whether or not the TOP SHELF POWER ON switch on the maintenance panel is in the ON position. The RESERVE BATTERY CONNECTED LED is not used.

**Bay Power Supplies.** Each digital equipment bay requires one Bay Power Supply (see Figure 7-9). There are two LED indicators located on the front panel of the bay power supply; the top LED is the power ON indicator, and the bottom LED is the ring generator indicator. The ring generator indicator will flash on only when ringing signal is applied.

## Floppy Disk Drive

- 7.12 The *SX-200* DIGITAL PABX 5.25" floppy disk drive has one LED on its front panel. For the LED indicator on the *SX-200* DIGITAL PABX 5.25 floppy disk drive see Figure 7-7. The LED indicators light up when the disk drive magnetic heads are in contact with the floppy diskette. Power should never be turned off while this LED is on. Powering down with the heads engaged can cause corruption of data on the diskette. If powering down is necessary, first wait for the LED to go off, then turn the lever to the 'diskette removal position' (see Figure 7-7). Both disk drives are powered from the BPS in Bay 2 (see Figure 7-9). On a 672-port cabinet, both disk drives are powered from Bay 0.

The *SX-200* FD 3.5" floppy disk drive has one LED on its front panel. For the LED indicator on the *SX-200* FD 3.5 floppy disk drive See Figure 7-6. The LED indicators light up when the disk drive magnetic heads are in contact with the floppy diskette. Power should never be turned off while this LED is on. Powering down with the heads engaged can cause corruption of data on the diskette.

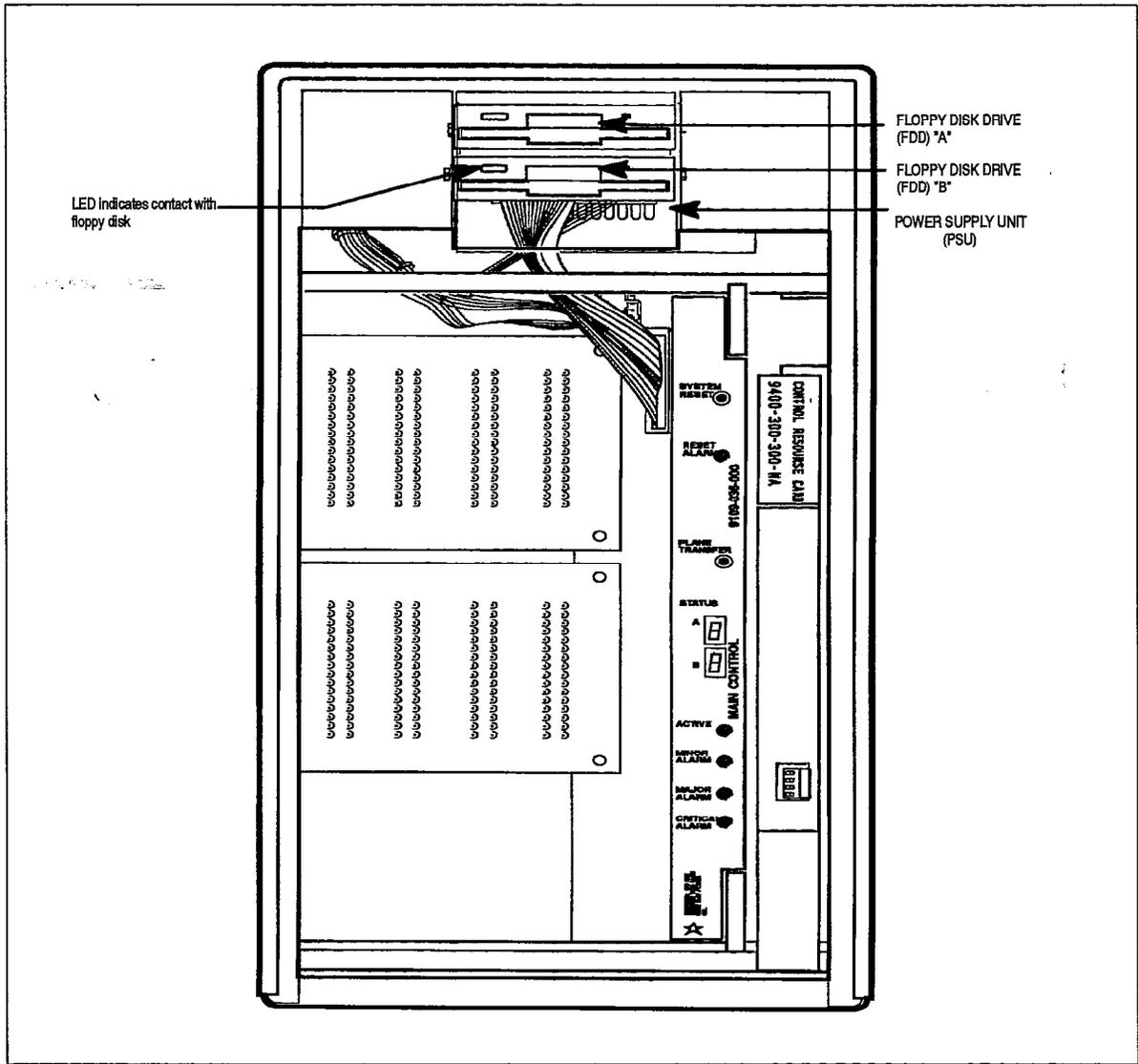
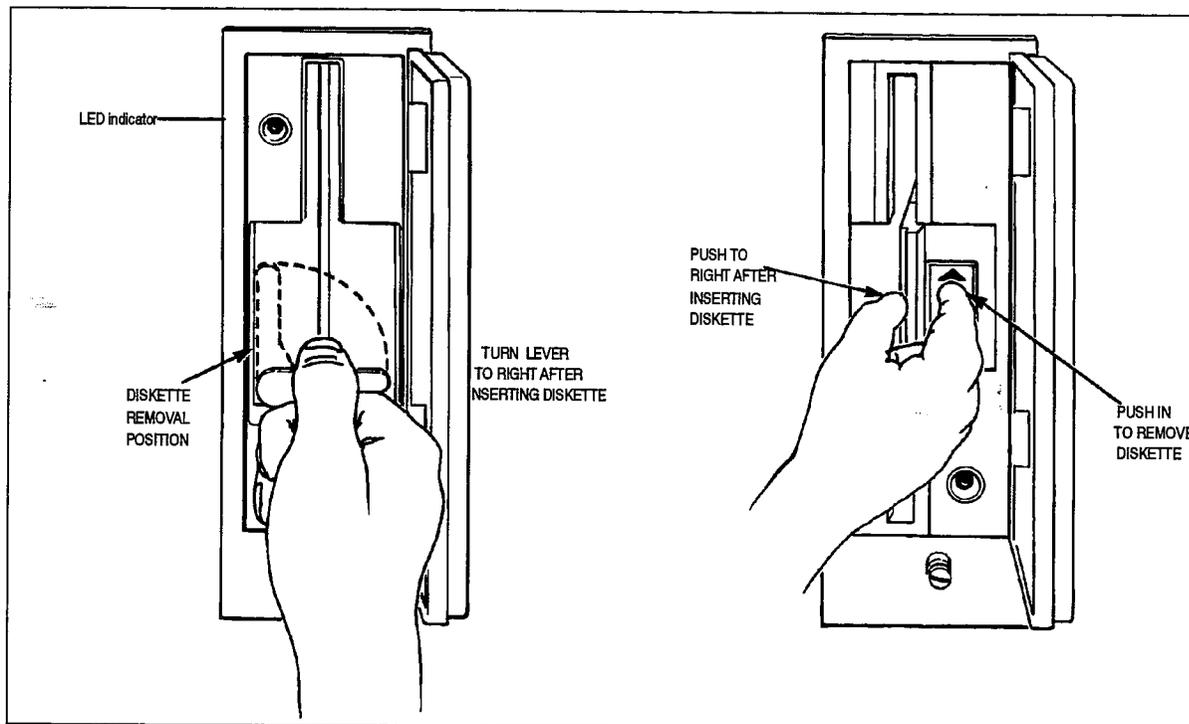


Figure 7-6 3.5" Floppy Disk Drive



**Figure 7-7 SX-200 DIGITAL Disk Drive**

### Power Fail Transfer Card

- 7.13 The Power Fail Transfer card is located on the inside of the equipment cabinet on the side panel (see Figure 7-10 and Figure 7-11). The power fail transfer LED is located at the top of the card (see Figure 7-12). When this LED is on, the system is in normal operation; when the LED is off, the system is in power fail transfer mode. The PFT card in the Universal Cabinet has no status LEDs, and is mounted on the right side as viewed from the rear, (see Figure 7-13).

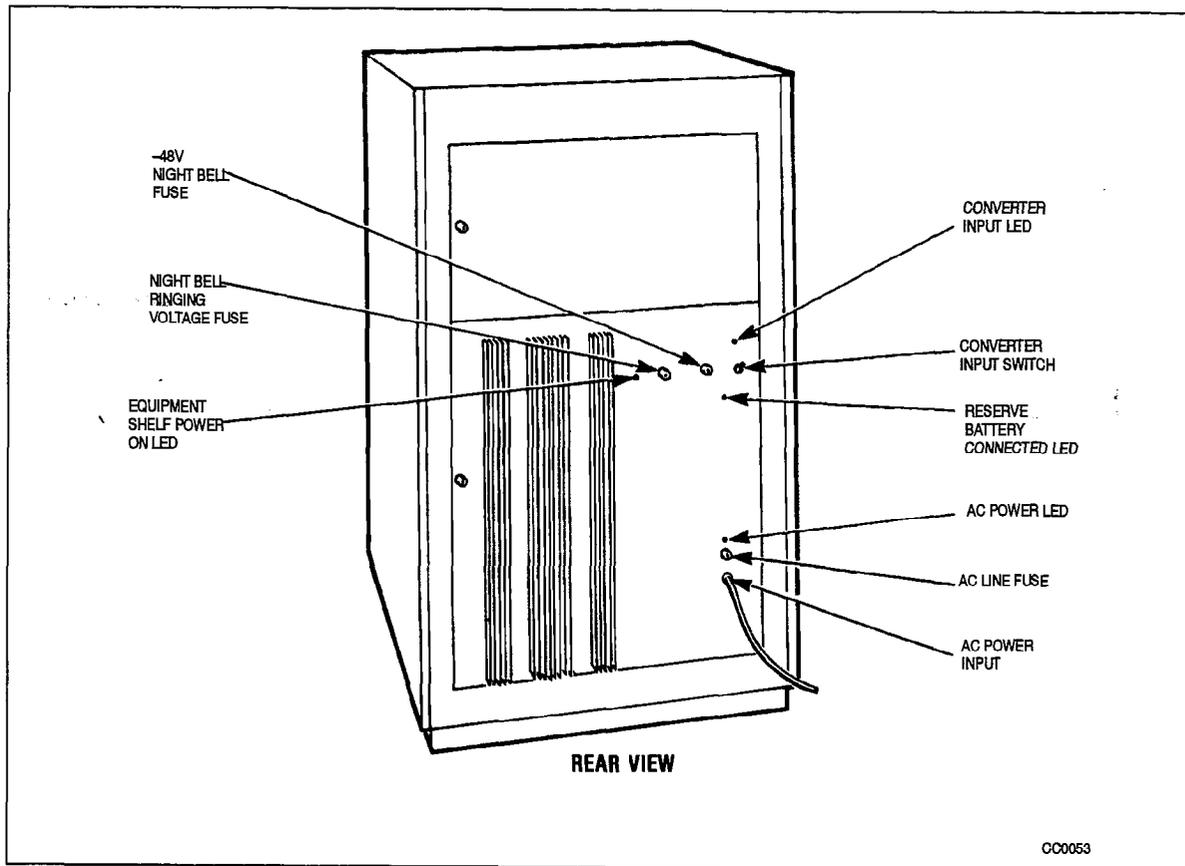


Figure 7-8 Rear Door Power Supply Indicators

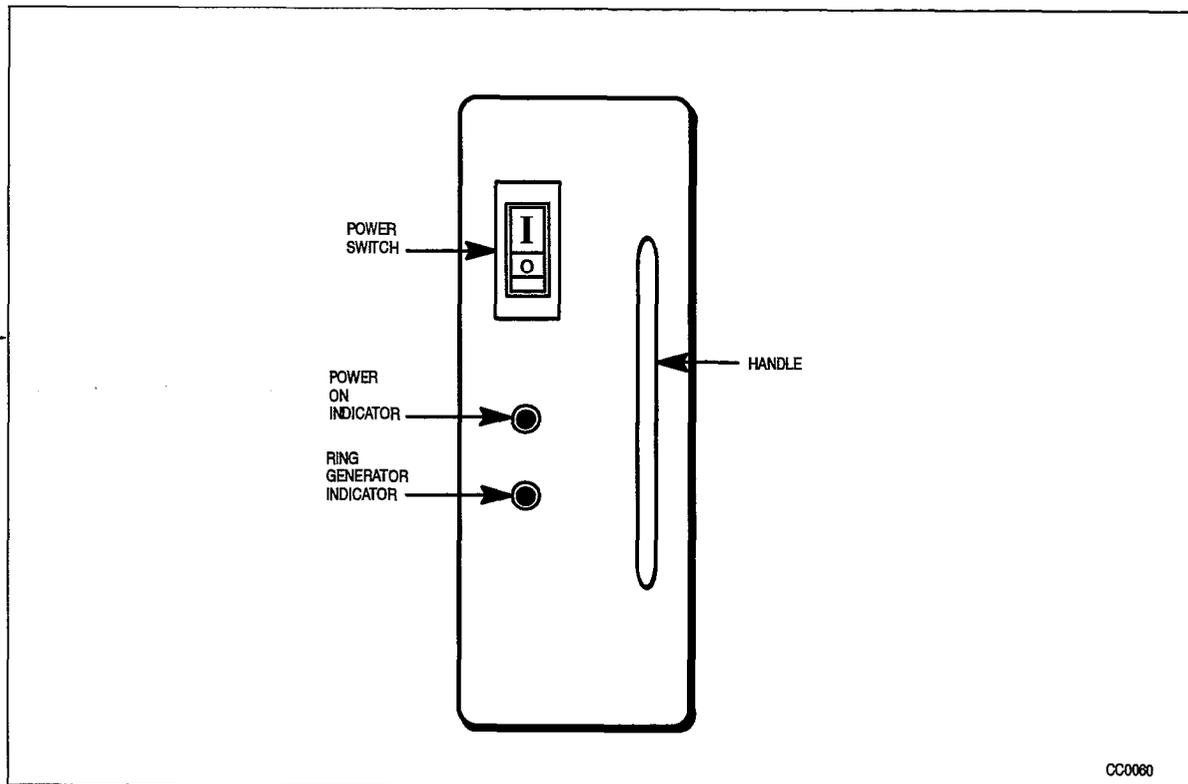


Figure 7-9 Bay Power Supply

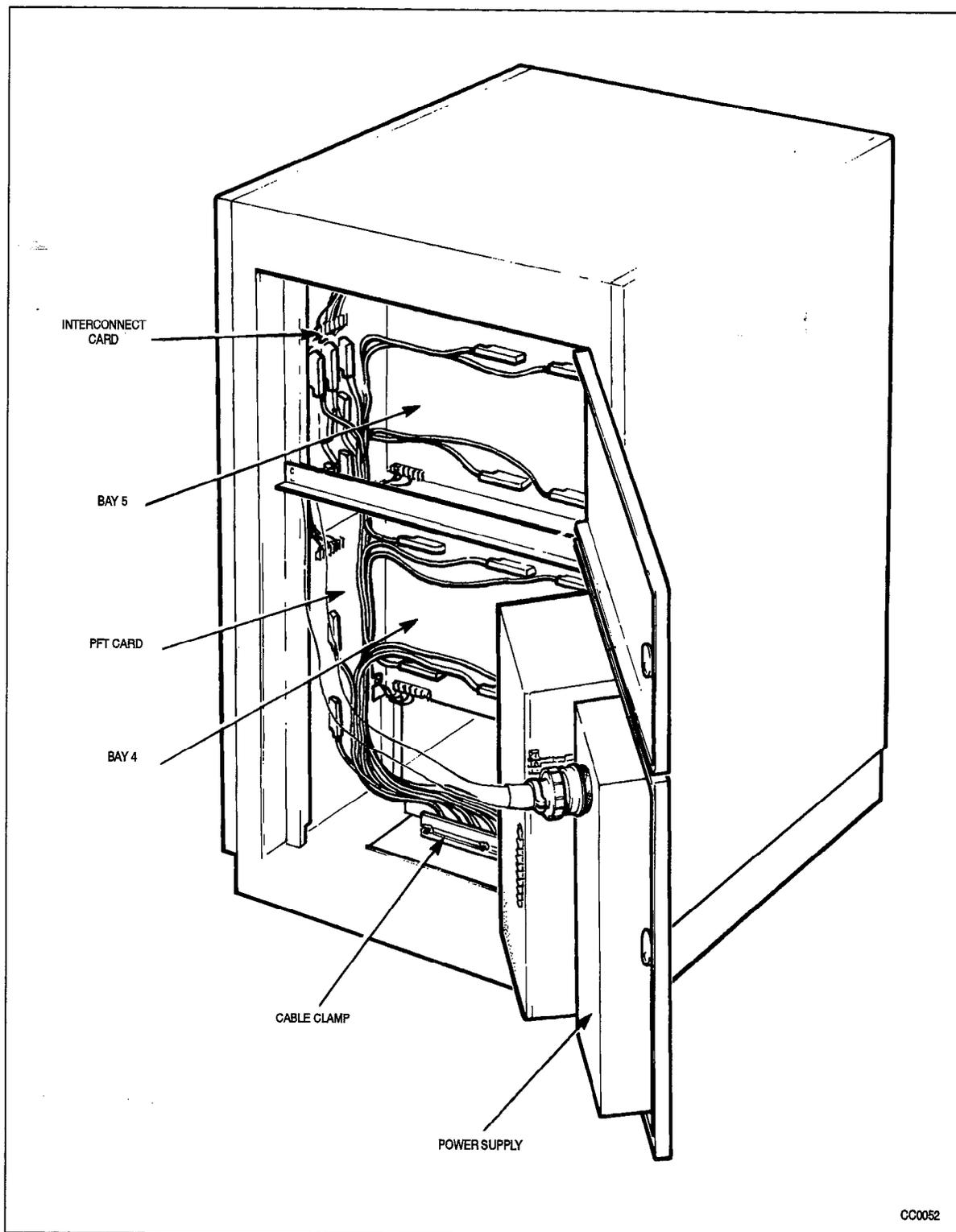
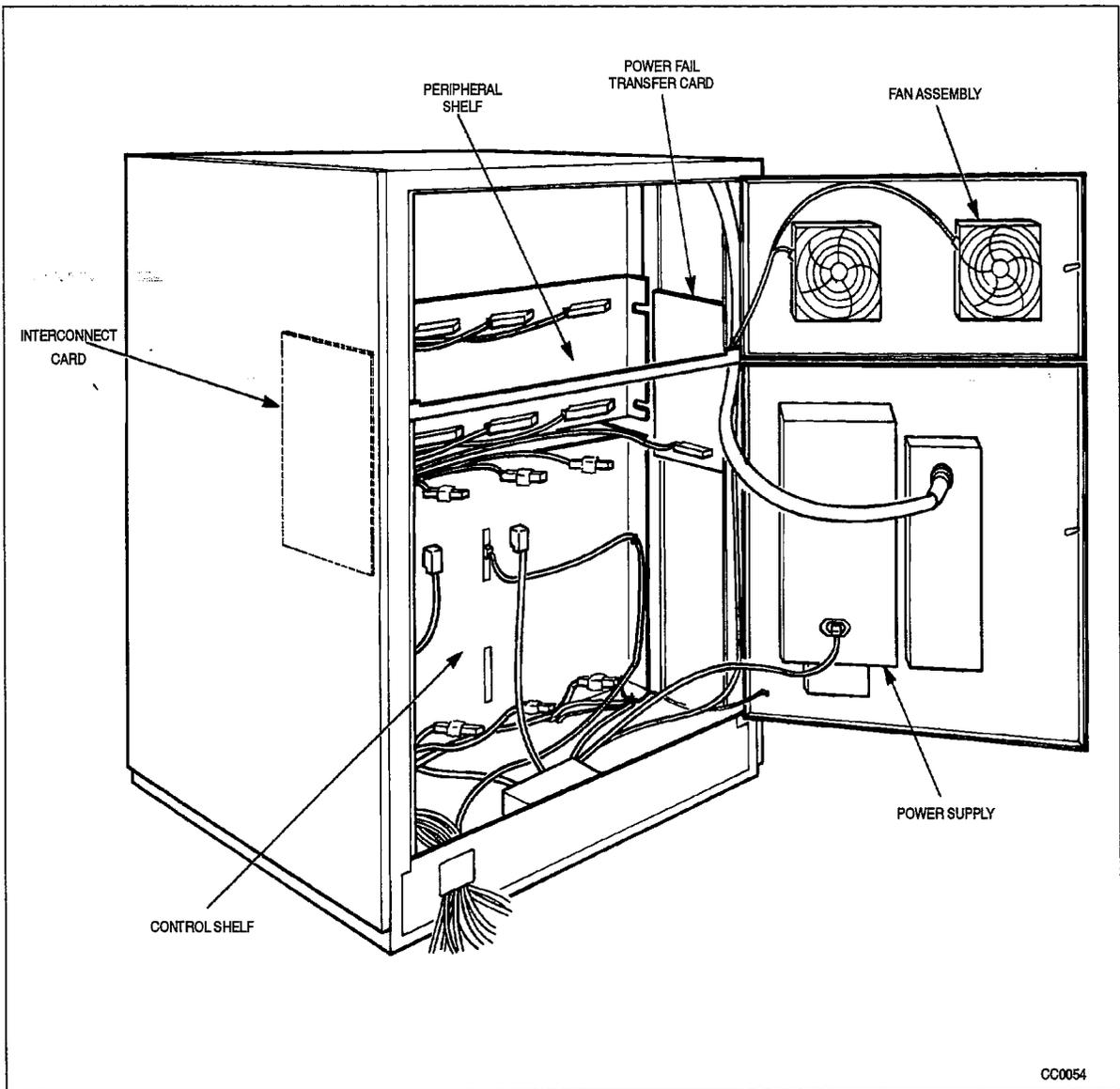


Figure 7-10 Power Fail Transfer Card Location – Peripheral Cabinet



**Figure 7-11 Power Fail Transfer Card Location – Universal Control Cabinet**

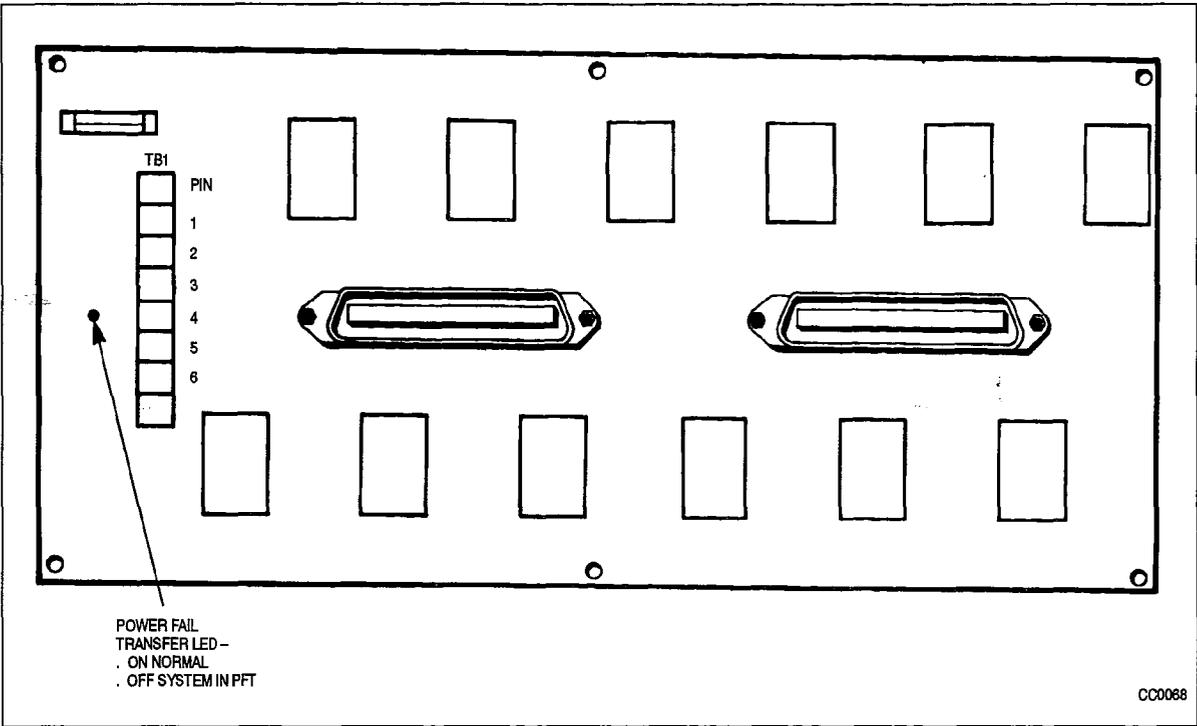


Figure 7-12 PFT Card (480-Port Configuration and Welded Control Cabinet)

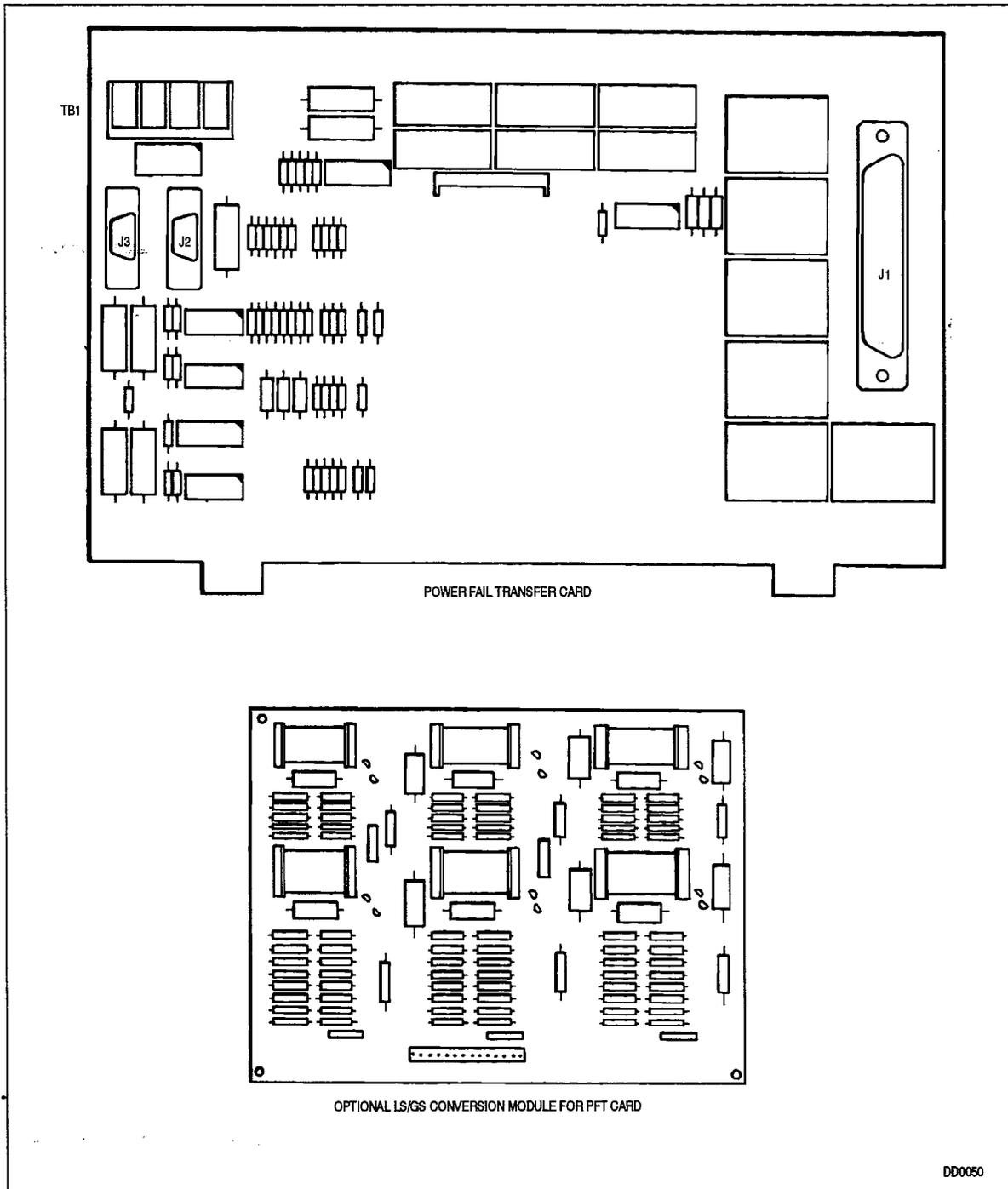


Figure 7-13 PFT Card for a Universal Cabinet

# Appendix A.

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## ROUTINE MAINTENANCE

The procedures described in the following paragraphs are the only routines required for the *SX-200* DIGITAL PABX, and are necessary due to the mechanical nature or limited operational life of the components concerned.

### Air Filter

- A.1 Each digital equipment cabinet has an air filter to remove dust and particles from the incoming air flow to maintain a clean environment within the cabinet. It is important that the filter be checked frequently, and cleaned regularly, since failure to do so will cause a reduction in the airflow, and a consequent buildup of excess heat within the cabinet, leading ultimately to component failure.

The air filter is located on the inside of the cabinet front door, at the bottom. It is held over the intake vent by a self-sticking strip bordering the vent. To remove the filter, simply pull it from the self-sticking strip border. To install the filter, simply place it over the vent, and firmly press the edges onto the self-sticking border.

The filter may be cleaned by washing in warm water and detergent, rinsing, and drying. After several washings, the filter may begin to deteriorate; at this point, it should be replaced.

The intervals at which this should be done will depend upon the environment in which the *SX-200* DIGITAL PABX is located. Regardless of environmental considerations, however, the filter should be changed at least every 6 months.

## General Maintenance Information

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# Appendix B.

## SYSTEM INITIALIZATION

### General

- B.1 When the system is first installed, the default data must be loaded into the system. Refer to Table B-1, Initial Power-up Procedures from the Terminal and Table B-2, Initial Power-up Procedures from the Attendant Console and to Practice 9109-096-200-NA, Installation Information, for details.

**Note:** Generic 1001 software requires only one diskette and one disk drive in Bay 2.

<b>Table B-1 Initial Power-up Procedures From The Terminal</b>	
<b>Step</b>	<b>Action</b>
1.	Ensure that the correct Decryption Module is installed. Refer to Practice 9109-096-200-NA, Installation Information.
2.	Turn power supplies ON.
3.	For the 336-port Configuration insert diskette A in the Bay 2 disk drive and diskette B in Bay 1 disk drive. For the 672-port Configuration insert diskette A into disk drive A and diskette B into disk drive B. For the SX-200 FD insert diskette A into the upper disk drive and diskette B into the lower disk drive. Correct diskette orientation is with the read/write access edge first and the write protect notch down. Do not power up or power down while diskettes are in place.
4.	Close the disk drive latches. The disk drives should begin to operate. If not, depress the System Reset button on the Main Control Card.
5.	Power-up or reset the terminal.
6.	Press the RETURN key twice; the terminal display returns the following: 1 - VT-100 COMPATIBLE 2 - TTY TYPE SELECT A TERMINAL TYPE :
7.	Select the terminal type by entering "1". The display returns the following: 1 - MAINTENANCE 2 - CDE 6 - QUIT SELECT AN APPLICATION ( OR QUIT TO START OVER ) :
8.	Select the Customer Data Entry application by entering "2". The display returns the following: ENTER USERNAME :





**General Maintenance Information**

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# Appendix C.

## SAVE DATABASE

This Appendix outlines the procedures to copy the system database. The *SX-200* DIGITAL PABX software is stored on floppy diskettes; the database is also stored here. When upgraded software is obtained, it is desirable to simply copy the customized database from the old software diskettes onto the new software diskettes, rather than to re-enter the database manually. The procedures are outlined below.

- Notes:**
1. Generic 1001 software requires only one diskette and one disk drive in Bay 2.
  2. These procedures are not possible across releases.

### Procedure

- C.1 These procedures involve a complete reset of the system (needed to initialize the new software). Therefore, they should be done only at night, or during a period of low traffic to ensure minimum effect upon system users. To save the database, follow the procedures in Table C-1.

Table C-1 Save Database	
Step	Procedure
1.	Select the MAINTENANCE application at the maintenance terminal, and log in.
2.	Press the SYSTEM softkey to access the System Level in the Maintenance Application.
3.	To copy the database, enter the following softkeys: COPY DATABASE ENTER
4.	A verification between the RAM and the diskette data bases is done. If any differences are found, an error message containing the reason for failure is issued and the copy operation is aborted (see Appendix B). Once a successful verification is obtained, wait for the data base to be read into DRAM; this has completed when the following message is displayed on the maintenance terminal: Insert new diskettes, close doors and press CONTINUE.
5.	Remove the original floppy diskettes from the diskette drives.
6.	Insert the new software diskettes into the disk drive, and move the latch into the closed position. Ensure diskettes are inserted into correct disk drives. Ensure that diskettes do not have write protect stickers installed.
7.	Press the CONTINUE softkey to write the database on to the new floppy diskettes.
8.	Wait for the write to complete; this is indicated by the following message: Copy successful. If upgrading then RESET – else press CANCEL to continue.
Page 1 of 2	

**Table C-1 Save Database  
(continued)**

Step	Procedure
9.	If it is not desirable to reset the system at this point, remove the new software diskettes from the disk drives, insert the original diskettes, press the CANCEL softkey, and wait for an appropriate time. Otherwise, proceed to Step 10.
10.	Press the SYSTEM RESET pushbutton on the Main Control Card. If the CANCEL softkey is pressed to continue and the upgrade diskettes are in the PABX, it will automatically reset itself.
11.	Wait for the reset to complete; this is indicated by the green ACTIVE LED indicator on the Main Control card flashing on and off. The system is now running the new software. <b>Note:</b> It will be possible to log into the maintenance terminal approximately 2 minutes after pressing the SYSTEM RESET pushbutton.
Page 2 of 2	

**Note:** The following items, which are stored in CMOS RAM, are copied to the new destination diskette when upgrading.

- set call-me-back messages (see Note)
- system ID
- traffic measurement parameters
- timed reminders
- wake-ups
- forwarding information
- room status, call type, and call restriction settings
- console language setting
- auto answer setting
- trunk meter pulses (message register)
- digital *SUPERSET* volume levels and ringer pitch
- printer UART speed
- log autoprint

**Notes:** 1. If the Main Control Card is changed, a copy data base onto itself should be done in order to obtain the latest version of these fields.

2. When upgrading from a Generic release that can store 100 call-me-back messages to one that can store 250 messages (Generic 1004 or Generic 1003 D05 and later) or downgrading from 250 to 100, all messages will be lost.

# Appendix D.

## USERNAME COMMAND PRIVILEGES

Table D-1 lists the command privileges of all of the valid username levels:

Table D-1 Username Command Privileges					
COMMAND	Installer	Maint1	Maint2	Supervisor	Attendant
SET TIME	X	X	X	X	X
SET DATE	X	X	X	X	X
SET PASSWORD	X	X	X	X	X
SET SPEED	X	X			
SHOW DATE	X	X	X	X	X
SHOW TIME	X	X	X	X	X
SHOW DEVICE	X	X	X	X	X
SHOW IDENTITY	X	X	X	X	X
COPY DATABASE	X	X	X		
MONITOR SMDR	X	X	X	X	
MONITOR DIAG	X	X	X	X	
MONITOR LOGS	X	X	X	X	
STOP MONITOR	X	X	X	X	
TEST	X	X			
SHOW ERRORS	X	X			
CLEAR ERRORS	X	X			
ENABLE/DISABLE BG DIAGS	X	X			
ENABLE/DISABLE PWR UP DIAGS	X	X			
BUSY-OUT RETURN TO SVC	X	X			
TRAFFIC SET	X	X	X	X	
RESTART	X				
SET RESET_TIME	X				
SET ALARM_THRESH	X				
TRAFFIC SHOW	X	X	X	X	

**Table D-1 Username Command Privileges  
(continued)**

COMMAND	Installer	Maint1	Maint2	Supervisor	Attendant
TRAFFIC PRINT	X	X	X	X	X
TRAFFIC READ	X	X	X	X	X
TRAFFIC STOP	X	X	X	X	X
LOGS SET AUTO	X	X			
LOGS READ	X	X			
LOGS PRINT	X	X			
STOP PRINT LOGS	X	X			
LOGS DELETE	X	X			
SHOW ALARMS	X	X			
SHOW CONFIG	X	X	X		
SHOW STATUS	X	X	X		
SHOW CHANNEL_MAP	X	X	X		

**SX-200® DIGITAL PABX**

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# Field- Replaceable Units

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### **NOTICE**

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## IMPORTANT SAFETY INSTRUCTIONS

### WARNING

Failure to follow all instructions may result in improper equipment operation and/or the risk of electric shock.

- This product is to be installed and serviced only by qualified personnel.
- Read all instructions before attempting to install or use this product.
- Install all assemblies using the procedures described in this Practice.
- Configure this product with only the assemblies specified in this Practice.
- Grounding circuit continuity is vital for safe operation of telecommunication equipment. Never operate telecommunication equipment with grounding conductor disconnected. Ensure grounding conductor is installed before connecting telecommunication cabling to any system.

## EXPLANATION OF USE FOR SYMBOLS AND NOTICES



**DANGEROUS  
VOLTAGE**

The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of an uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a significant risk of electric shock to persons.



**INSTRUCTIONS**

The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the product.



**PROTECTIVE  
GROUNDING  
TERMINAL**

The ground symbol within a circle identifies the terminal which is intended for connection to an external protective conductor. This connector must be connected to earth ground prior to making any other connections to the equipment.

**DANGER**

Danger indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

**WARNING**

Warning indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

**CAUTION**

Caution indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury and/or damage to the equipment or property.



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1.

## INTRODUCTION

This document contains ordering information and field replacement instructions for the *SX-200*® DIGITAL Private Automatic Branch Exchange (PABX).

### Reason for issue

- 1.1 This document reflects the content of *SX-200* DIGITAL and the *SX-200* FD software release Generic1005. This document also applies to Generic 1001, Generic 1002, Generic 1003, and Generic 1004



## 2.

## ORDERING INFORMATION

The ordering information is divided into the following tables:

- Table 2-1 lists all digital cards and modules required.
- Table 2-2 lists spares for all configurations.
- Table 2-3 lists all analog cards required.
- Table 2-4 lists all peripheral equipment.
- Table 2-5 lists upgrade kits.
- Table 2-6 lists system documentation.

**Note:** A complete list of circuit card part numbers, engineering numbers and revision levels is provided in Practice 9109-096-203-NA, Safety Instructions.

### Warranty

- 2.1 The MITEL® *SX-200* DIGITAL communications system is warranted against defective material and workmanship. Equipment requiring service or repair during the warranty period must be packaged in accordance with Chart 3-21 and returned prepaid to the supplier. Repaired or replacement equipment is returned to the customer, post prepaid by MITEL.

### Spares Level

- 2.2 MITEL recommends that the minimum sparing level be one replacement unit for any part installed in the field for the first system installed. This would be 100% spares for the first system installed. As the number of installed systems increases, the sparing level should decrease to 10% of the installed units.

Table 2-1 Digital Peripheral Cards		
Common Name	Part Number	Comments
ONS Line Card	9109-010-000-SA	For Rotary and DTMF Telephones (12 circuits per card)
COV Line Card	9109-020-000-SA	6 COV Circuits per card
OPS Line Card	9109-040-000-SA	6 OPS Circuits per card
Digital Line Card	9109-012-000-SA	12 DNIC Circuits per card

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**Table 2-1 Digital Peripheral Cards  
(continued)**

Common Name	Part Number	Comments
LSGS Trunk Card – CSA	9109-011-001-SA	6 CO Trunk Interfaces (for use in Canada and the United States)
DID Trunk	9109-031-000-SA	6 DID Circuits per card
T1 Trunk Card SX-200 DIGITAL	9109-021-000-SA	Includes T1 Trunk Adapter.
T1 Trunk Adapter SX-200 DIGITAL	9109-121-000-NA	
T1 Trunk Card SX-200 FD		
T1 Trunk Adapter SX-200 FD	9400-100-302-NA	
T1 Clock Module	9109-060-000-SA	Stratum 3 Clock Module
T1 Clock Module	9109-061-000-SA	Stratum 4 Clock Module
Universal Card	9109-005-000-SA	supports: – E&M Trunk Module – Music On Hold/Pager Module – Receiver/Relay Module – Console Module
E&M Trunk Module	9109-013-000-SA	1 E&M Trunk Circuit per Module
Music On Hold/Pager Module	9109-018-000-SA	Music Input, Paging Preamp Output, and Relay to control external amplifier
Receiver/Relay Module	9109-016-000-SA	4 DTMF Receivers and 2 General Purpose Relays
Console Module	9109-025-000-SA	Console Interface (LCD Console)
Page 2 of 2		

**Table 2-2 Spares**

Marketing Name	Part Number	Comments
Basic Control Cabinet	9108-000-001-01	Universal Cabinet with COMBO Control Bay (Bays 1 and 2) – 115 volt (for use in the United States)
Basic Control Cabinet	9108-000-005-01	Universal Cabinet with COMBO Control Bay (Bays 1 and 2) – 230 volt
Basic Control Cabinet	9108-000-011-01	Universal Cabinet with COMBO Control Bay (Bays 1 and 2) – 115 volt (for use in Canada)
Page 1 of 4		

**Table 2-2 Spares  
(continued)**

<b>Marketing Name</b>	<b>Part Number</b>	<b>Comments</b>
Basic Control Cabinet	9109-000-002-01	Universal Cabinet with 672-port Control Bay (Bays 0 and 1) (for use in the United States)
Basic Control Cabinet	9109-000-012-00	Universal Cabinet with 672-port Control Bay (Bays 0 and 1) (for use in Canada)
672-port Control Cabinet	9109-000-003-00	Universal Cabinet with 672-port Control Bay (Bays 0 and 1) - 240 volt
672-port Peripheral Cabinet	9109-000-004-01	For 672-port configurations only (for use in the United States)
672-port Peripheral Cabinet	9109-000-014-00	For 672-port configurations only (for use in Canada)
672-port Peripheral Cabinet	9109-000-004-02	For 672-port configurations only - 240 volt
Spare PCM Cable	9109-050-000-NA	
Peripheral FIM Carrier	9400-100-301-NA	For SX-200 FD
FIM Module	9400-300-301-NA	For SX-200 FD
Quad FIM Carrier	9400-300-302-NA	For SX-200 FD
Power Supply Assembly	9400-300-200-NA	For SX-200 FD
3.5" Floppy Disk Drive	9400-300-305-NA	For SX-200 FD
Intercabinet Cable Assembly (672-port)	9109-026-000-NA	For 672-port configurations only
Digital Peripheral Bay Shelf Assembly	9109-015-000-SA	Includes 1 peripheral backplane installed.
Spare Fan - 115 volt	9109-032-000-NA	For Universal cabinet
Spare Fan - 230 volt	9109-032-001-NA	For Universal cabinet
Rear Door Fan Assembly	9108-032-000-NA	For 480-port system (115 volt)
Rear Door Fan Assembly	9108-032-001-NA	For 480-port system (230 volt)
Replacement Filter	9109-037-000-NA	
Floppy Disk Drive Assembly	9109-124-000-SA	For Universal Cabinet
Floppy Disk Drive Assembly	9109-024-000-NA	For welded cabinet only - not sold in Canada
Disk Drive Adapter	9108-038-000-NA	For welded cabinet, Bay 2
Disk Drive Adapter	9108-037-000-NA	For welded cabinet, Bay 1
System Disks Generic 1001 - 336-port	9109-034-000-NA	3 Floppy Diskettes
System Disks Generic 1001 - 480-port	9108-034-001-NA	3 Floppy Diskettes
System Disks Generic 1002 - all configurations	9109-034-001-NA	6 Floppy Diskettes
System Disks Generic 1003 Base	9109-034-301-NA	6 Floppy Diskettes

**Table 2-2 Spares  
(continued)**

<b>Marketing Name</b>	<b>Part Number</b>	<b>Comments</b>
System Disks Generic 1003 ACD	9109-034-302-NA	6 Floppy Diskettes
System Disks Generic 1003 672-port Base	9109-034-311-NA	6 Floppy Diskettes
System Disks Generic 1003 672-port ACD	9109-034-312-NA	6 Floppy Diskettes
System Disks Generic 1004 Base	9109-034-400-NA	6 Floppy Diskettes
System Disks Generic 1004 ACD	9109-034-410-NA	6 Floppy Diskettes
Main Control Card	9109-036-000-SA	Without modules
2 Meg Memory Module	9109-002-003-SA	Generic 1001, Generic 1002 and Generic 1003
4 Megabyte Memory Module	9109-002-005-SA	Generic 1003 ACD and Generic 1004
DX Module	9109-004-000-SA	for 336-, 456-, and 480-ports (mounts on MCC)
Switch Matrix Card	9109-006-000-SA	For 672-port system only
Switch Matrix Module for Generic 1005	9400-100-300-NA	For SX-200 FD
Control Resource Card for Generic 1005	9400-100-303-NA	For SX-200 FD
Bay Power Supply	9109-008-000-SA	115 volt - one required in each equipped digital Bay
Bay Power Supply	9109-008-002-NA	230 volt - one required in each equipped digital Bay
Bay Control Card	9109-017-000-SA	
Power Fail Transfer Card	9109-023-000-SA	6 Power Fail Transfer Circuits
PCM Cable (Bay 2-3)	9108-025-000-NA	For 480-port system
PCM and Ground Cable (Bay 2-4)	9108-026-000-NA	For 480-port and 456-port systems
PCM Cable (Bay 4-5)	9108-027-000-NA	For 480-port and 456-port systems
PFT Monitor Cable	9108-028-000-NA	For 480-port and 456-port systems
Rear Door Power Supply - 110V	9110-108-003-NA	For 480-port analog Bay 3 and analog Peripheral cabinet
Rear Door Power Supply - 230V	9110-208-000-NA	For 480-port analog Bay 3 and analog Peripheral cabinet (with 20 Hz ringer)
Digital Interface Card	9108-002-000-SA	

Table 2-2 Spares (continued)		
Marketing Name	Part Number	Comments
Peripheral Control Card	9108-203-100-SA	
LSGS Conversion Module	9109-043-000-SA	Converts 6 Circuits from Loop Start to Ground Start (mounts onto PFTcard)
Page 4 of 4		

Table 2-3 Analog Peripheral Cards		
Marketing Name	Part Number	Comments
E&M Trunk Card – CSA	9110-013-001-NA	
DIDTIE Trunk Card – CSA	9110-031-001-NA	
Scanner Card (1200 BAUD)	9110-104-000-NA	
Line Card (8-Station)	9110-110-000-NA	
CO Trunk Card – CSA	9110-211-001-NA	4-Circuit CO Trunk Card
<i>SUPERSET</i> <sup>™</sup> Line Card	9110-410-000-NA	8-Circuit <i>SUPERSET 3</i> <sup>™</sup> and <i>SUPERSET 4</i> <sup>®</sup> Line Card

Table 2-4 Peripheral Equipment		
Marketing Name	Part Number	Comments
<i>ACD Telemarketer</i> <sup>®</sup> Reporting System	9150-ACD-02D-NA	
LCD Console	9108-007-001-NA	ESD enhanced
<i>SUPERCONSOLE 1000</i> <sup>™</sup> attendant console (English)	9189-000-001-NA	Console with tilt LCD display (interfaces to Digital Line Card) and English documentation
<i>SUPERCONSOLE 1000</i> attendant console (French)	9189-000-003-NA	Console with tilt LCD display (interfaces to Digital Line Card) and French documentation
LCD Console Lens and Label Kit	9108-036-000-NA	Keypad Label and Protective Lens
Page 1 of 4		

**Table 2-4 Peripheral Equipment  
(continued)**

Marketing Name	Part Number	Comments
Console Cable	9109-007-900-NA	Spare 3.5 m (12 ft.) console cable
LCD Console French Conversion Kit	9108-040-000-CA	French Keypad Label and French Attendant Console Guide
<i>SUPERSET 3</i> Telephone	9173-000-021-NA	Multi-feature 3-line Telephone
<i>SUPERSET 3</i> French Conversion Kit	9173-070-000-CA	French Labels and User Reference Cards (quantity: 25)
<i>SUPERSET 3</i> Lens Kit	9173-002-000-NA	<i>SUPERSET 3</i> Protective Lens (quantity: 10)
<i>SUPERSET 4</i> Telephone	9174-000-025-NA	Full Feature Multiline Telephone
<i>SUPERSET 4</i> Telephone French	9174-000-022-CA	French <i>SUPERSET 4</i> Telephone
<i>SUPERSET 4</i> Label Kit (Mark I)	9174-002-001-NA	Telephone number and Line Identification labels (quantity: 25)
<i>SUPERSET 4</i> Lens Kit (Mark I)	9174-002-000-NA	<i>SUPERSET 4</i> Protective Lens (quantity: 10)
<i>SUPERSET 4</i> Label Kit (Mark II / III) English and French	9174-002-004-NA	Telephone number and Line Identification labels (quantity: 25)
<i>SUPERSET 4</i> Lens Kit (Mark II and Mark III)	9174-002-003-NA	<i>SUPERSET 4</i> Protective Lens (quantity: 10)
<i>SUPERSET 4</i> Support Stand	9174-001-000-NA	Spare Stand for <i>SUPERSET 4</i> Telephone (quantity: 8)
Handset	9170-048-002-NA	Spare Handset for <i>SUPERSET 3</i> and <i>SUPERSET 4</i> Telephones (quantity: 10)
Handset Cord	9170-048-001-NA	Spare Handset Cord for <i>SUPERSET 3</i> and <i>SUPERSET 4</i> Telephones (quantity: 10)
<i>SUPERSET</i> Line Cord Pack	9170-048-004-NA	Spare Line Cord for <i>SUPERSET</i> telephones and for <i>SUPERCONSOLE 1000</i> Attendant Consoles (quantity: 10)
<i>SUPERSET 401</i> Telephone	9113-000-060-NA	Single line digital telephone set
<i>SUPERSET 401</i> Label Kit (Mark II / III) English and French	9113-005-001-NA	Telephone number and Line identification labels (quantity: 12)
<i>SUPERSET 401</i> Lens Kit (Mark II and Mark III)	9113-004-001-NA	<i>SUPERSET 401</i> Protective Lens (quantity: 12)
<i>SUPERSET 410</i> Telephone	9114-000-000-NA	Multi-line digital telephone set
<i>SUPERSET 410</i> Label Kit (Mark II / III) English and French	9114-002-001-NA 9114-003-001-NA	Telephone number identification labels Line number identification labels

<b>Table 2-4 Peripheral Equipment (continued)</b>		
<b>Marketing Name</b>	<b>Part Number</b>	<b>Comments</b>
<i>SUPERSET 410</i> Lens Kit (Mark II / III) English and French	9114-004-001-NA 9114-005-001-NA	<i>SUPERSET 410</i> Protective Lens for (quantity: 10)
<i>SUPERSET 420</i> Telephone	9115-000-000-NA	Multi-feature, multi-line digital telephone set
<i>SUPERSET 420</i> Label Kit (Mark II / III) English and French	9115-002-001-NA 9115-003-001-NA	Telephone number and Line identification labels (quantity: 10)
<i>SUPERSET 420</i> Lens Kit (Mark II / III) English and French	9115-004-001-NA 9115-005-001-NA	<i>SUPERSET 420</i> Protective Lens (quantity: 10)
<i>SUPERSET 430</i> Telephone	9116-000-000-NA	Full-feature, multi-line digital telephone set
<i>SUPERSET 430</i> Label Kit (Mark II / III) English and French	9116-002-001-NA 9116-003-001-NA	Telephone number and Line identification labels (quantity: 10)
<i>SUPERSET 430</i> Lens Kit (Mark II / III) English and French	9116-004-001-NA 9116-005-001-NA	<i>SUPERSET 430</i> Protective Lens (quantity: 10)
International Handset for <i>SUPERSET 400</i> series	9115-007-001-NA	Spare Handset for <i>SUPERSET 400</i> series telephone sets (quantity:10)
International Handset Cord for <i>SUPERSET 400</i> series	9115-010-001-NA	Handset Cord for <i>SUPERSET 400</i> series telephone sets (quantity:10)
Static Protection Unit	9180-067-001-NA	Protects system against static discharges at stations. Installed at distribution frame. One unit handles 25 stations.
<i>SUPERSET 3™</i> DN Telephone	9183-000-200-NA	Multi-feature Multiline Digital Telephone
<i>SUPERSET 3/</i> <i>SUPERSET 4™</i> DN Lens Kit	9183-002-000-NA	<i>SUPERSET 3</i> DN/ <i>SUPERSET 4</i> DN Protective Lens (quantity: 10)
<i>SUPERSET 3</i> DN Label Kit	9183-002-001-NA	<i>SUPERSET 3</i> DN Telephone number labels (quantity: 10)
<i>SUPERSET 4</i> DN Telephone	9184-000-001-NA	Full Feature Multiline Digital Telephone
<i>SUPERSET DSS™</i> Module	9188-000-001-NA	<i>SUPERSET DSS</i> Module with Busy Lamp Field
<i>SUPERSET 4</i> DN Label Kit	9184-002-001-NA	<i>SUPERSET 4</i> DN Telephone number label (quantity: 10)
<i>SUPERSET 3</i> DN Telephone with data	9183-000-210-NA	with DATASET 1101 asynchronous cartridge installed
<i>SUPERSET 4</i> DN Telephone with data	9184-000-210-NA	with DATASET 1101 asynchronous cartridge installed

**Table 2-4 Peripheral Equipment  
(continued)**

Marketing Name	Part Number	Comments
DATASET 1102 card	9141-110-200-NA	Dual Rack-Mounted asynchronous DATASET
Standalone DATASET 1103	9141-110-300-NA	Standalone asynchronous DATASET
Milink Data Module	9112-100-000-NA	For the SX-200 FD
DATASET 2102 card	9141-210-200-NA	Rack-Mounted synchronous/asynchronous DATASET
Standalone DATASET 2103	9141-210-300-NA	Standalone synchronous/asynchronous DATASET
DATA CABINET 9000	9141-900-100-NA	Cabinet to hold datashelves
DATASHELF 9100	9141-901-100-NA	Shelf to hold rack-mounted DATASETS
Modem Interconnect Panel	9141-940-100-NA	Installs in DATA CABINET 9000 cabinet
Page 4 of 4		

**Table 2-5 Upgrade Kits**

Marketing Name	Part Number	Comments
Analog Bay 5 kit	9108-013-000-NA	
12-circuit PFT Kit	9108-030-000-NA	
6-circuit PFT Kit	9109-030-000-SA	
LSGS Conversion Module for 6-circuit PFT Card	9109-043-000-SA	Converts 6 Circuits from Loop Start to Ground Start (mounts onto PFTcard)
Digital Peripheral Bay Kit with Shelf - 115 Volt	9109-046-000-SA	Includes bay power supply, Bay Control Card and Digital Peripheral Bay with backplane.
Digital Peripheral Bay Kit with Shelf - 230 Volt	9109-046-001-NA	Includes bay power supply, Bay Control Card and Digital Peripheral Bay with backplane.
Digital Peripheral Bay Kit without Shelf - 115 Volt	9109-047-000-SA	Includes bay power supply, Bay Control Card and peripheral backplane.
Digital Peripheral Bay Kit without Shelf - 230 Volt	9109-047-001-NA	Includes bay power supply, Bay Control Card and peripheral backplane.
336- to 672 -port Upgrade Kit (for USA)	9109-129-000-SA	
336- to 672 -port Upgrade Kit (for Canada)	9109-129-010-NA	

Table 2-6 Documentation

Marketing Name	Part Number	Comments
Generic 1005 System Documentation	9109-035-005-NA	Contains Technical Documentation, covering all features of all software generics (Generic 1001 through Generic 1005), and includes reference cards and end user manuals.
Attendant Console Guide	9109-090-005-NA	Details Attendant Console Operation.
Generic 1005 System Documentation – French	9109-035-004-CA	Technical Documentation (French)
French Attendant Console Guide	9108-090-010-CA	
LCD Console French Conversion Kit	9108-040-000-CA	French Keypad Label and French Attendant Console Guide
General Information Book	9109-952-006-NA 9109-952-006-CA	Includes an overall description of the <i>SX-200 DIGITAL</i> PABX features and peripheral devices (Generic 1003). CA refers to the French version.
<i>SUPERSET 4</i> DN User Guide	9184-953-001-NA	
<i>SUPERSET 3</i> DN User Guide	9183-953-001-NA	
Extension User Guide	9180-953-009-NA	
<i>SUPERSET 4</i> User Guide	9174-953-003-NA	
<i>SUPERSET 3</i> User Guide	9173-953-002-NA	
DATASET 1100 Series User Guide	9141-953-110-NA	
ACD Agent Reference Card	9109-953-005-NA	
ACD Supervisor/Senior Supervisor Guide	9109-953-006-NA	quantity: 10
<i>ACD Telemarketer</i> Reporting System User Guide	9150-953-002-NA	
Milink Data Module User Guide	9112-953-100-NA	
<i>SUPERSET 401</i> User Guide	9113-953-001-NA	
<i>SUPERSET 401</i> Installation Guide	9113-953-050-NA	
<i>SUPERSET 410</i> User Guide	9114-953-001-NA	
<i>SUPERSET 410</i> Installation Guide	9114-953-050-NA	
<i>SUPERSET 420</i> User Guide	9115-953-001-NA	

**Table 2-6 Documentation  
(continued)**

<b>Marketing Name</b>	<b>Part Number</b>	<b>Comments</b>
<i>SUPERSET 420</i> Installation Guide	9115-953-050-NA	
<i>SUPERSET 430</i> User Guide	9116-953-001-NA	
<i>SUPERSET 430</i> Installation Guide	9116-953-050-NA	

## 3.

**FIELD-REPLACEMENT  
PROCEDURES**

Only persons who have successfully completed a MITEL Installation and Maintenance training course for the *SX-200* DIGITAL PABX should perform removal and replacement procedures.

**WARNING**

**Instructions must be followed explicitly when they involve work with and changes to the primary power supply of the unit.**

**Precautions**

- 3.1 Observe the following precautions when working on the system, particularly when handling PCB cards or using test equipment to measure voltages.
- When replacing PCB cards turn power off (when possible), but maintain the ground connections to the equipment. Power must be OFF, when inserting or removing common control cards, which are identified with appropriate warnings on their face-plates.
  - Always wear an antistatic wrist strap when handling printed circuit cards. Handle PCB cards only by the edges and avoid contact with any exposed electrical connections. When removing a new card from its package, touch the package to the cabinet frame first to release any static voltage buildup, prior to removing the card and inserting it into the equipment.
  - Conductive packages (antistatic bags) should be grounded prior to opening them to remove the contents, and similarly grounded prior to placing a card in the package. Suspected faulty cards should be placed in conductive packages to prevent further possible damage to the cards. Cards that are not correctly packed in antistatic bags when returned will not be covered by any warranty.

**Chart 3-1 Power Down System**

**When you have completed this chart you will have:**

- Powered down the system.

Step	Action	Comments
<b>Power Down System</b>		
1.	Unlock and open rear and front doors.	
2.	Remove diskettes from floppy drive(s) (access via the front of the cabinet).	Ensure disk drive LEDs are OFF before removing diskettes.
3.	Turn off Bay Power Supply switches, Peripheral Shelf power switches (if present), and remove cabinet line cord(s) from the wall outlet.	The system is now properly powered down, and its doors are open, to provide access to all equipment contained within.

**Chart 3-2 Power Up System**

**When you have completed this chart you will have:**

- Powered up the system.

Step	Action	Comments
<b>Power Up System</b>		
1.	Plug cabinet line cord(s) into the wall outlet. Turn on Bay Power Supply switches and Peripheral Shelf power switches (if present).	
2.	Reinsert diskettes into floppy drive(s), and press RESET on the Main Control card front panel.	
3.	Replace any covers or barriers that were removed previously. Close and lock the front and rear doors.	The system is now properly powered up, and its doors are closed and locked, to prevent unauthorized access to equipment contained within.

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**Chart 3-3 Install Digital Peripheral Bay**


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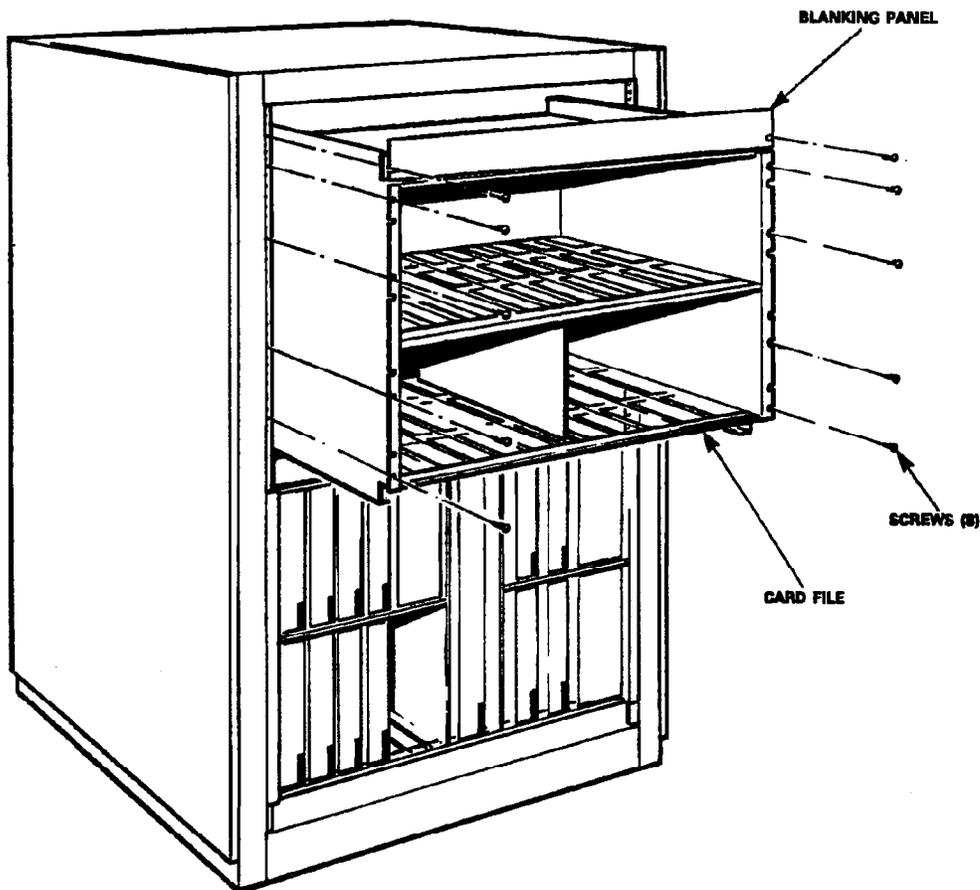
**When you have completed this chart:**

- The original shelf will be disconnected and removed.
- The equipment to be installed as digital peripheral bay will be inventoried, unpacked, and inspected.
- The original cards, Bay Control Card and the Bay Power Supply will be set aside.
- The shelf and backplane will be installed.
- Shelf grounds will be connected.
- PCM cables will be connected.

Step	Action	Comments
	<b>Power Down System</b>	Refer to Chart 3-1.
	<b>Remove Shelf</b>	
1.	Remove cards from shelf. <ul style="list-style-type: none"> <li>• Remove all cards from the shelf.</li> <li>• Identify each card with the location from which it was removed.</li> </ul>	Note that the bay power supply has a line cord (which must be unplugged) attached to it at the back of the shelf. Store each card nearby in an antistatic bag. The Floppy Disk Drive and the Bay Power Supply are secured to the shelf by locking screws at the front.
2.	Disconnect wiring from shelf backplane.	Identify and label all wires and cables removed from backplane.
3.	At the front of the cabinet, remove and retain screws holding the shelf, and slide the shelf out of the cabinet.	See Figure 3-1.
	<b>Unpack New Equipment, Inspect</b>	
4.	Unpack all cartons.	
5.	Tag defective items.	
6.	Fill in the relevant portion of damage report.	
7.	Repack tagged items and return according to local procedures.	
	<b>Install Shelf</b>	
8.	<i>If digital peripheral bay 3 is being added to an operating system, power it down.</i>	
9.	Open the front door of the control cabinet.	

**Chart 3-3 Install Digital Peripheral Bay  
(continued)**

Step	Action	Comments
10.	Slide the digital peripheral shelf onto top of existing shelf.	
11.	Fasten it to the front rails with eight 10-32 x 0.5 in screws.	Shown in Figure 3-1.
12.	Install the blanking panel above the shelf, and fasten it to the front rails with two 10-32 x 0.5 in. screws.	Shown in Figure 3-1.
13.	Replace original cards, Bay Power Supply, Floppy Drive in shelf.	Use antistatic wrist strap. Reconnect Disk Drive line cord at backplane.
14.	Close the front door.	



**Figure 3-1 Removal/Installation of Digital Peripheral Bay and Panel**

**Chart 3-3 Install Digital Peripheral Bay  
(continued)**

Step	Action	Comments
	<b>Connect Shelf Ground Wires</b>	
15.	Open the rear door.	
16.	Connect the original ground wires from the new shelf to the cabinet frame using a 10-32 x 0.5 in. screw and external tooth lock washer.	Details of ground connections are shown Practice 9109-096-200-NA, Installation Information.
	<b>Connect PCM Cables</b>	
17.	Connect original PCM cables to the backplane.	<b>CAUTION:</b> The connector plug must be positioned so the cable hangs downwards from it. If a connector plug is reversed, equipment function will be impaired.
18.	Connect original PCM ground leads to associated Fasten connectors.	Shown in Practice 9109-096-200-NA, Installation Information.
19.	Close rear door.	

**Chart 3-4 Install Control Cabinet**

**When you have completed this chart:**

- The original cabinet will be disconnected, emptied and removed.
- The new control cabinet will be in its assigned position.
- Power requirements will be checked.
- Shelf screws will be tightened.
- Bays will be numbered
- The cabinet will be powered up.

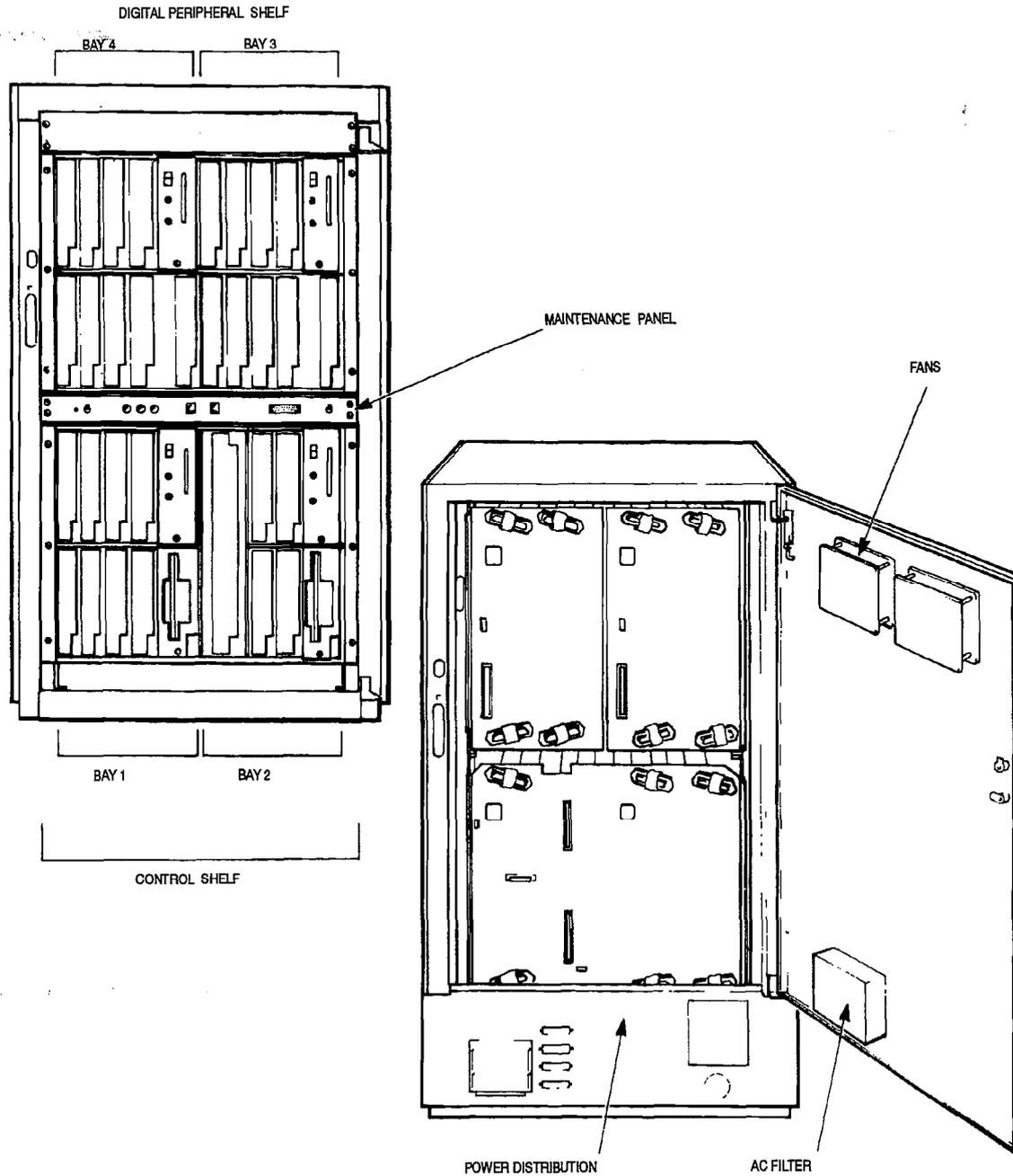
- Notes:**
1. When positioning the control cabinet, allow room for any PABX accessories, such as a UPS or AC surge suppressor, or peripherals such as a maintenance terminal.
  2. Arrange for the power requirements for these peripherals and accessories. These power requirements are described in the documentation provided with the items.

Step	Action	Comments
1.	Unpack and inspect new cabinet – check for damaged, or missing items. Position it near the cabinet to be replaced.	
2.	Power down system.	Refer to Chart 3-1.
3.	Move the existing cabinet aside (with the green ground cable still connected).	This will allow for cards and other components to be transferred directly from the old cabinet to the new cabinet.
<b>Position New Cabinet</b>		
4.	Put the new control cabinet in its assigned position.	<b>Equipment Location:</b> The cabinet has a fan assembly mounted in the rear door for cooling. Therefore, the bottom area of the cabinet must be unobstructed and not too close to a wall or other equipment so the air vents are clear. All cabinet installation conditions listed in Practice 9109-096-200-NA, Installation Information, must be met.
5.	Make sure there is adequate room for access.	The minimum floor space is 75 cm (30 in.) front and rear, 60 cm (24 in.) at one side, and 5 cm (2 in.) at the other side.
6.	Allow enough room for cables to enter the rear base of the cabinet.	
7.	Make sure the cabinet is within reach of the cross-connect block.	

**Chart 3-4 Install Control Cabinet  
(continued)**

Step	Action	Comments
8.	Make sure it is within reach of the AC receptacle.	The plug should be accessible enough so you can unplug the cabinet for maintenance. However, you shouldn't be able to unplug the cabinet accidentally.
9.	<p align="center"><b>Connect System Ground To New Cabinet</b></p> Connect the green ground wire to the ground stud in the new cabinet; then make a temporary connection between that ground stud, and the ground stud in the old cabinet.	
10.	<p align="center"><b>Transfer Wires and Cables</b></p> Identify and remove wires and cables from the old cabinet, and reconnect to same locations in the new cabinet.	If a peripheral shelf is present, transfer it when its cables have been disconnected (see applicable procedure). The upper PFT card must be removed after the shelf is removed. Similarly, it must be installed in the new cabinet before the shelf is installed.
11.	<p align="center"><b>Tighten Shelf Screws</b></p> Tighten all shelf retaining screws.	
12.	<p align="center"><b>Transfer Cards</b></p> While wearing an antistatic wrist strap, remove cards from the old cabinet, and install directly into the same locations in the new cabinet.	
13.	<p align="center"><b>Remove Old Cabinet</b></p> When all items have been transferred to the new cabinet, remove the temporary ground connection, and remove the old cabinet.	
14.	<b>Power Up System.</b>	Refer to Chart 3-2.

Chart 3-4 Install Control Cabinet  
(continued)



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Figure 3-2 Control Cabinet with Digital Peripheral Shelf (336-port Configuration)

Chart 3-4 Install Control Cabinet  
(continued)

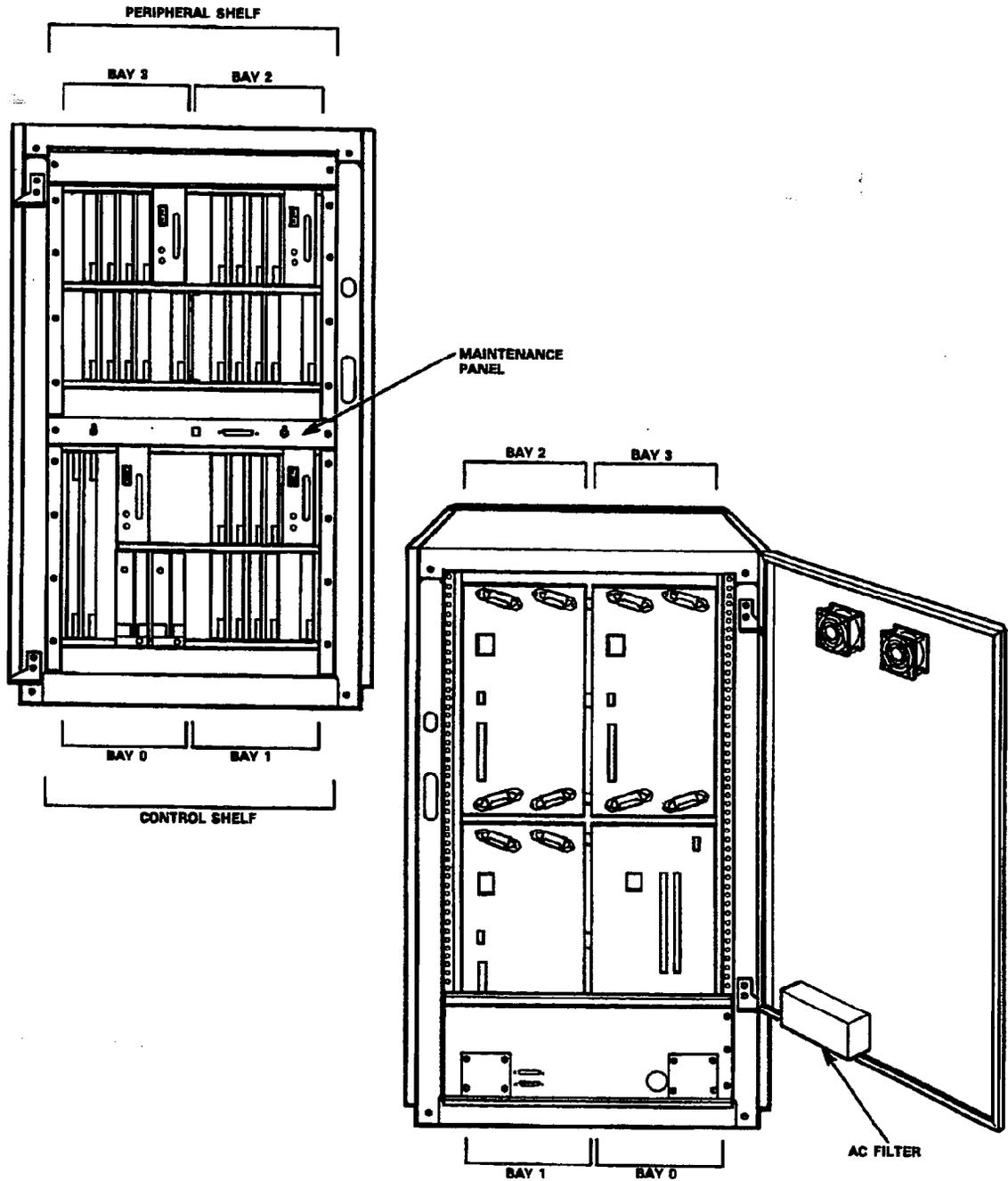


Figure 3-3 Control Cabinet with Digital Peripheral Shelf (672-Port Configuration)

Chart 3-5 Install Six-Circuit Power Fail Transfer Card

**When you have completed this chart:**

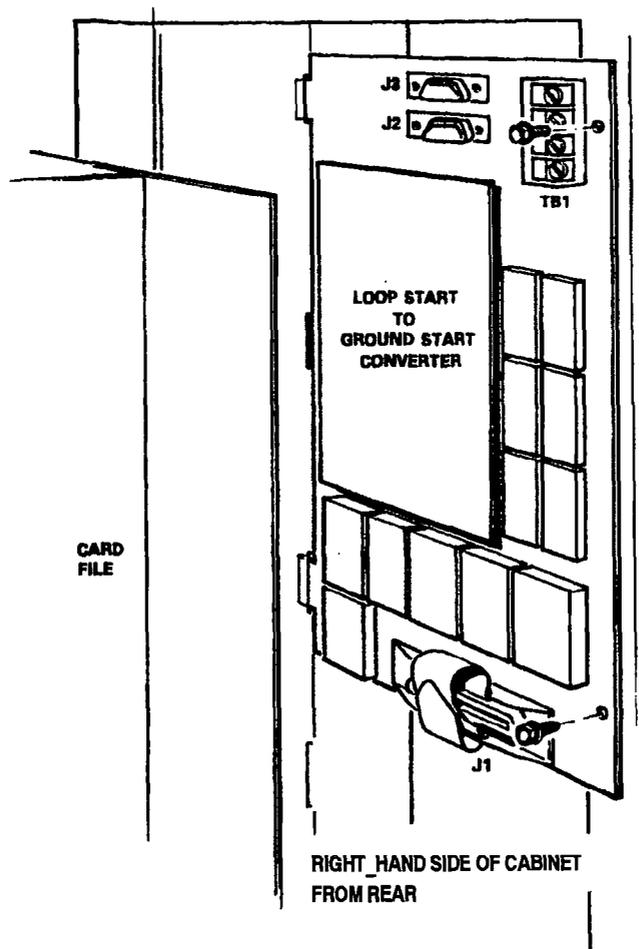
- The old PFT card(s) will be removed.
- The new PFT card(s) will be installed.
- An alarm will be connected (optional).

- Notes:**
1. The PFT card connects central office trunks to selected station lines when there is a power failure. Calls in progress are dropped. Calls made in PFT mode and in progress when the system returns to normal operation are not dropped and end normally when the call ends. Dial pulse trunks must connect to rotary dial telephones. DTMF trunks can connect to either DTMF or rotary dial telephones.
  2. In 336-port systems, the PFT relays are controlled from bay 2; in 672-port systems, they are controlled from bay 0.
  3. All systems are delivered with a six-circuit PFT card installed. Two more six-circuit PFT cards can be added in the control cabinet. In the 672-port system, PFTs in the peripheral cabinet can be connected to the optional PFT alarm.

Step	Action	Comments
1.	<b>Power Down System</b> <b>Disconnect PFT Wiring.</b>	See Chart 3-1.
2.	Identify and disconnect wires and cables from the PFT card to be replaced.	Identifying / labeling simplifies the reconnecting of cables to the replacement PFT card.
3.	<b>Remove PFT Card</b> Attach antistatic wrist strap, and remove the screws which hold the PFT card in place; remove the PFT card.	The top PFT card is held in place by 4 screws. To access 2 of them, it is necessary, (if an SAE socket set is used then this is not necessary) to go to the front of the cabinet and remove the screws which hold the shelf in place. Then slide the shelf out to expose the PFT screws  After replacing the PFT card, slide the shelf back in, and put the shelf mounting screws back in.
4.	<b>Remove LS/GS Module</b> If there is a Loop Start to Ground Start module on the PFT card, remove it, and retain it, to connect it to the replacement PFT card.	Place it in an antistatic bag until it required.

**Chart 3-5 Install Six-Circuit Power Fail Transfer Card  
(continued)**

Step	Action	Comments
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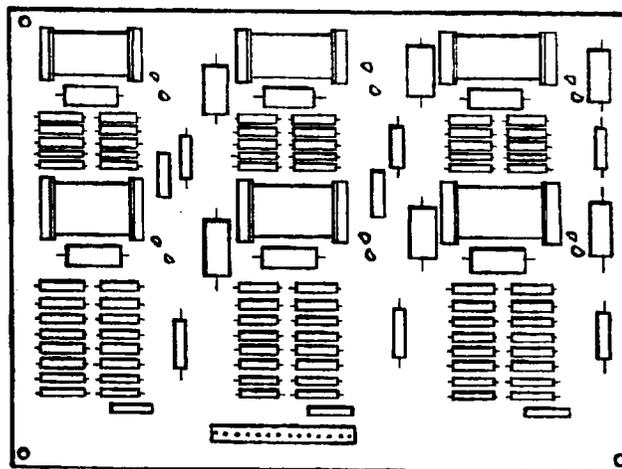
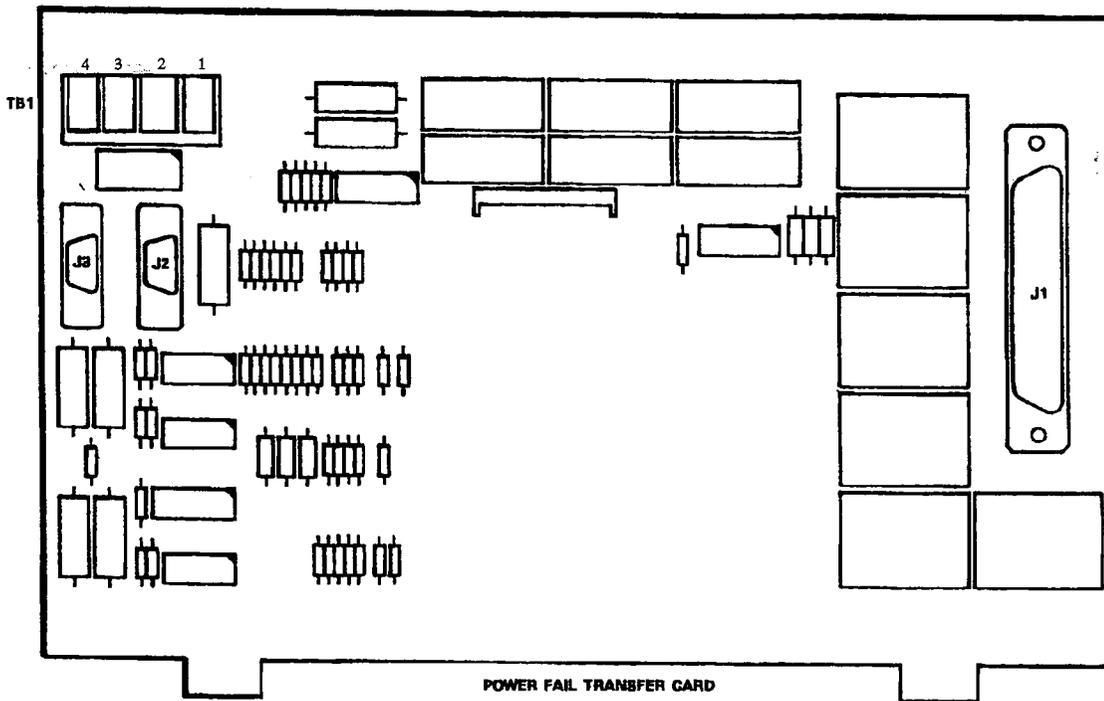


**Figure 3-4 Locating the PFT Card in a Control Cabinet**

	<p><b>Unpack, Inspect New PFT Card(s)</b></p> <p>5. Carefully unpack PFT card.</p> <p><b>Install LS to GS Conversion Module</b></p> <p>6. Position the LS to GS conversion module on the card, and attach it to the standoffs with the screws supplied.</p>	<p>A PFT card is shown in Figure 3-4.</p>
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**Chart 3-5 Install Six-Circuit Power Fail Transfer Card  
(continued)**

Step	Action	Comments
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OPTIONAL LS/GS CONVERSION MODULE FOR PFT CARD

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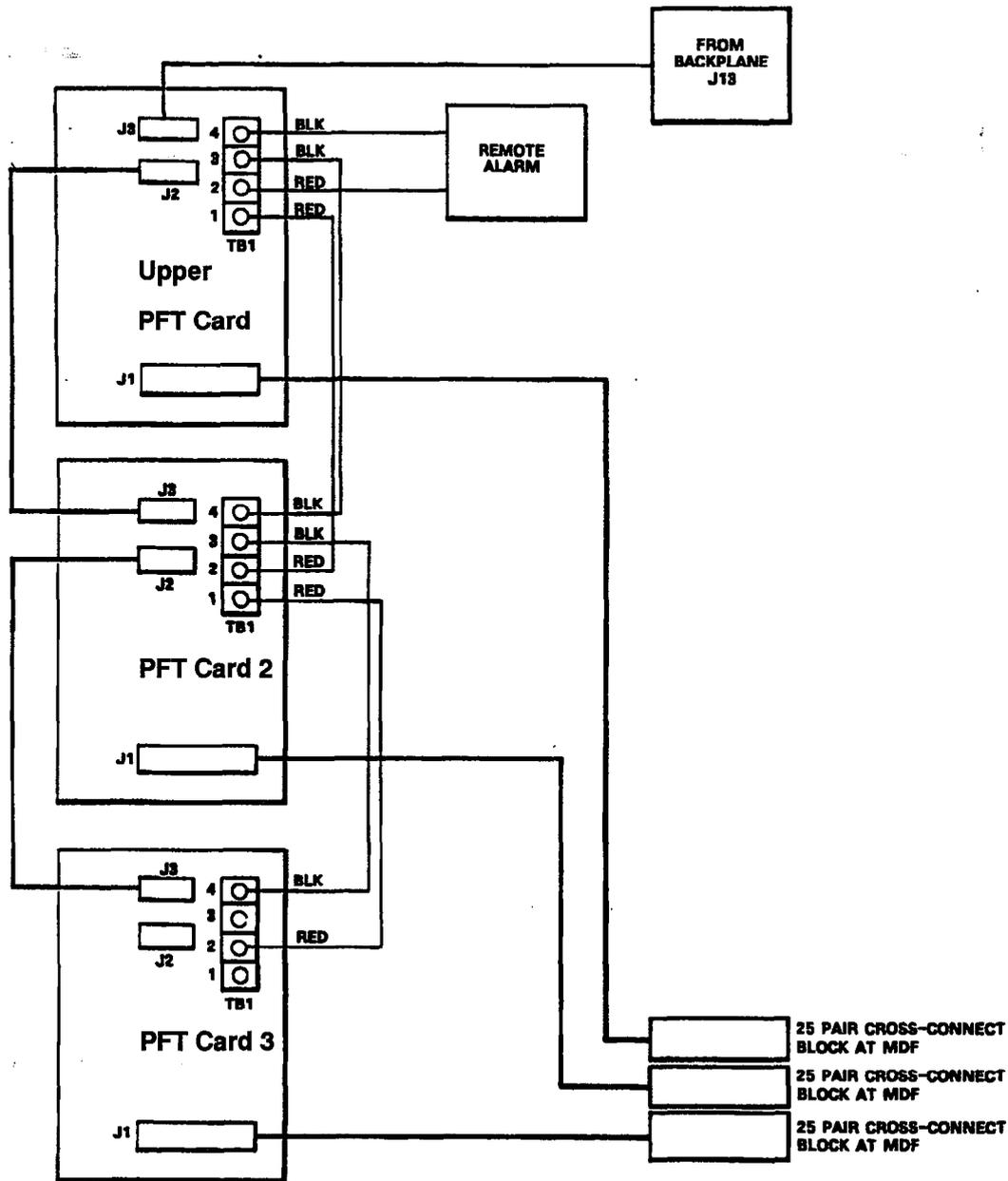
**Figure 3-5 Power Fail Transfer Card**

**Chart 3-5 Install Six-Circuit Power Fail Transfer Card  
(continued)**

Step	Action	Comments
7.	<p><b>Install Card</b></p> <p>Position the PFT card – line up with holes, and screw on with the two self-tapping screws.</p>	<p>Shown in Figure 3-4. The PFT card is already installed.</p>
8.	<p><b>Connect Cables to New PFT Card</b></p> <p>Reconnect cables to new PFT card – see Figure 3-5 or Figure 3-6.</p>	<p>Reference Practice 9109-096-200-NA, Installation Information, if required.</p>
9.	<p><b>Connect Optional Alarm</b></p> <p>Connect an optional remote alarm (customer-supplied) to TB1-2 and TB1-4 of the upper PFT card in the control cabinet.</p>	<p>The PFT card supplies a closed contact signal when in PFT mode.</p>
10.	<p>Connect the ALARM pair from TB1-1 and TB1-3 of the upper card to TB1-2 and TB1-4 respectively, of the second card.</p>	
11.	<p>Connect the ALARM pair from TB1-1 and TB1-3 of the second card to TB1-2 and TB1-4 respectively, of the third card.</p>	

**Chart 3-5 Install Six-Circuit Power Fail Transfer Card  
(continued)**

Step	Action	Comments
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**Figure 3-6 PFT Card Connections (336-port Configuration)**

Chart 3-5 Install Six-Circuit Power Fail Transfer Card  
(continued)

Step	Action	Comments
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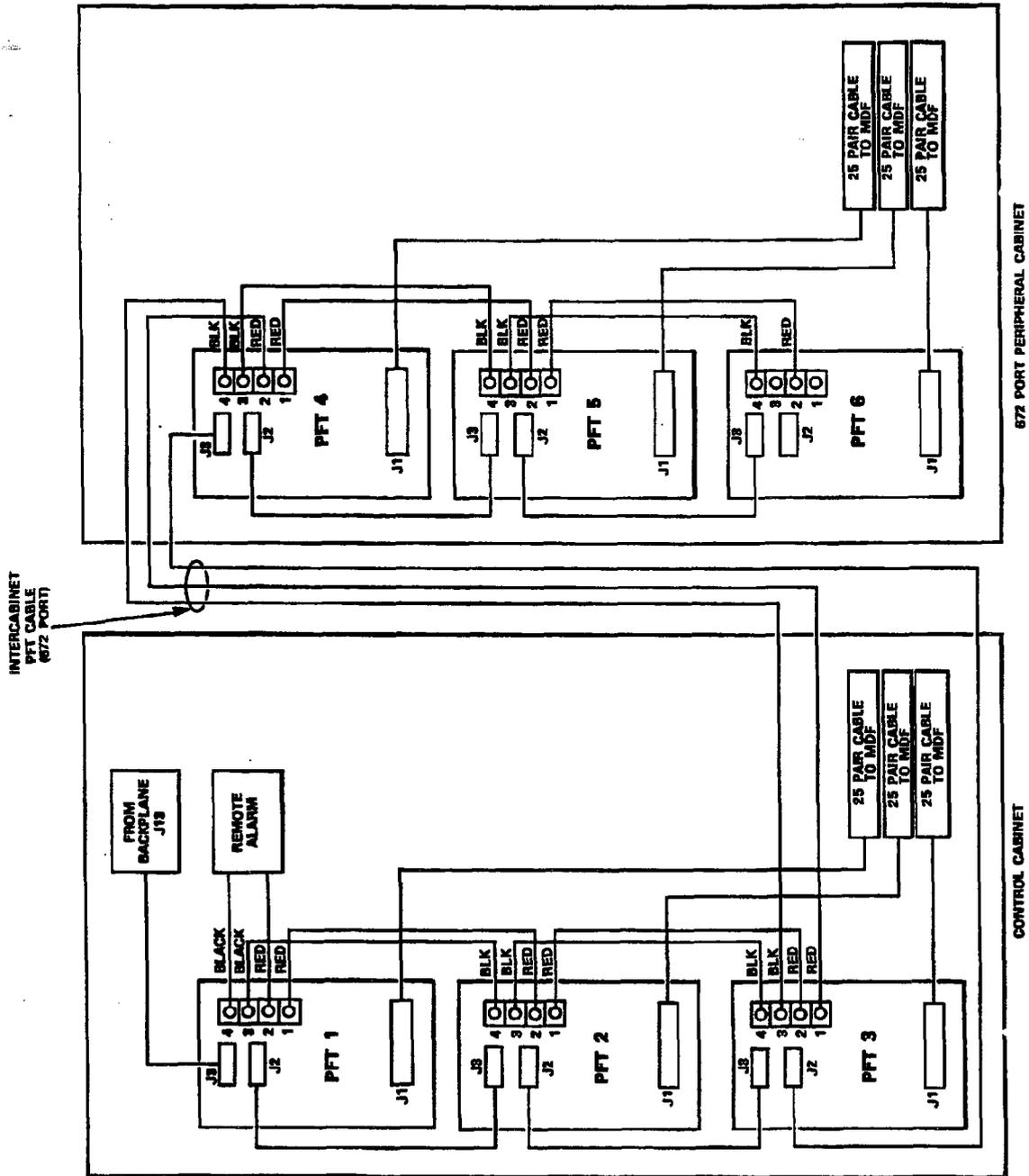


Figure 3-7 PFT Card Connections

**Chart 3-6 Remove / Install Analog Peripheral Bay**

**When you have completed this chart:**

- The original shelf will be disconnected and removed.
- The equipment to be installed as a new peripheral bay will be inventoried, unpacked, and inspected.
- The original cards will be set aside.
- The new shelf and backplane will be installed.
- Shelf grounds will be connected.
- Signal cables will be connected.

Step	Action	Comments
	<b>Power Down System</b>	Refer to Chart 3-1.
	<b>Remove Shelf</b>	
1.	Remove cards from shelf. <ul style="list-style-type: none"> <li>• Remove all cards from the shelf.</li> <li>• Identify each card with the location from which it was removed.</li> </ul>	Store each card nearby in an antistatic bag.  If there is a surge clamp connected to the backplane, remove it and retain.
2.	Disconnect wiring from shelf backplane.	Identify and label each all wires and cables removed from backplane. This will simplify the connection of cables to the new shelf.
3.	At the front of the cabinet, remove and retain screws holding the shelf, and slide the shelf out of the cabinet.	
	<b>Unpack New Equipment, Inspect</b>	
4.	Unpack all cartons.	
5.	Tag defective items.	
6.	Fill in the relevant portion of damage report.	
7.	Repack tagged items and return according to local procedures.	
	<b>Install New Shelf</b>	
8.	Place the replacement shelf on to the shelf guides, slide into place, and fasten with the eight screws removed previously.	

**Chart 3-6 Remove / Install Analog Peripheral Bay  
(continued)**

Step	Action	Comments
	<b>Connect Cables to New Shelf</b>	
9.	At rear of cabinet, connect ground, power and signal cables to the new shelf in the same way that the original shelf was connected.	
	<b>Install Cards</b>	
10.	Replace original cards into shelf in the same slots they were located in the old shelf.	Use antistatic wrist strap.  If there was a surge clamp connected to the old backplane, install it on to the new backplane. Its top pins connect to pins 9 and 10 of slot 16.
11.	Close the front door. Power up system.	Refer to Chart 3-2.

Page 2 of 2

**Chart 3-7 Remove / Install Printed Circuit Cards**

**When you have completed this chart:**

- You will know how to remove circuit cards from the PABX.
- You will know how to repack printed circuit cards for return.

**CAUTION**

Power must be off when you are removing the Main Control Card, Bay Control Card, Bay Power Supply, Control Resource Card, Floppy Disk Drive and Switch Matrix Card.

**CAUTION**

Cards that are not correctly packed in antistatic bags and foam packing when returned will not be covered by any warranty.

Step	Action	Comments
<p>1.</p> <p>2.</p> <p>3.</p> <p>4.</p>	<p><b>Removing Cards</b></p> <p><i>If you are removing cards from an operating system, turn power off, if possible.</i></p> <p><b>For Bay Power Supply, refer to Chart 3-10; for 5.25" Floppy Disk Drive, refer to Chart 3-14;</b></p> <p>Make sure the PABX ground is connected.</p> <p>Put on the antistatic wrist strap when removing and repacking cards.</p> <p>Remove the card by using the extractor as a lever and pulling the card towards you.</p>	<p><b>CAUTION:</b> The cards that must not be removed while the system power is on carry a Caution notice. These cards are: <b>Main Control Card, Bay Control Card, Bay Power Supply unit, Control Resource Card, Floppy Disk Drive, and Switch Matrix Card.</b></p> <p>The antistatic wrist strap must be connected to the PABX chassis, which must be connected to an approved ground to provide protection from static discharges.</p> <p>Each digital peripheral card has one card extractor. The extractor helps seat the card firmly in the backplane.</p> <p>The extractor is used to provide leverage to pull the card free of the backplane connector.</p>

**Chart 3-7 Remove / Install Printed Circuit Cards  
(continued)**

Step	Action	Comments
	<b>Install New Card</b>	
5.	Unpack the replacement card; if there are modules or jumpers on the original card, transfer them to the replacement card. Ensure that any switches on the replacement card are in the same position as the original card.	Retain the packaging material for the repacking of the original card for return.
6.	Install the replacement card into the card slot.	
	<b>Repacking Cards</b>	Packaging is shown in Figure 3-8.
7.	Handle printed circuit cards by their edges only, except when seating connectors.	Handling the card faces or components may cause damage.
8.	Do not touch the gold edge connectors.	
9.	Avoid contact with any exposed electrical connections.	
10.	Use the sleeve, foam packing, and antistatic bag kept after unpacking.	The original, or similar, packaging material should be used.
11.	Ground the antistatic bag before putting a card in it.	
12.	As soon as you remove a card from a slot, place it in an antistatic bag.	Suspected faulty cards should be placed in antistatic bags to prevent further possible damage.  <b>CAUTION:</b> Cards that are not correctly packed in antistatic bags and foam packing when returned will not be covered by any warranty.
13.	When you are finished, replace the antistatic wrist strap in the cabinet.	
14.	If you have powered down the system, power it up again.	
	<b>Return Card</b>	
15.	Return a damaged card according to local procedures.	

Chart 3-7 Remove / Install Printed Circuit Cards  
(continued)

Step	Action	Comments
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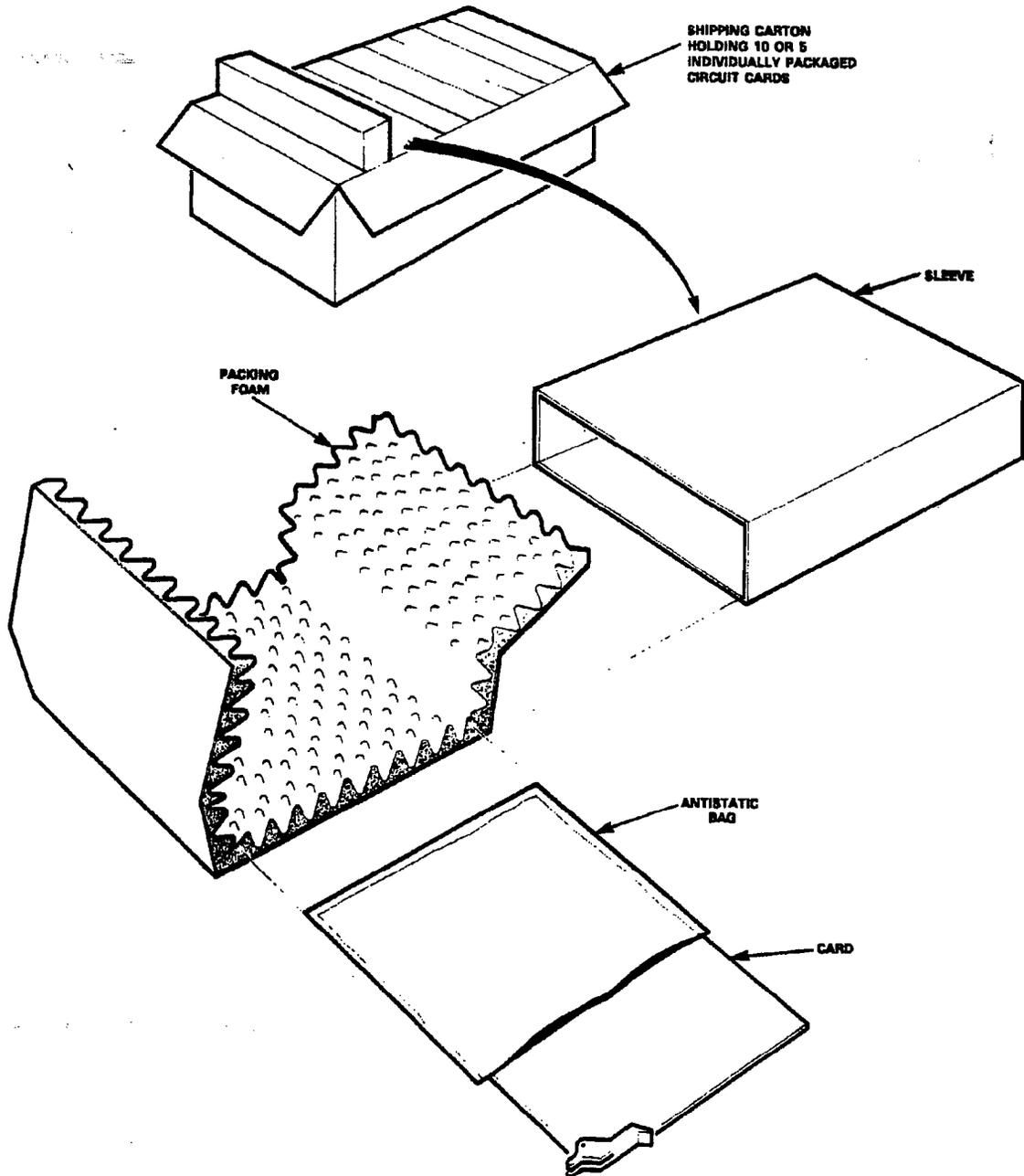


Figure 3-8 Printed Circuit Card Packaging

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**Chart 3-8 Remove a Module from the Main Control Card**


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**When you have completed this chart:**

- A module will be safely removed from the MCC.

**CAUTION**

Remove conductive articles such as rings and watches before handling the Main Control Card.

**CAUTION**

Do not use a screwdriver or any similar object to pry the modules away from the main control card. Damage to components or circuit card tracks may result.

Step	Action	Comments
	<b>Follow General Procedures</b>	
1.	Follow the general procedures for handling circuit cards.	Given in Chart 3-7.
2.	Pop the module from the standoffs by applying pressure with your thumb onto the short portion of the standoff projecting through the hole in the module, while pinching with one or two fingers on the opposite side of the module right near the standoff.	This "pinching action" avoids bending the circuit card any more than is necessary to release it from the standoff.
3.	Carefully separate the connectors by applying pressure at each end of connector.	
4.	Lift the module from the MCC. <b>DO NOT BEND OR FLEX</b> the module by pulling up on the corners.	

**Chart 3-9 Install Modules on Main Control Card**

**When you have completed this chart:**

- The memory module will be installed on the MCC.
- The DX module will be installed on the MCC (336-port configuration only).
- The Switch Matrix module will be installed on the MCC (SX-200 FD system only).
- The decryption module will be installed on the MCC.
- The T1 clock module will be installed on the MCC (optional).
- The MCC will be installed.

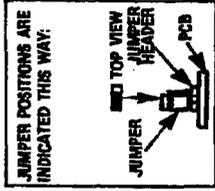
- Notes:**
1. **336-port Configuration:** The MCC is located in the control shelf in Bay 2. It is powered by the bay 2 power supply unit.
  2. **672-port Configuration:** The MCC is located in the control shelf in Bay 0.
  3. **SX-200 FD PABX:** The MCC is located in slot 1 of the Control Node.

**CAUTION**

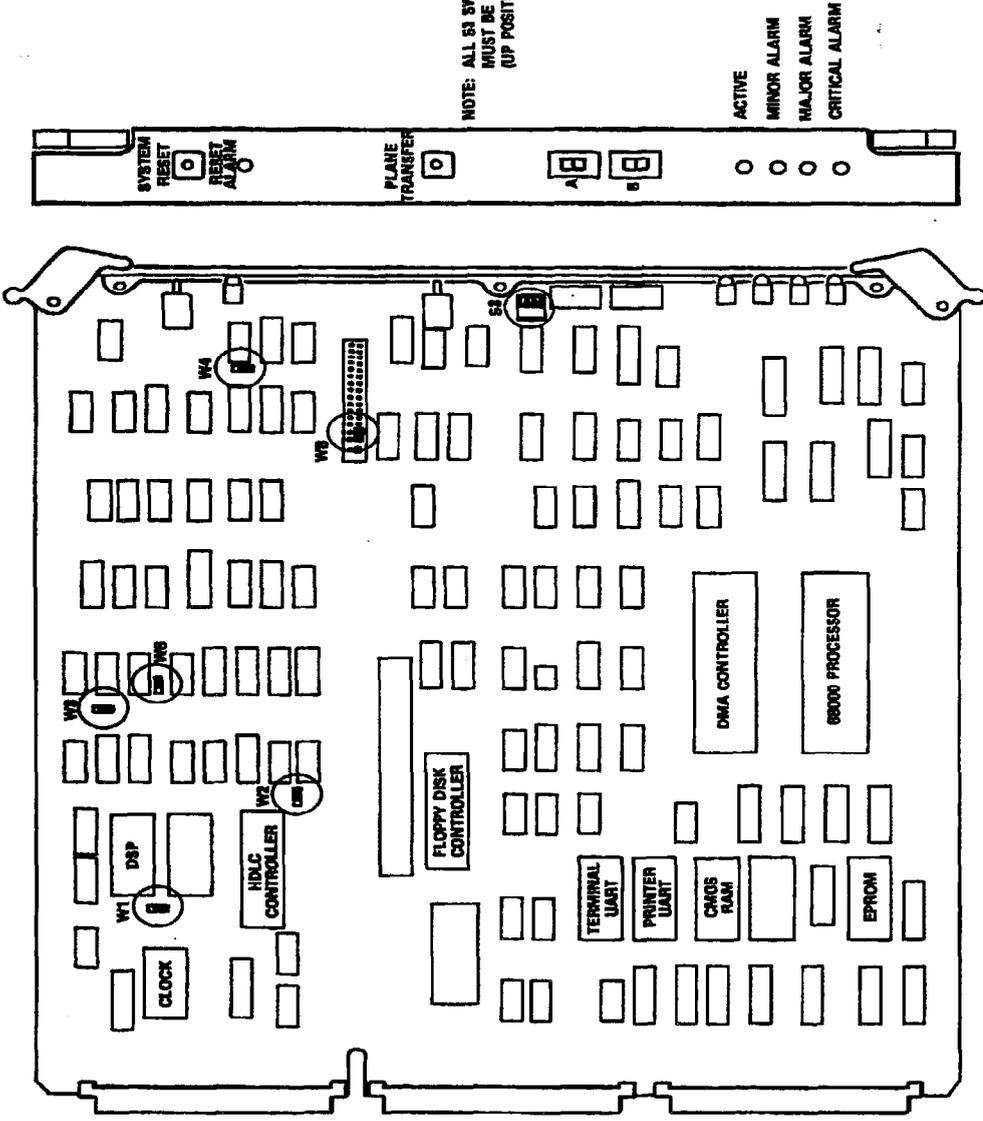
Remove conductive articles such as rings and watches before handling the main control card.

Step	Action	Comments
1.	Follow the general procedures for handling circuit cards.  <b>Inspect MCC</b>	Given in Chart 3-7.
2.	Attach the antistatic wrist strap.	
3.	Complete repair tag, repack, and return any damaged or incorrect items.	<b>CAUTION:</b> The card may bend as pressure is applied to seat the connectors.
4.	Put the MCC, component side up, onto the bag on top of the PABX or any nearby firm surface. Do not put it on a deformable surface.	
5.	Make sure that the jumpers (if applicable) are correctly positioned on the MCC and that the S3 switches are set to the OFF or OPEN position.	

Chart 3-9 Install Modules on Main Control Card  
(continued)

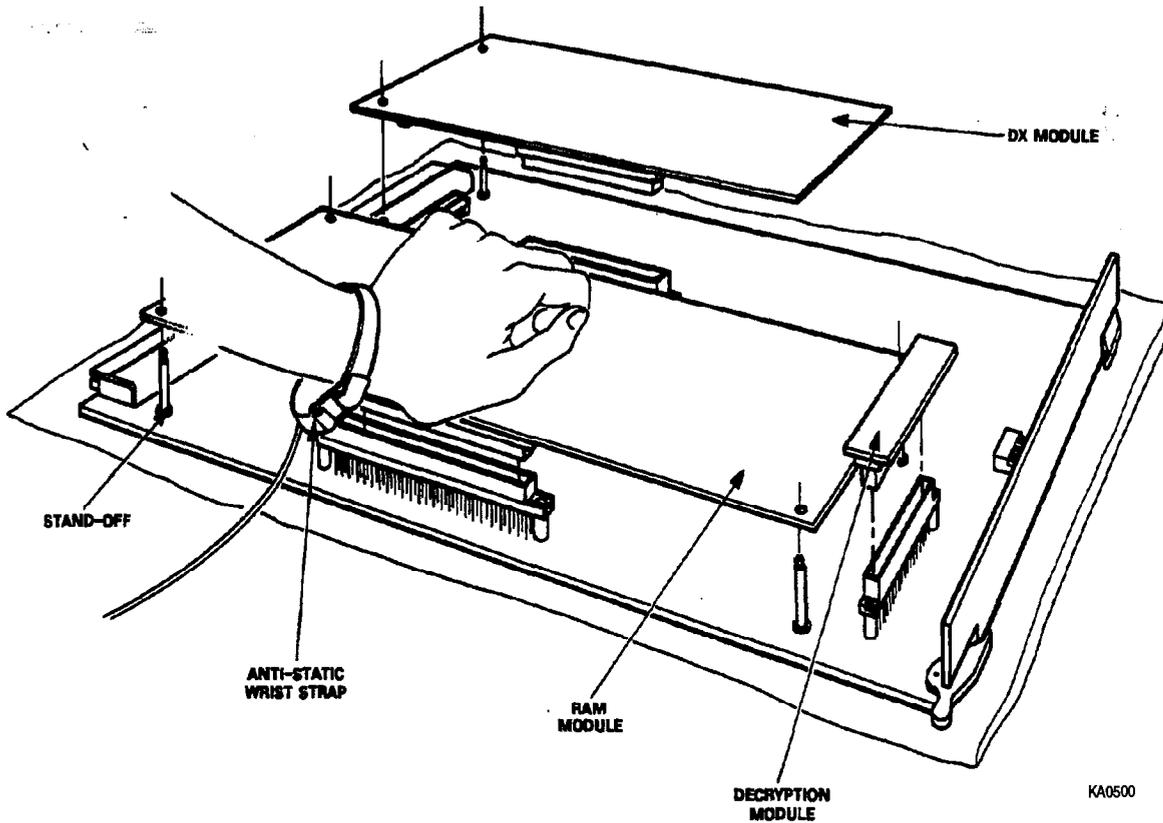


NOTE: ALL S1 SWITCHES MUST BE OFF OR OPEN (UP POSITION).



**Chart 3-9 Install Modules on Main Control Card  
(continued)**

6.	<p><b>Inspect Standoffs</b></p> <p>Inspect the plastic standoffs on the MCC (where required to mate with the modules).</p>	Shown in Figure 3-10.
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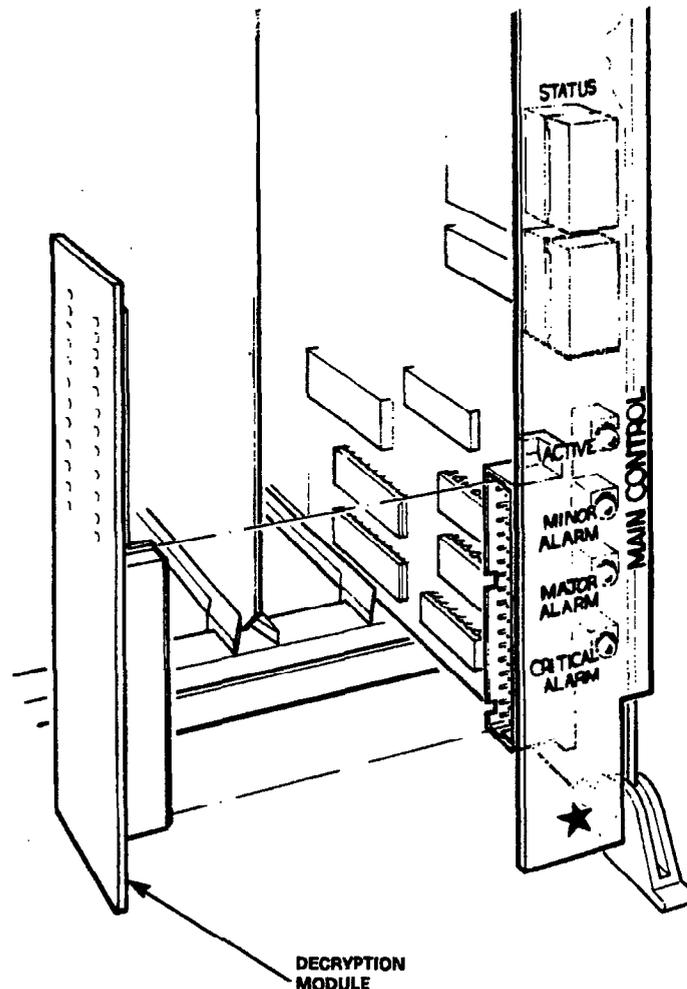


**Figure 3-10 Installation of Modules**

<p>7.</p> <p>8.</p> <p>9.</p> <p>10.</p> <p>11.</p> <p>12.</p> <p>13.</p> <p>14.</p>	<p><b>Install Memory Module</b></p> <p>Position it on the MCC.</p> <p>Press its connector into place with the palm of your hand.</p> <p>Press the standoffs into place.</p> <p>Reseat the connector.</p> <p><b>Install DX Module</b></p> <p>Unpack the DX module.</p> <p>Position it on the MCC.</p> <p>Press its connector into place with the palm of your hand.</p> <p>Press the standoffs into place.</p>	Does not apply to <i>SX-200</i> FD systems.
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**Chart 3-9 Install Modules on Main Control Card  
(continued)**

<b>Install Decryption Module</b>		
<b>15.</b>	Unpack the decryption module.	It is packaged with the system software diskette. Each software release has a unique decryption module.
<b>16.</b>	Position it on the MCC.	Shown in Figure 3-11.
<b>17.</b>	Press its connector into place with the palm of your hand.	There are no standoffs for it.



**Figure 3-11 Main Control Card and Decryption Module**

<b>Install Switch Matrix Module.</b>		Applies only to the SX-200 FD systems.
<b>18.</b>	Unpack the Switch Matrix module.	Shown in Figure 3-10
<b>19.</b>	Position the Switch Matrix module over the J1 and J2 connectors on the MCC.	

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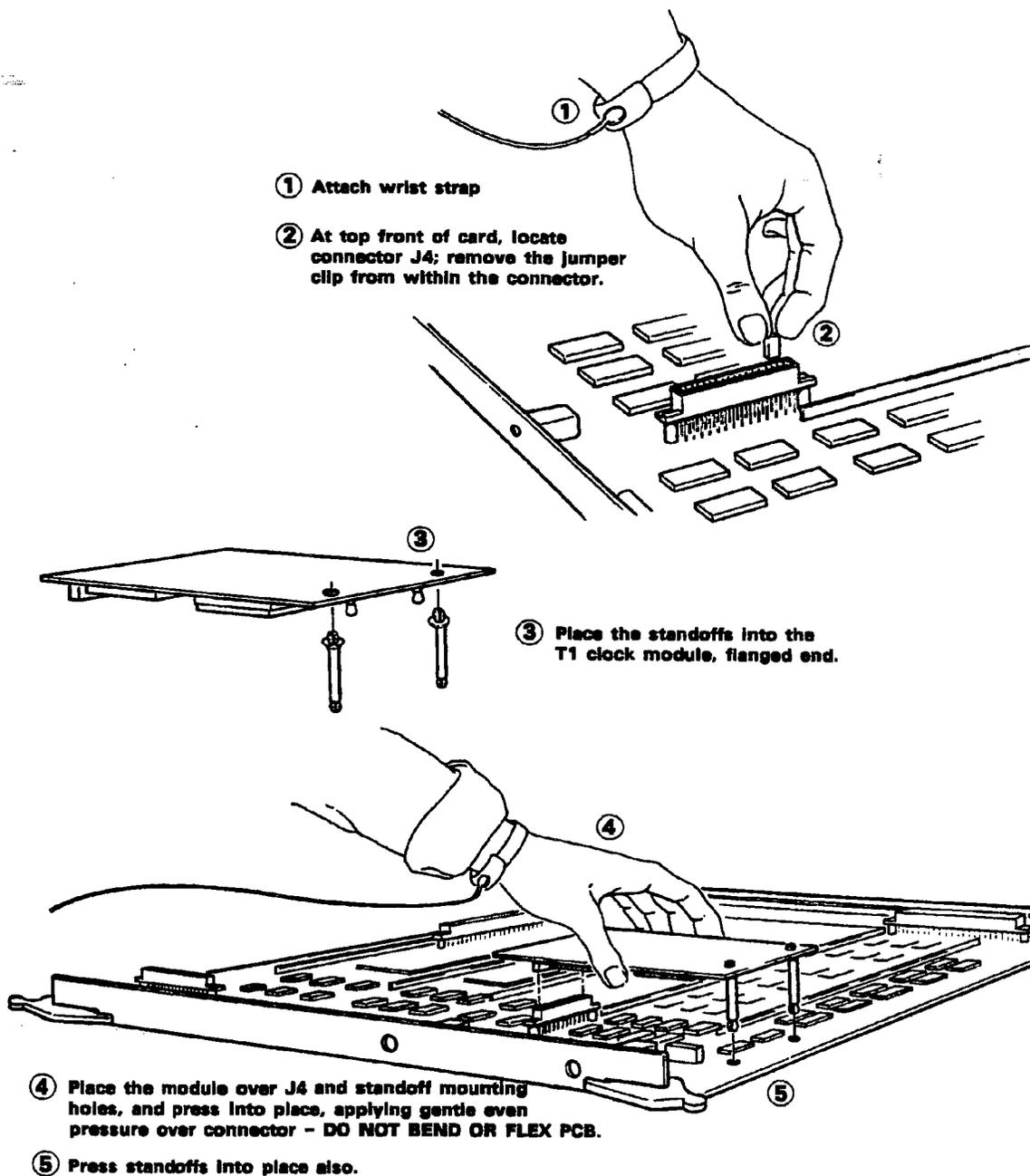
**Chart 3-9 Install Modules on Main Control Card  
(continued)**

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20.	Press the connector into place with the palm of your hand.	
21.	Press the standoffs into place.	
	<b>Install T1 Clock Module</b>	
22.	At the top front of the card, locate connector J4.	Shown in Figure 3-12.
23.	Remove the jumper clip from within the connector.	
24.	Position the module over J4 and the standoff mounting holes.	
25.	Press into place with the palm of your hand.	
26.	Press standoffs into place.	
	<b>Install MCC</b>	
27.	Slide the MCC into its slot.	The MCC and its card slot are each marked with a star.

**Chart 3-9 Install Modules on Main Control Card  
(continued)**

**28.** Reseat the connectors.



**Figure 3-12 Installation of a T1 Clock Module onto an MCC**

**Chart 3-10 Remove/Install Control Resource Card in the SX-200 FD Control Node**

**When you have completed this chart:**

- The original Control Resource Card (CRC) will be disconnected, and removed.
- The new CRC will be unpacked and inspected.
- The CRC will be installed in the SX-200 FD PABX Control Node.

**Note:** The Control Resource Card (CRC) is installed only in the SX-200 FD PABX.

Step	Action	Comments
	<p><b>Follow General Procedures</b></p>	
1.	Follow the general procedures for handling circuit cards.	Given in Chart 3-7.
	<p><b>Remove Original CRC</b></p>	
2.	Remove original CRC from slot 2 of the Control Node.	Attach the antistatic wrist strap.
	<p><b>Unpack and Inspect New CRC</b></p>	
3.	Wearing the antistatic wrist strap, unpack and inspect the CRC for damage.	Retain packaging for shipment of original unit.
4.	Complete repair tag, repack, and return any damaged or incorrect items.	
	<p><b>Install New CRC</b></p>	
5.	Slide the CRC into slot 2 of the Control Node	<b>CAUTION:</b> The card may flex as pressure is applied to seat the connectors.

---

**Chart 3-11 Remove/Install Bay Control Card**


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**When you have completed this chart:**

- The original Bay Control Card (BCC) will be disconnected, and removed.
- The new Bay Control Card will be unpacked and inspected.
- The Bay Control Card will be installed in each peripheral bay.
- In the *SX-200* FD PABX, the Fiber Interface Module will be installed on the Peripheral FIM Carrier card which will be installed on the Bay Control Card.

- Notes:**
1. **336-port Configuration:** Install one BCC in digital peripheral Bay 3, and one BCC in the digital peripheral Bay 4.
  2. **672-port Configuration:** Install one BCC in digital peripheral Bays 1 through 7.
  3. ***SX-200* FD PABX:** Install one BCC in each digital peripheral Bay (1 through 7).

Step	Action	Comments
	<b>Follow General Procedures</b>	
1.	Follow the general procedures for handling circuit cards.	Given in Chart 3-7.
	<b>Remove Original BCC</b>	
2.	Attach the antistatic wrist strap, and remove original BCC from the digital peripheral Bays.	The BCC and its slots are marked with a semicircle.
	<b>Unpack and Inspect New BCC</b>	
3.	Wearing the antistatic wrist strap, unpack and inspect the BCC for damage.	Retain packaging for shipment of original unit.
4.	Complete repair tag, repack, and return any damaged or incorrect items.	
5.	If this is a 336-port or a 672 port configuration, go to step 7; if this is a <i>SX-200</i> FD, go to step 6.	

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**Chart 3-11 Remove/Install Bay Control Card  
(continued)**

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<b>Step</b>	<b>Action</b>	<b>Comments</b>
	<b>Install New BCC in Digital Bays</b>	
6.	Install the Peripheral FIM Carrier and Fiber Interface Module on the BCC, as described in Chart 3-18.	To remove the FIM Carrier and FIM module, go to Chart 3-19.
7.	Slide the BCC into its slot in each digital peripheral bay.	The BCC and its slots are marked with a semicircle.

---

**Chart 3-12 Remove/Install SX-200 FD Power Supply Unit**


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**When you have completed this chart:**

- The SX-200 FD Power Supply Unit will be installed.

**Note:** Only personnel who have successfully completed a MITEL Installation and Maintenance training course for the SX-200 FD PABX should perform this procedure.

Step	Action	Comments
	<b>Power down the Node</b>	
1.	Power down the node as described in Chart 3-1, Power Down System.	
	<b>Open Control Node Cabinet</b>	
2.	Open the Control Cabinet as described in Chart 3-16, Open and Close the Control Cabinet.	
	<b>Disconnect AC Power Input Line Cord</b>	
3.	Disconnect the AC power cord from the input receptacle on the PSU, located on the Control Node backplate. See Figure 3-13	Where adapter cables are present, disconnect the adapter cable at both ends and mark them for later identification. Adapter cables may have to be changed with the replacement PSU.
4.	Remove the white cover from the PSU.	
	<b>Disconnect Power Distribution Cables</b>	
5.	Ensure that the AC power switch on the backplate is in the OFF position and that all cables are clear.	See Figure 3-13
6.	Unplug DC power distribution cables from the back of the PSU to the Control Interconnect Card(CIC), the FIM Carrier, the floppy disk drive.	
	<b>Remove PSU</b>	
7.	Unscrew the 4 remaining screws and remove the PSU from the top rear of the node.	
8.	Remove pushbutton power switch from the backplate by removing the 2 screws holding it in place, and the ground connection from the power switch cable to the cabinet frame.	

**Chart 3-12 Remove/Install SX-200 FD Power Supply Unit  
(continued)**

Step	Action	Comments
	<b>Unpack PSU Kit</b>	
9.	Check contents against packing list and inspect for loose damaged or missing items.	
	<b>Position and fasten PSU in Node</b>	
10.	Place the PSU on the upper shelf of the node, with the rear of the PSU placed in the opening on the rear panel of the node. Make sure to align the mounting slots of the PSU with the 4 screw slots of the backplane.	
11.	Fasten the PSU to the backplate with the 4 screws and washers.	See Figure 3-13
	<b>Connect Power Distribution Cables</b>	
12.	Mount the pushbutton power switch from the PSU in the backplate power switch cutout next to the PSU opening. Attach the ground connector to a screw in the node frame near the PSU.	
13.	Connect the appropriate power distribution cable to the Control Interconnect Card (CIC), the FIM Carrier, the floppy disk drive.	See Table 3-1 for PSU connector information.
14.	Replace the white PSU cover.	
	<b>Power up the Node</b>	
15.	Power up the node as described in Chart 3-2, Power Up System.	
	<b>Close Control Node Cabinet</b>	
16.	Close Control Node cabinet as described in Chart 3-16.	

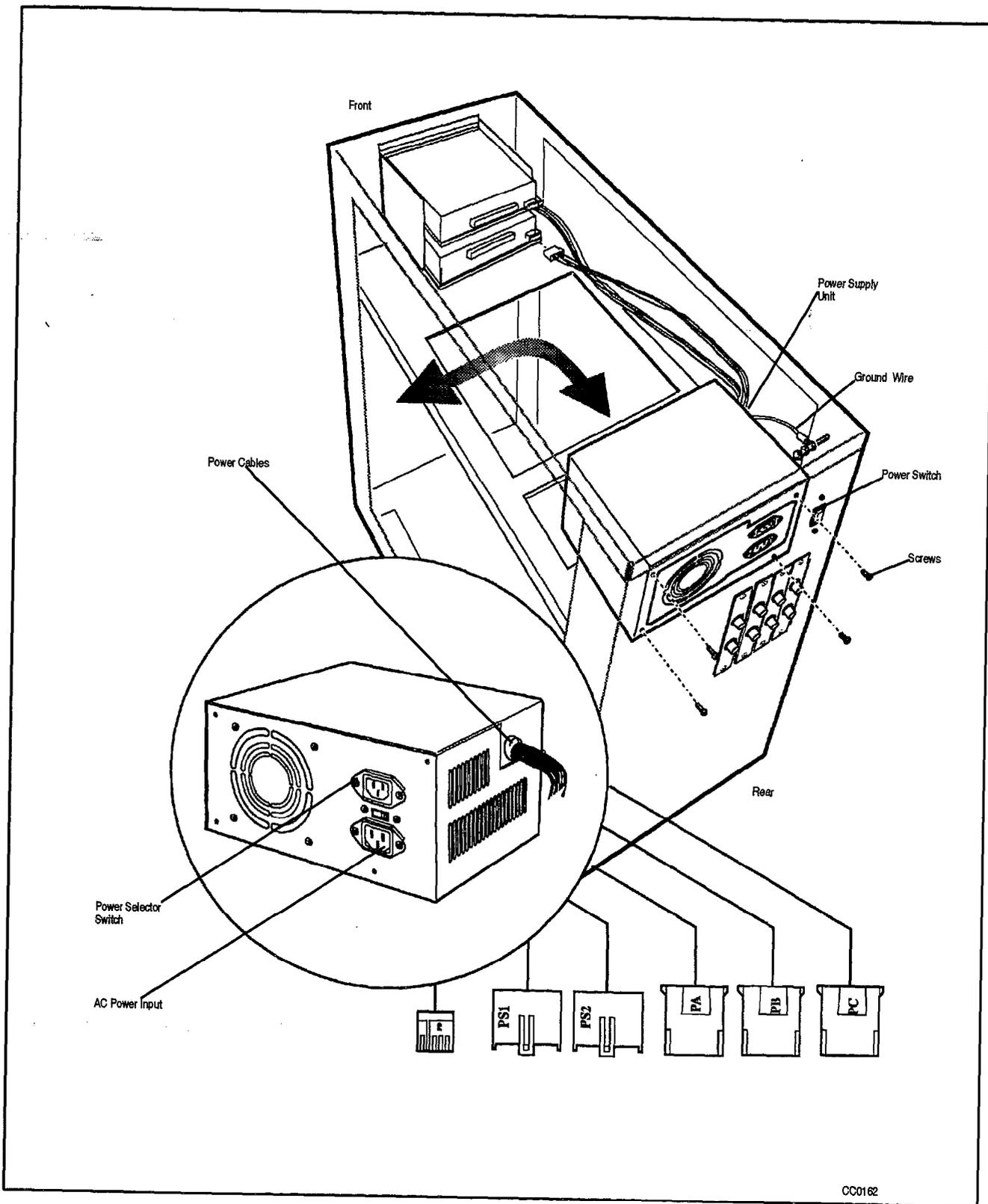


Figure 3-13 Power Supply Unit

**Table 3-1 PSU Connectors and Cable Adapters (SX-200 FD System)**

<b>SX-200 FD System Connector</b>	<b>PSU Type 1</b>		<b>PSU Type 2</b>	
	<b>PSU Connector</b>	<b>Adapter Cable</b>	<b>PSU Connector</b>	<b>Adapter Cable</b>
J6 Control Interconnect Card	PS1	—	P2	—
J7 Control Interconnect Card	PS2	—	P1	—
J2 Top Floppy Disk Drive	PD	—	P5	—
J2 Bottom Floppy Disk Drive	PA	136060	P6	—
J7 Top FIM Carrier	PC	—	P3	—

---

**Chart 3-13 Remove/ Install Bay Power Supply**


---

**When you have completed this chart:**

- The original Bay Power Supply (BPS) will be disconnected, and removed.
- The new bay BPS will be unpacked and inspected.
- In the 336-port configuration, the BPS will be installed in the Control Bay (BAY 0) and in digital peripherals Bays 1 through 7.
- In the SX-200 FD PABX, the BPS will be installed in each peripheral cabinet
- The power cable will be plugged into the unit.

- Notes:**
1. The BPS is an AC-to-DC convertor. The BPS faceplate is labeled "BAY PSU". It has a ringing voltage generator used by the card slots it supports. There should be one BPS for each digital peripheral bay.
  2. In the 336-port configuration, a BPS is not needed in BAY 1 when a Floppy Disk Drive is installed in Bay 1. The Floppy Disk Drive in Bay 1 is powered by the BPS in Bay 2.
  3. In the SX-200 FD PABX, a BPS must be installed in each Peripheral Cabinet. A BPS is not required in the Control Node.

Step	Action	Comments
<b>Follow General Procedures</b>		
1.	Follow the general procedures for handling circuit cards.	Given in Chart 3-7.
<b>Remove Original BPS</b>		
2.	Turn off the unit.	If the unit is in Bay 2 of a 336 port, 456 port, or 480 port system, or in Bay 0 of a 672 port system, perform the PDS procedures (see Chart 3-1).
<b>Unpack and Inspect New BPS</b>		
3.	Wearing the antistatic wrist strap, unpack and inspect the BPS.	Retain packaging for shipment of original unit.
4.	Complete repair tag, repack, and return the original unit.	

**Chart 3-13 Remove/ Install Bay Power Supply**  
(continued)

Step	Action	Comments
<b>Install New BPS</b>		
5.	Insert the BPS into its slot, and tighten the thumbscrew at the upper front of the BPS to secure it to the cardfile.	The BPS and its slot are each marked with a right triangle. The slot is located in the upper left corner of each bay. See Figure 3-14
6.	Make sure that the BPS I/O (on/off) switch is in the O (off) position.	<b>336-port Configuration:</b> The first BPS must be installed in Bay 2. If any cards are to be installed in any other digital bay, a BPS must also be installed in that bay.
7.	If this is an <i>SX-200</i> FD system, go to step 12.	<b>672-port Configuration:</b> The first BPS must be installed in Bay 0. If cards are to be installed in any other digital bay, a BPS must also be installed in that Bay.  <b>SX-200 FD PABX:</b> A BPS must be installed in each peripheral bay.
<b>Route Power Cable—upper digital bays</b>		
8.	At the rear of the cabinet, cut off the cable ties securing the power cables to the bottom of the cabinet.	The power supply cables to the upper digital bays are long cables that are coiled in the bottom of the cabinet.
9.	Route the power cable from AC distribution along the inside of the cardfile side plates.	
10.	Tie the power cable and the braided ground cable to the cardfile.	
<b>Connect Power—upper and lower bays</b>		
11.	Connect the plug to the BPS.	
<b>Connect Power Cable</b>		
12.	Remove the cover plate on the node backplane from the internal AC power cord access cutout .	To remove the cover plate unscrew the two screws and place them nearby.
13.	Plug the internal AC power cord into the back of the Bay Power Supply, directly under the access cutout.	
14.	Replace the access cover plate back over the cutout and secure with the two screws removed in step 12.	If PDS was performed, perform a PUS — see Chart 3-2.

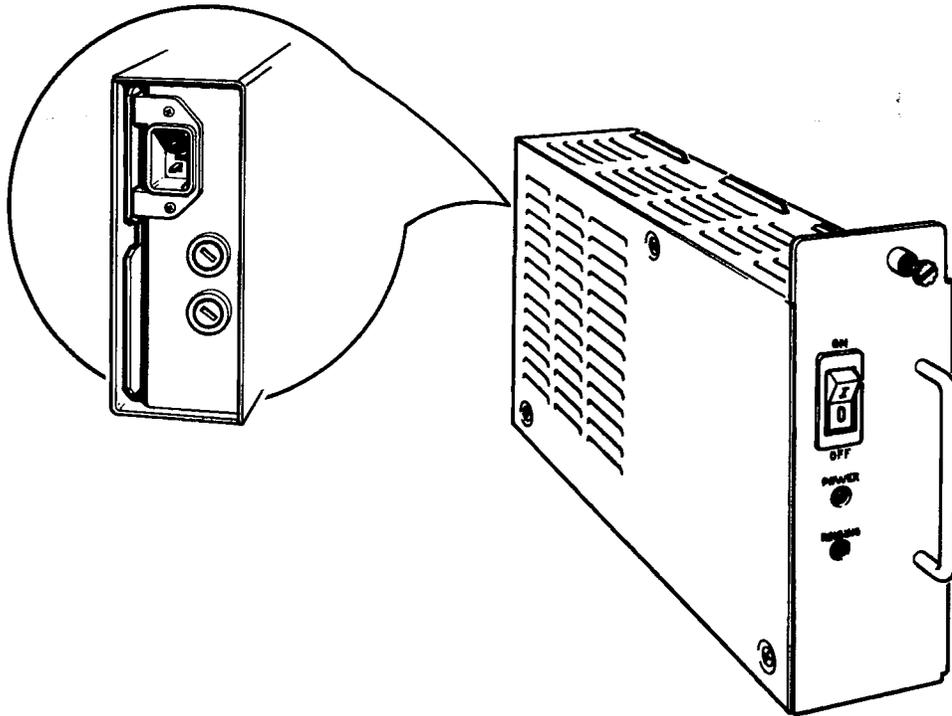
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**Chart 3-13 Remove/ Install Bay Power Supply**  
(continued)

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Step	Action	Comments
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**Figure 3-14 Bay Power Supply**

**Chart 3-14 Remove / Install 5.25" Floppy Disk Drive**

**When you have completed this chart:**

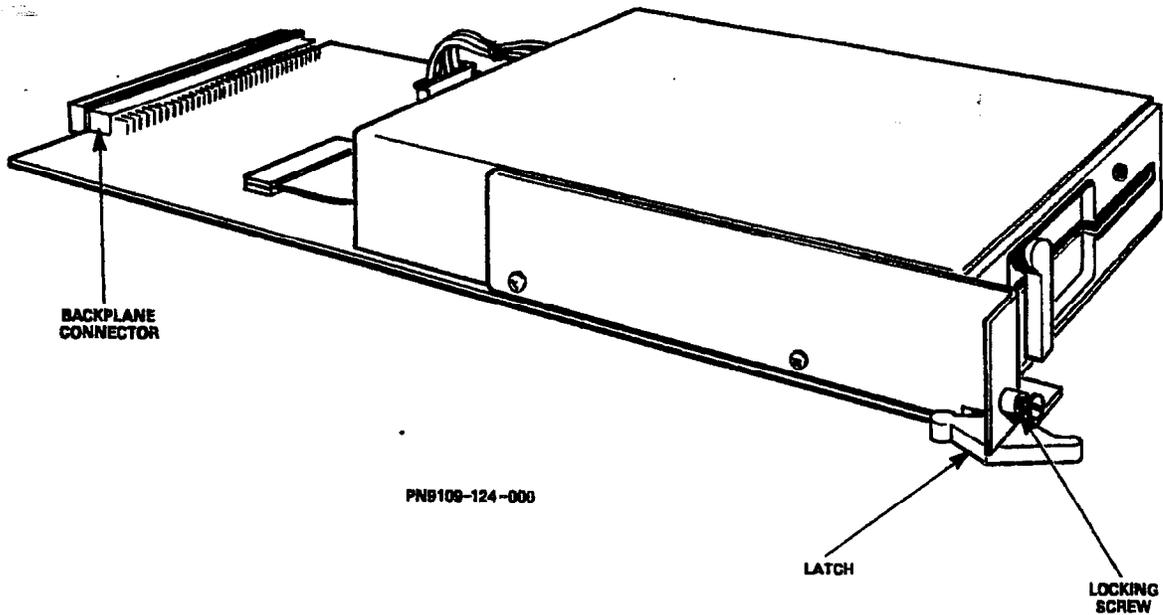
- The original 5.25" Floppy Disk Drive (FDD) will be disconnected and removed.
- The new 5.25" Floppy Disk Drive will be unpacked and inspected.
- The new 5.25" Floppy Disk Drive will be installed.

**Note:** Remove or install diskette from drive while power is ON and drive indicator is OFF.

Step	Action	Comments
<b>Follow General Procedures</b>		
1.	Follow the general procedures for handling circuit cards.	Given in Chart 3-7
<b>Remove Original 5.25" Floppy Disk Drive</b>		
2.	Power down system.	See Chart 3-1.
3.	If working on an SX-200 welded cabinet, open the rear door, and disconnect the adapter from the rear of the FDD.	See Figure 3-16.
4.	Unfasten locking screw. Unlock latch and withdraw disk drive through front of card slot.	Note: drive PN 9109-024-000 has no lock latch.
<b>Unpack and Inspect New Unit</b>		
5.	While wearing antistatic wrist strap, unpack and inspect FDD.	Shown in Figure 3-15.  Retain packing material for shipment of original FDD.

**Chart 3-14 Remove / Install 5.25" Floppy Disk Drive  
(continued)**

Step	Action	Comments
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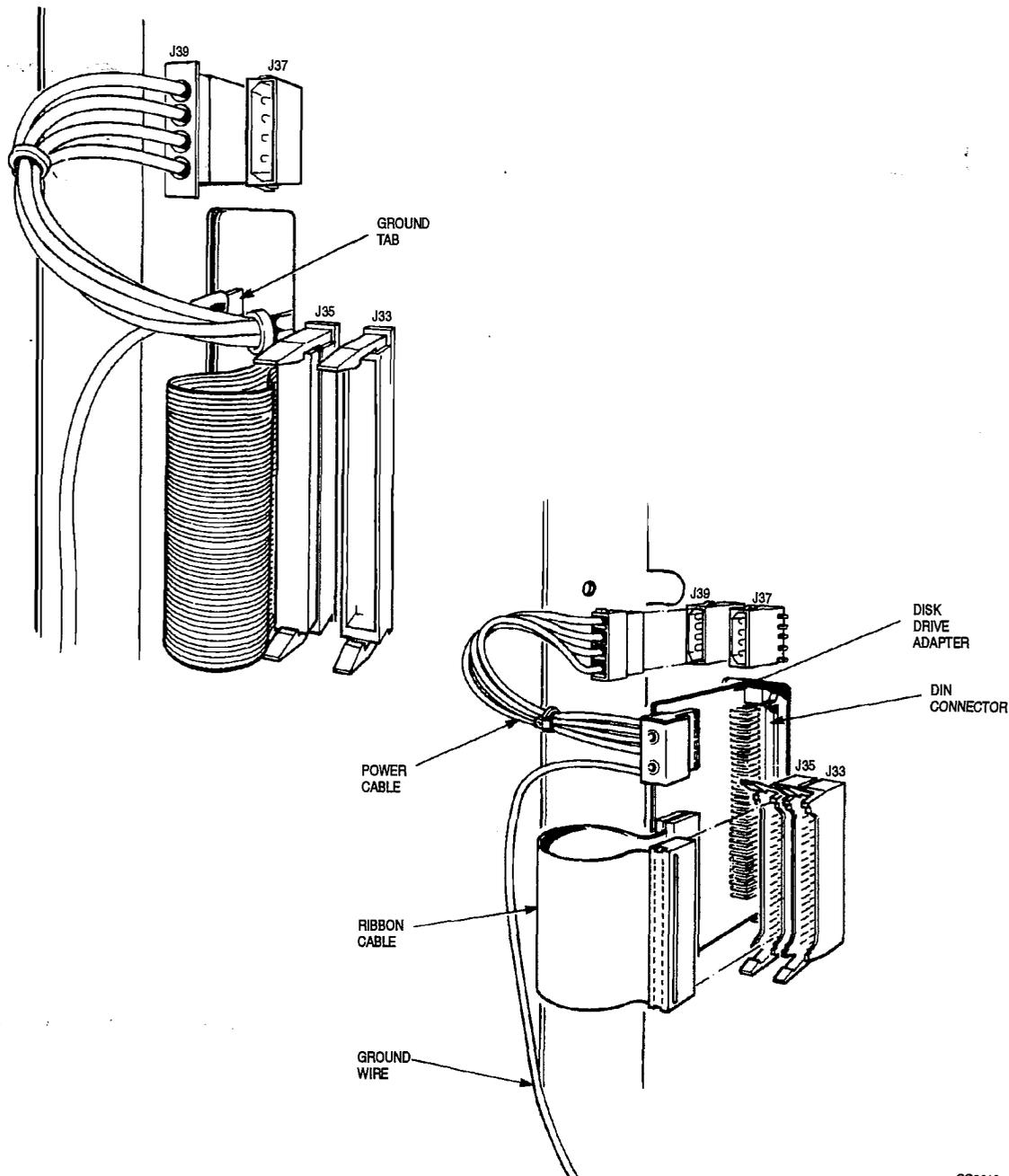


**Figure 3-15 Floppy Disk Drive**

	<p><b>Install 5.25" Floppy Disk Drive</b></p> <p>6. Install FDD into its slot.</p> <p>7. Secure it with its extractor and locking screw.</p> <p>8. Power up system.</p>	<p>The unit plugs directly into the backplane.</p> <p>If working on an SX-200 FD welded cabinet, reconnect the adapter at the rear of the FDD. See Figure 3-16.</p> <p>See Chart 3-2.</p>
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**Chart 3-14 Remove / Install 5.25" Floppy Disk Drive  
(continued)**

Step	Action	Comments
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CG0013

**Figure 3-16 Adapter Connections (SX-200 Welded Cabinet)**

Chart 3-15 Remove / Install 3.5" Floppy Disk Drive

**When you have completed this chart:**

- The original 3.5" Floppy Disk Drive (FDD) will be disconnected and removed.
- The new 3.5" Floppy Disk Drive will be unpacked and inspected.
- The new 3.5" Floppy Disk Drive will be installed.

**Notes:** 1. The SX-200 FD has two 3.5" Floppy Disk Drives already installed in the Control Node.

2. Remove or install diskette from drive while power is ON and drive indicator is OFF.

Step	Action	Comments
	<b>Follow General Procedures</b>	
1.	Follow the general procedures for handling circuit cards.	See Chart 3-7.
	<b>Remove Original 3.5" Floppy Disk Drive</b>	
2.	Power down system.	See Chart 3-1.
3.	While wearing antistatic wrist strap, remove the two locking screws located at the front of the FDD. See Figure 3-17. Place the two screws on top of the Control Node to use when installing the new FDD.	The antistatic wrist strap must be connected to the PABX chassis, which must be connected to an approved ground to provide protection from static discharges.
4.	Gently pull the FDD forward.	
5.	Disconnect the signal and power cables at the rear of the Floppy Disk Drive.	
6.	Pull the Control Node forward.	
7.	Remove the FDD.	
	<b>Unpack and Inspect New Unit</b>	
8.	While still wearing the antistatic wrist strap, unpack and inspect FDD.	Retain packing material for shipment of original FDD.
	<b>Install 3.5" Floppy Disk Drive</b>	
9.	Install FDD into its slot.	
10.	Connect the signal and power cables to the rear of the FDD.	
11.	Secure the two locking screws located at the front of the FDD.	
12.	Power up system.	See Chart 3-2.

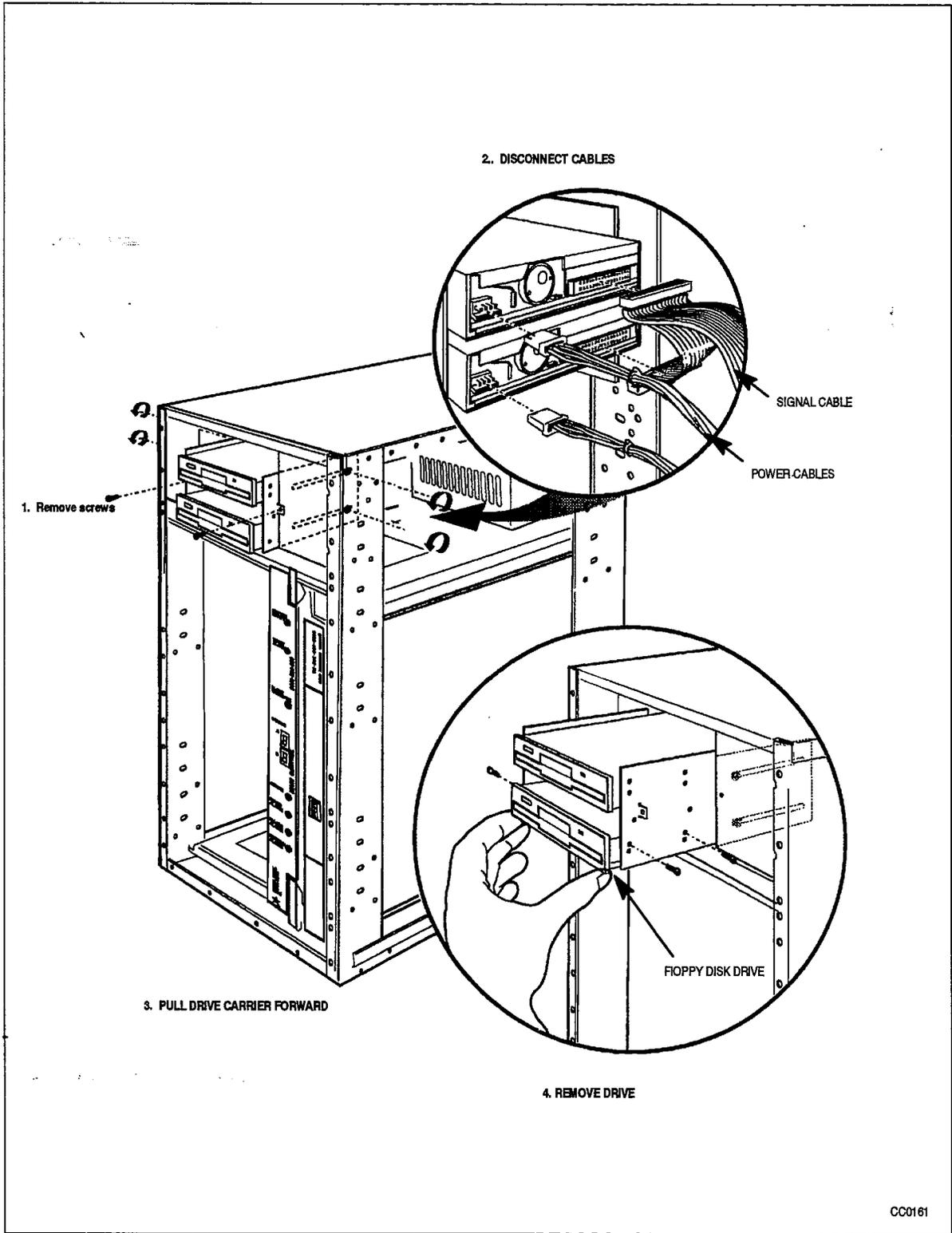


Figure 3-17 Remove/Install 3.5" Floppy Disk Drive

Chart 3-16 Open and Close SX-200 FD Cabinet Door

When you have completed this chart you will have:

- Opened or closed the SX-200 FD Cabinet front door.

Step	Action	Comments
<b>Open Cabinet Front Door</b>		
1.	Pry open the 2 latches on the right hand side of the black cover panel on the front door, and swing the cover panel off to the left.	
2.	Remove the 2 Phillips screws under the black panel to release the front door panel.	
3.	Pull the top of the front door out from the node cabinet and lift off the lower front cabinet rail.	
4.	Remove screws holding cabinet sleeve in place on the back of the node, and lift the sleeve off of the node.	Only remove the sleeve if you are replacing the PSU.
<b>Close Cabinet Front Door</b>		
5.	Lower the front door panel down over the front cabinet rail and position it on the front of the node so that the 2 screw slots are aligned.	
6.	Hold the door panel on the front of the node and replace the 2 Phillips screws.	
7.	If the sleeve was removed, replace it. Lower the cabinet sleeve down over the cabinet, making sure that the screw holes in the sleeve are on the back of the cabinet, and that the lips of the sleeve slide down over the top of the backplate.	
8.	Place the black cover panel over the appropriate opening, first catching the latch on the left hand side, and then the 2 latches on the right hand side.	

**Chart 3-17 Install a FIM Carrier in SX-200 FD Control Node**

**When you have completed this chart:**

- The Second FIM Carrier will be installed, in the opening under the first FIM Carrier.

**Note:** The Control Node is delivered with one FIM Carrier installed. It can hold up to 4 FIMS, for interconnection with up to 4 Peripheral bays. If more than 4 Peripheral bays are to be installed, then a second FIM Carrier is required. The following chart describes the installation of the second FIM Carrier.

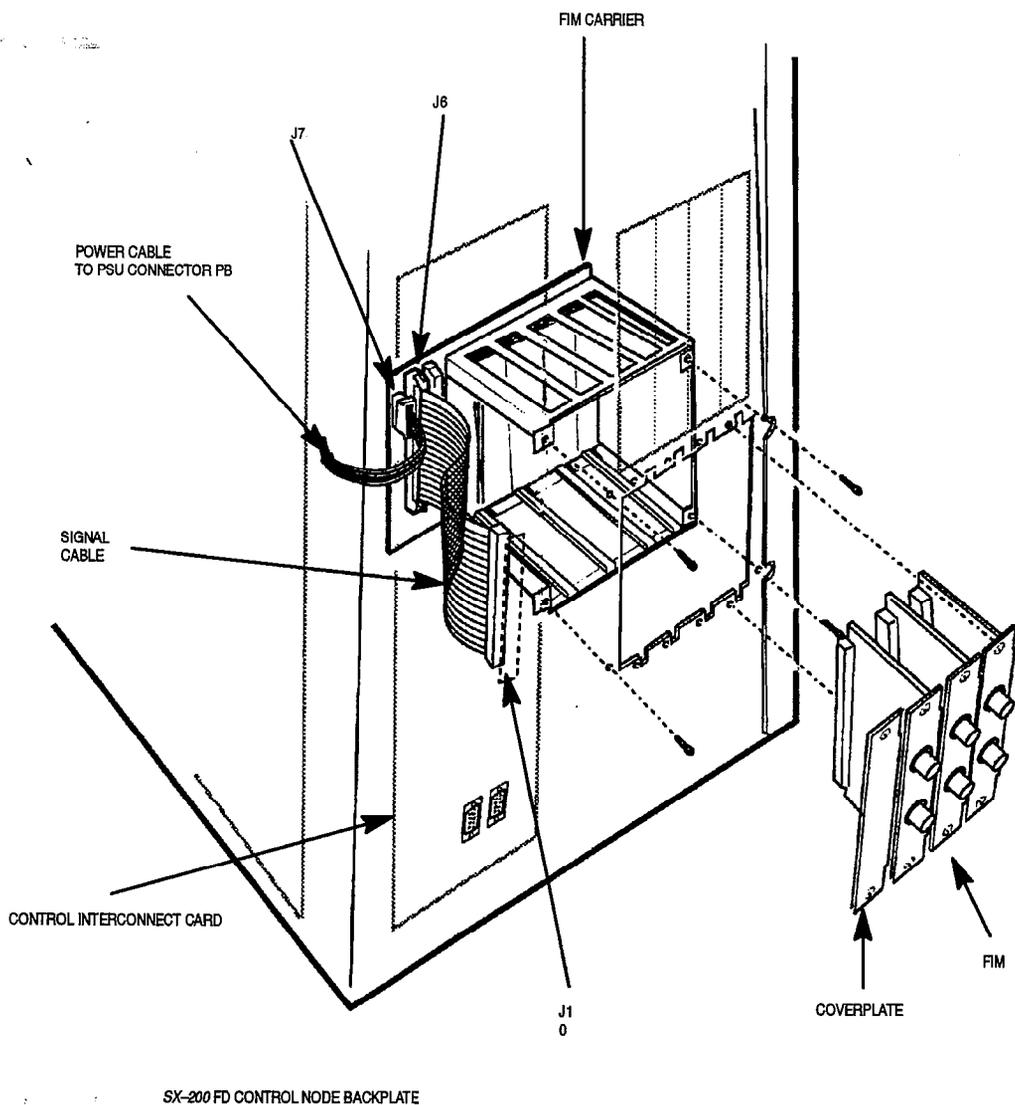
Step	Action	Comments
1.	<p><b>Unpack and inspect the FIM Carrier</b></p> <p>Turn the power OFF during this procedure. If the Control Node is presently powered ON, power down now.</p>	
2.	Attach the antistatic wrist strap to unpack and handle the FIM Carrier.	
3.	Unpack the FIM Carrier and inspect it for damage.	
4.	Complete repair tag, repack, and return any damaged or incorrect items.	
	<b>Remove Cabinet Sleeve</b>	
5.	Open the front panel on the Control Node	See Chart 3-16
6.	Remove the screws that are holding the cabinet sleeve in place on the node backplate.	
7.	Lift the sleeve up off of the node cabinet.	
	<b>Remove Cover Plate from FIM Carrier Opening</b>	
8.	Remove the 4 screws that are holding the cover plate in place over the opening for the FIM Carrier, on the backplate .	
	<b>Connect Power and Signal Cables</b>	
9.	Lay the FIM Carrier on the Control Node floor, directly below the installed FIM Carrier, and place it in the same position as the first installed FIM Carrier	The FIM backplane should be away from the cabinet backplate, and the cable connectors on the side of the FIM Carrier should be away from the cabinet side.

**Chart 3-17 Install a FIM Carrier in SX-200 FD Control Node  
(continued)**

Step	Action	Comments
10.	Connect the extender power cable from connector J7 on the FIM Carrier to the PB or P4 cable connector on the PSU.	There should only be one PSU cable connector not in use when you install a second FIM Carrier. This is the cable connector for the second FIM Carrier.
11.	Connect the signal ribbon cable from J6 on the FIM Carrier backplane to J10 on the Control Interconnect Card.	See Figure 3-19.
<b>Mount FIM Carrier in Cabinet</b>		
12.	Position the FIM Carrier in the Control Node so that the screw holes on the FIM Carrier align with the 4 screw holes in the backplate around the opening directly below the first FIM Carrier.	See Figure 3-18.
13.	Mount the FIM Carrier securely in place with the 4 screws provided	
<b>Install FIM Slot Filler Plates</b>		
14.	On the backplate, cover each FIM slot that will not be used with a FIM filler plate (provided). Secure each filler plate in place with 2 screws (provided).	
<b>Replace Cabinet Sleeve</b>		
15.	Lower the cabinet sleeve down over the cabinet, making sure that the screw holes in the sleeve are on the back of the cabinet, and that the lips of the sleeve slide down over the top of the backplate.	
16.	The sleeve should catch on 2 lip plates on the bottom sides of the cabinet. Press down firmly until the screw holes on the back align.	
17.	Secure the sleeve in place, using the screws removed in step 6.	

**Chart 3-17 Install a FIM Carrier in SX-200 FD Control Node  
(continued)**

Step	Action	Comments
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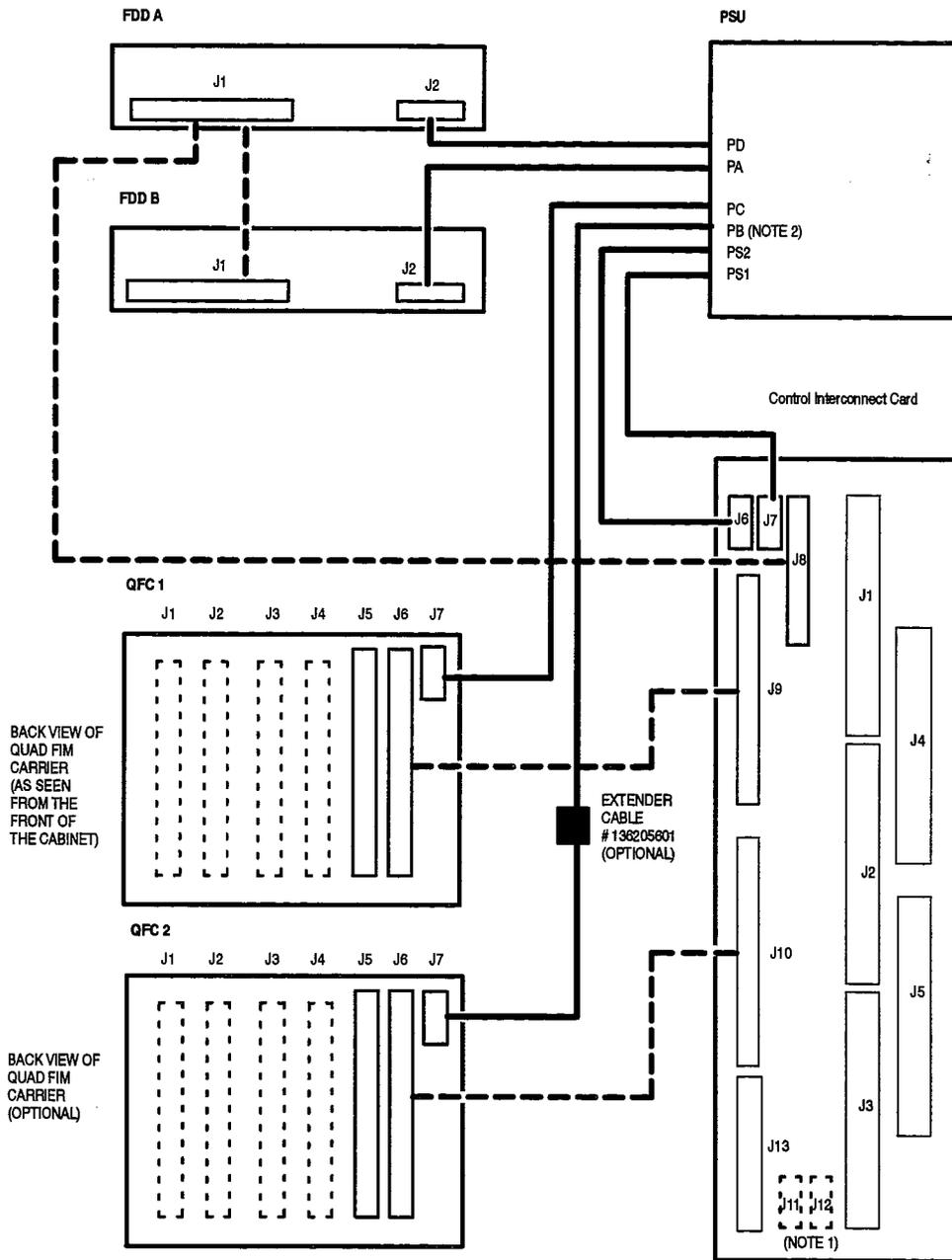


**Figure 3-18 SX-200 FD FIM Carrier**

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**Chart 3-17 Install a FIM Carrier in SX-200 FD Control Node**  
(continued)

Step	Action	Comments
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NOTE 1: J11 AND J12 ARE LOCATED ON THE REVERSE SIDE OF THE CONTROL INTERCONNECT CARD. BOTH ARE 9 PIN "D" CONNECTORS.

NOTE 2: FDD POWER CABLE REQUIRES CABLE ASSEMBLY PART # 138060801 (CONVERTS CONNECTOR AMP 480424 TO AMP 171822)

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**Figure 3-19 Cable Connection for the Second (Optional) FIM Carrier**

**Chart 3-18 Install Peripheral FIM Carrier and FIM in a SX-200 FD Peripheral Cabinet**

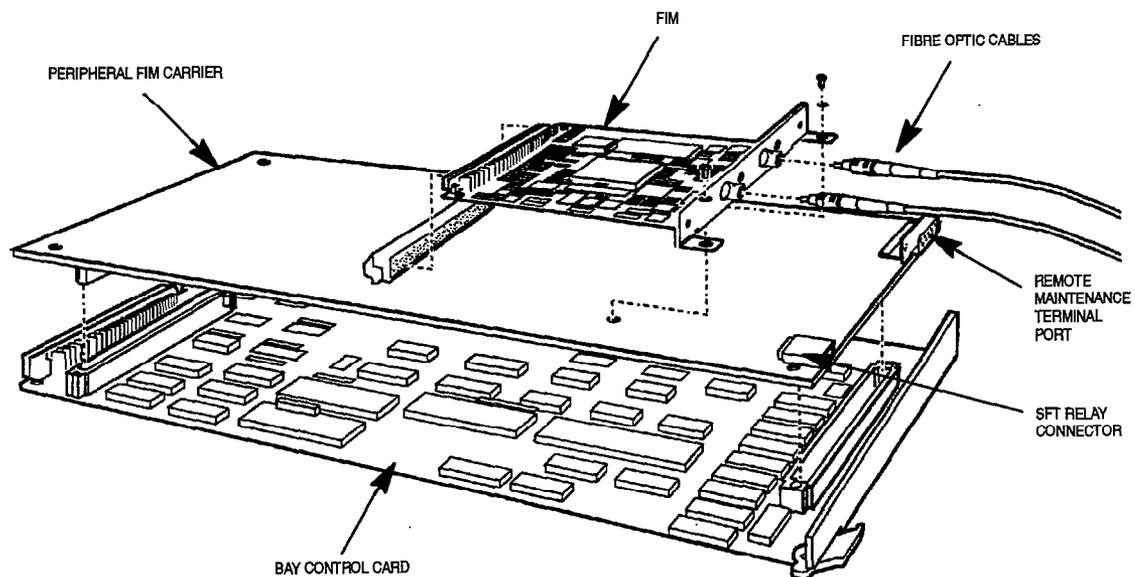
**When you have completed this chart:**

- The Peripheral FIM Carrier will be installed.
- The Fiber Interface Module will be installed in the Peripheral FIM Carrier.
- The Bay Control Card will be ready to install in the peripheral bay.

Step	Action	Comments
	<b>Follow General Procedures</b>	
1.	Follow the general procedures for handling circuit cards.	Given in Chart 3-7.
	<b>Unpack and Inspect</b>	
2.	Wearing the antistatic wrist strap, unpack and inspect the FIM Carrier and the Fiber Interface Module for damage.	Retain packaging for shipment of original unit.
3.	Complete repair tag, repack, and return any damaged or incorrect items.	
	<b>Install Peripheral FIM Carrier on the BCC</b>	See Figure 3-20.
4.	Position the Peripheral FIM Carrier on the component side of the BCC so that the connectors are properly aligned.	
5.	Snap the Peripheral FIM Carrier into place on the BBC.	
	<b>Install Fiber Interface Module</b>	
6.	Slide the FIM into the Peripheral FIM Carrier until it connects firmly with the DIN connector on the Carrier.	
7.	Fasten the FIM faceplate to the Peripheral FIM Carrier with 2 screws.	

**Chart 3-18 Install Peripheral FIM Carrier and FIM in a SX-200 FD Peripheral Cabinet  
(continued)**

Step	Action	Comments
	<b>Connect Fiber Interface Cable to the FIM</b>	
8.	Remove the protective caps from the cable connectors on the cables, and from the TX and RX connectors on the FIM faceplate.	
9.	Connect the optical fiber cable from the Tx of the control node to the Rx of the peripheral. See Figure 3-21.	The cables have Tx and Rx labels at the ends connecting to the FIM. See Figure 3-22.

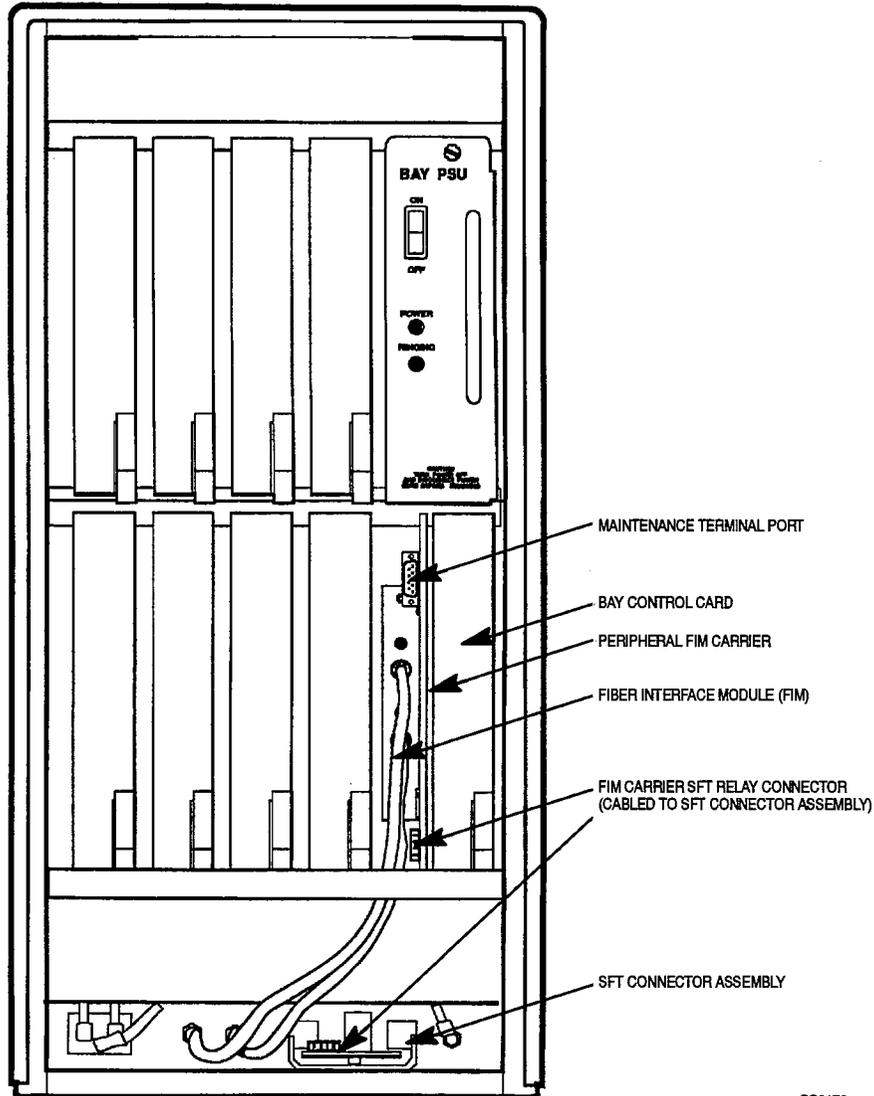


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**Figure 3-20 Peripheral FIM Carrier and the FIM**

**Chart 3-18 Install Peripheral FIM Carrier and FIM in a SX-200 FD Peripheral Cabinet  
(continued)**

Step	Action	Comments
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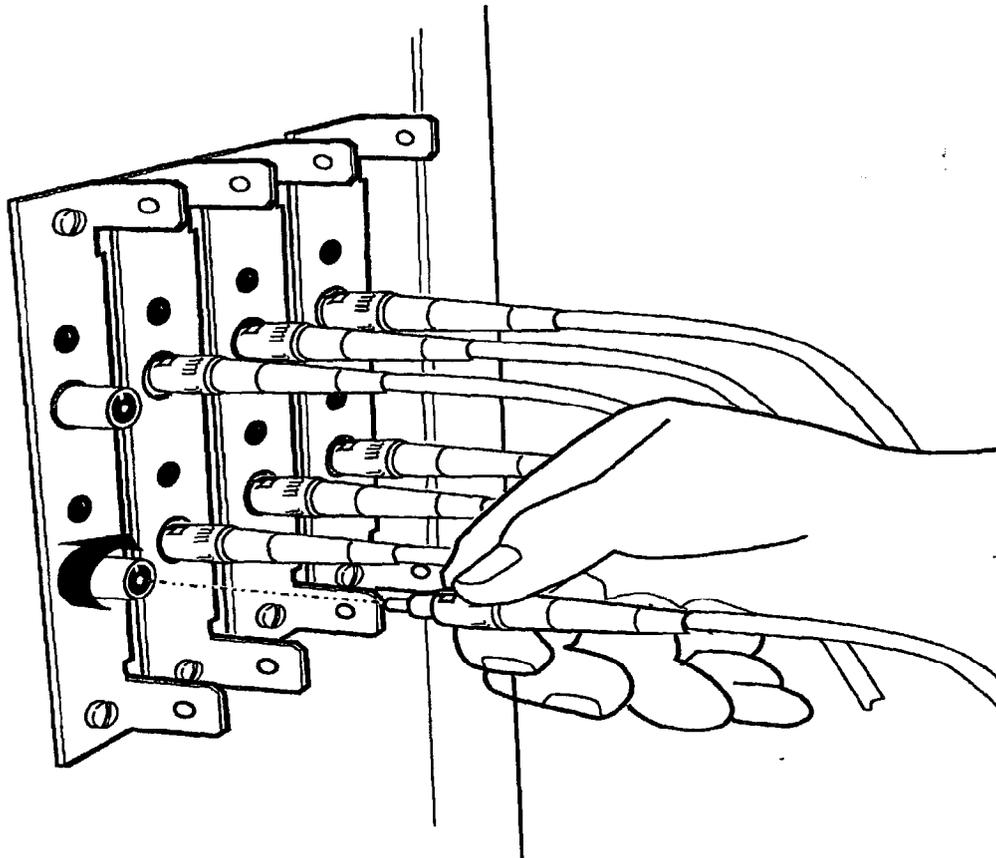


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**Figure 3-21 Front View of SX-200 FD Peripheral Cabinet**

**Chart 3-18 Install Peripheral FIM Carrier and FIM in a SX-200 FD Peripheral Cabinet  
(continued)**

Step	Action	Comments
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**Figure 3-22 Installing Fiber Cables from the Control Node to the Peripheral Node**

Chart 3-19 Remove Peripheral FIM Carrier and FIM from a SX-200 FD Peripheral Cabinet

## When you have completed this chart:

- The Bay Control Card will be removed from the peripheral bay.
- The Fiber Interface Module will be removed from the Peripheral FIM Carrier.
- The Peripheral FIM Carrier will be disconnected, and removed.

Step	Action	Comments
	<b>Follow General Procedures</b>	
1.	Follow the general procedures for handling circuit cards.	Given in Chart 3-7.
	<b>Disconnect Fiber Interface Cable from the FIM</b>	
2.	Attach the antistatic wrist strap.	
3.	Disconnect and label the Rx and the Tx fiber cables from the faceplate of the FIM on the BCC.	
4.	Unstrap the internal optical fiber cables from the inside panel of the Peripheral cabinet.	
5.	Remove the BCC from its slot.	Follow instructions given in Chart 3-11.
	<b>Remove Fiber Interface Module</b>	
6.	Unfasten the FIM faceplate from the Peripheral FIM Carrier by removing the 2 screws.	
7.	Slide the FIM from the Peripheral FIM Carrier until it disconnects from the DIN connector on the Carrier.	
	<b>Remove the Peripheral FIM Carrier from the BCC</b>	See Figure 3-20
8.	Unsnap the Peripheral FIM Carrier from the component side of the BCC .	
	<b>Unpack and Inspect the FIM Carrier and FIM</b>	
9.	Wearing the antistatic wrist strap, unpack and inspect the FIM Carrier and Fiber Interface Module for damage.	Retain packaging for shipment of original unit.
10.	Complete repair tag, repack, and return any damaged or incorrect items.	
	<b>Install Peripheral FIM Carrier on the BCC</b>	Given in Chart 3-18
11.	Proceed with installation.	

**Chart 3-20 Remove / Install Rear Door Fan Assembly on an SX-200 DIGITAL  
Universal Cabinet**

**When you have completed this chart you will have:**

- Replaced the fan assembly.

Step	Action	Comments
<b>Remove Old Fan Assembly</b>		
1.	Power down system.	See Chart 3-1.
2.	Unplug fan supply cord at each fan.	
3.	Remove each fan by removing the 4 mounting screws. Retain all mounting hardware and the fan guards.	
<b>Unpack Replacement Part</b>		
4.	Unpack the replacement fan assembly.	Retain the packaging material for shipment of the original assembly.
<b>Install New Part</b>		
5.	Mount each fan such that its terminals are on its upper left corner, and air flow is OUT of the cabinet. Four external tooth lockwashers are required between each fan and the door panel (one for each screw). The mounting nuts hold the fan guard against the fan.	Apply thread locking adhesive to hold each nut.
6.	Connect both fans to the fan supply cord.	
7.	Power up system.	See Chart 3-2.

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**Chart 3-21 Repacking Equipment For Shipment**

---

**When you have completed this chart you will have:**

- Properly repacked equipment for shipment.

- Notes:**
1. Do not disconnect the system ground until printed circuit cards have been properly packed. The system must be properly grounded for the wrist strap to be effective.
  2. Whenever possible, re-use original packing material to repack equipment for shipment.

Step	Action	Comments
1.	Pack all circuit cards in antistatic bags and PC card shipping cartons.	Wear the antistatic wrist strap while handling circuit cards.
2.	Handle cards by the edges only, and follow the card handling procedures.	
3.	Wrap all items with air-cushion type material, and surround with loose paper to minimize movement within the carton.	Ensure that items within the carton cannot shift about, and will not get scratched or damaged.
4.	Repack all items carefully, and list the contents of each carton on the label.	

9109-096-180-NA

Issue 1  
Feb. 1992

**SX-200<sup>®</sup> DIGITAL PABX**

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# Engineering Information

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### **NOTICE**

The information contained in this document is believed to be accurate in all respects but is not warranted by Mitel Corporation (MITEL®). The information is subject to change without notice and should not be construed in any way as a commitment by Mitel or any of its affiliates or subsidiaries. Mitel and its affiliates and subsidiaries assume no responsibility for any errors or omissions in this document. Revisions of this document or new editions of it may be issued to incorporate such changes.

## IMPORTANT SAFETY INSTRUCTIONS

### WARNING

**Failure to follow all instructions may result in improper equipment operation and/or the risk of electric shock.**

- This product is to be installed and serviced only by qualified personnel.
- Read all instructions before attempting to install or use this product.
- Install all assemblies using the procedures described in this Practice.
- Configure this product with only the assemblies specified in this Practice.
- Grounding circuit continuity is vital for safe operation of telecommunication equipment. Never operate telecommunication equipment with grounding conductor disconnected. Ensure grounding conductor is installed before connecting telecommunication cabling to any system.

## EXPLANATION OF USE FOR SYMBOLS AND NOTICES



**DANGEROUS  
VOLTAGE**

The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of an uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a significant risk of electric shock to persons.



**INSTRUCTIONS**

The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the product.



**PROTECTIVE  
GROUNDING  
TERMINAL**

The ground symbol within a circle identifies the terminal which is intended for connection to an external protective conductor. This connector must be connected to earth ground prior to making any other connections to the equipment.

**DANGER**

Danger indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

**WARNING**

Warning indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

**CAUTION**

Caution indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury and/or damage to the equipment or property.



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1.

## INTRODUCTION

### General

- 1.1 This Practice provides basic engineering information for the *SX-200*<sup>®</sup> DIGITAL PABX, with Generic 1001, Generic 1002, Generic 1003, Generic 1004 or Generic 1005 software. It describes the physical aspects of the system, configurations, and technical characteristics.

### Reason for Issue

- 1.2 This section is issued to provide basic engineering information for the *SX-200* DIGITAL PABX including the *SX-200* FD (Fiber Distributed).

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## 2.

## FEATURES

## General

- 2.1 The SX-200 DIGITAL PABX and the SX-200 FD offer many features which are provided by a software package. A full description of these features appears in Practice 9109-096-105-NA, Features Description. Certain limitations which apply to System Features are listed in Table 2-1.

Table 2-1 Feature Limitations				
Feature	Generic 1001	Generic 1002	Generic 1003	Generic 1004/1005
Maximum number of simultaneous calls (336- and 456-port)	100	200	200	200
(672-port)	na	na	248	248
Maximum number of speech paths or channels used by any call	2	2	2	2
Maximum number of simultaneous consultations	5	5	5	5
Maximum number of simultaneous add-on (3-way) calls	6	6	6	6
Maximum number of simultaneous station-controlled conference calls	6	6	6	6
Maximum number of parties in conference at one time	5	5	5	5
Maximum number of calls that can simultaneously be camped on to a station, trunk group, or hunt group	100	200	200	200
Maximum number of simultaneous callbacks that can be enabled	100	200	200	200
Maximum number of simultaneous call forwards that can be enabled	400	400	400	400
Maximum number of simultaneous "Dial 0" calls	100	100	100	200
Maximum number of messages queued in the system maximum number with release D06 or later	100 na	100 na	100 250	250 250
Maximum number of hunt groups	50	50	50	100
Maximum number of hunt groups in ACD	na	na	99	99
Maximum number of calls that can be simultaneously connected to Music On Hold	178	178	178	178
Maximum number of stations in a station hunt group	50	50	50	50

**Table 2-1 Feature Limitations  
(continued)**

Feature	Generic 1001	Generic 1002	Generic 1003	Generic 1004/ 1005
Maximum number of stations in a call pickup group	50	50	50	50
Maximum number of dial call pickup groups	50	50	50	50
Maximum number of trunks assignable to night stations	200	200	200	200
Maximum number of trunks in a trunk group	50	50	50	50
Maximum number of trunk groups	50	50	50	50
Maximum number of calls that can override a given extension	1	1	1	1
Maximum number of attendant consoles	11	11	11	11
Maximum number of calls that can be simultaneously held by one attendant	8	8	8	8
Maximum number of calls incoming that can be separately identified at the Attendant Console	8	8	8	8
Maximum number of LDNs that can be identified at the Attendant Console	9	9	9	9
Maximum number of LDNs	100	100	100	100
Maximum Number of Night Bells	25	25	25	25
Maximum number of calls waiting that can be displayed at Console	99	99	99	99
Maximum number of calls that can be waiting at Console	200	200	200	200
Maximum number of abbreviated dial numbers	1000	1000	1000	1000
Maximum number <i>SUPERSET™</i> Speed Dial numbers	2212	2212	2212	2212
Maximum number of trunk buffers for SMDR	75	200	200	200
Maximum number of DATA SMDR buffers	na	128	128	128
Maximum number of <i>SUPERSET 3™</i> and <i>SUPERSET 4®</i> telephones				
336-port configuration	78	78	78	78
456-port configuration	118	118	118	118
672-port configuration	na	na	162	162
Maximum number of <i>SUPERSET 3™</i> DN and <i>SUPERSET 4™</i> DN telephones				
336-port configuration	na	324	324	324
456-port configuration	na	228	228	228
672-port configuration	na	na	400	500

<b>Table 2-1 Feature Limitations (continued)</b>				
<b>Feature</b>	<b>Generic 1001</b>	<b>Generic 1002</b>	<b>Generic 1003</b>	<b>Generic 1004/ 1005</b>
Maximum number of <i>SUPERSET 401™</i> , <i>SUPERSET 410™</i> , <i>SUPERSET 420™</i> , and <i>SUPERSET 430™</i> telephones	na	na	na	324
336-port configuration				
456-port configuration	na	na	na	228
672-port configuration	na	na	na	500
672-port configuration ( <i>SX-200</i> FD)	na	na	na	500
Maximum number of lines (336-port systems)	300	300	300	300
Maximum number of lines (456-port systems)	400	400	400	400
Maximum number of lines (672-port systems)	na	na	500	500
Maximum number of T1 Trunks per digital bay	na	na	1	1
Maximum number of T1 Trunks per system				
336-port configuration	na	na	4	4
456-port configuration	na	na	3	3
672-port configuration	na	na	7	7
Maximum Number of Page Groups	na	na	na	50
Maximum Number of Stations in a Page Group	na	na	na	16
Maximum Number of Subattendants	na	na	na	25
Maximum Number of LDN Appearances	na	na	na	16
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**Notes:** 1. *SUPERSET 401*, *SUPERSET 410*, *SUPERSET 420*, *SUPERSET 430*, and *SX-200* FD not available with Generic 1001, Generic 1002, Generic 1003, and Generic 1004.

2. *SUPERSET 430* not available with Generic 1005 FPKG1.



## 3.

**SYSTEM OVERVIEW****General****SX-200 DIGITAL PABX**

- 3.1 The *SX-200* DIGITAL PABX employs digitally controlled solid-state, space and time division switching with stored-program control. Depending on system configuration, the *SX-200* DIGITAL PABX can be either a one or two cabinet system. The system is available in three variants: 336-port (fully digital), 456-port, and 672-port (fully digital).

**Note:** The 456-port configuration is available only to upgrade an installed *SX-200* PABX to become an *SX-200* DIGITAL PABX by adding a digital Control cabinet to the existing analog cabinet.

The maximum quantities of trunk and line cards which can be accommodated in each configuration are illustrated in Figure 3-1 through Figure 3-3.

**Note:** Generic 1001 is a single 5.25 inch disk drive system; Generics 1002, 1003, and 1004 require two 5.25 inch disk drives.

**SX-200 FD PABX**

The *SX-200* FD (Fiber Distributed) PABX employs the same digital technology as the *SX-200* DIGITAL. It consists of separate Control and Peripheral cabinets connected by Fiber Optic Cables. Each Peripheral cabinet or Bay is 96-ports and up to seven Peripheral Bays can be connected to the Control cabinet (672-ports). This allows remote locating of the Peripheral Bays close to the devices they support, reducing installation costs.

**Note:** The *SX-200* FD is not available with Generic 1001, Generic 1002, Generic 1003, and Generic 1004. An installed 336-port *SX-200* DIGITAL PABX can be upgraded to an *SX-200* FD by replacing the Control Bay with a Fiber Distributed Control Cabinet. Existing Peripheral Bays can be connected to the Control Cabinet. Additional ports can be installed by adding new Peripheral Bays.

**Note:** Generic 1005 FPKG1 cannot be used for upgrades.

The maximum quantities of trunk and line cards which can be accommodated in each Peripheral Bay are illustrated in Figure 3-4.

**Note:** The *SX-200* FD (Generic 1005) uses two industry standard 3.5 inch disk drive units mounted directly in the Control Cabinet.

All configurations are compatible with most existing station, key telephone, private branch exchange, and central office equipment.

### **Generic 1001**

Generic 1001 provides:

- use of a flexible numbering plan
- simultaneous use of DTMF and rotary dial stations
- optional use of attendant consoles
- extensive selection of standard and optional features
- data port facility for traffic analysis and other requirements
- automatic diagnostics
- six to 36 power fail transfer trunks
- optional reserve power supply or UPS
- *SUPERSET 3* telephone
- *SUPERSET 4* telephone.

### **Generic 1002**

Generic 1002 also includes the following features in addition to the features available with Generic 1001:

- *SUPERSET 3* DN telephone
- *SUPERSET 4* DN telephone
- DATASET 1100 Series.

### **Generic 1003**

Generic 1003 also includes the following features and configuration in addition to the features available with Generics 1001 and 1002:

- DATASET 2100 Series
- T1 trunks
- Automatic Call Distribution
- Automated Attendant
- 672-port.

### **Generic 1004**

Generic 1004 also includes the following features in addition to the features available with Generics 1001, 1002, and 1003:

- Application Platform Package
- Enhanced Hotel/Motel
- Enhanced Subattendant Features

- Departmental Key Applications.

### **Generic 1005**

Generic 1005 also includes the following features in addition to the features available with Generics 1001, 1002, 1003 and 1004:

- *SX-200* FD (Fiber Distributed)
- *SUPERSET 401* telephone
- *SUPERSET 410* telephone
- *SUPERSET 420* telephone
- *SUPERSET 430* telephone
- *MiLink* Data Module
- ISDN interface capability
- DTMF Automatic Number Identification (ANI)
- DTMF Dialed Number Identification Service (DNIS).

### **Generic 1005 FPKG1**

Generic 1005 FPKG1 is a functionality reduced version of Generic 1005 that has the following limitations:

- operates only on the *SX-200* FD
- *SUPERSET 430* not available
- *MiLink* Data Module not available
- ANI and DNIS not available
- ACD, HCI, and Data not available
- Hotel/Motel Front Desk Terminal not available
- Property Management System not available
- Automated Attendant not available
- ONS Voice Mail not available
- Printing (only one RS-232 port is available).

## **Maintenance**

- 3.2 Modular design and functional packaging of the equipment permits rapid location and replacement of defective components. Circuit malfunctions are detected by diagnostic routines automatically initiated by the Main Control Card (MCC). Diagnostic routines, detailed in Practice 9109-096-353-NA, General Maintenance Information, and Practice 9109-096-350-NA, Troubleshooting, direct service personnel to the defective circuit card or assembly, and identify the required field-replaceable unit. Diagnostic routines and maintenance procedures do not interfere with users unaffected by the malfunction.



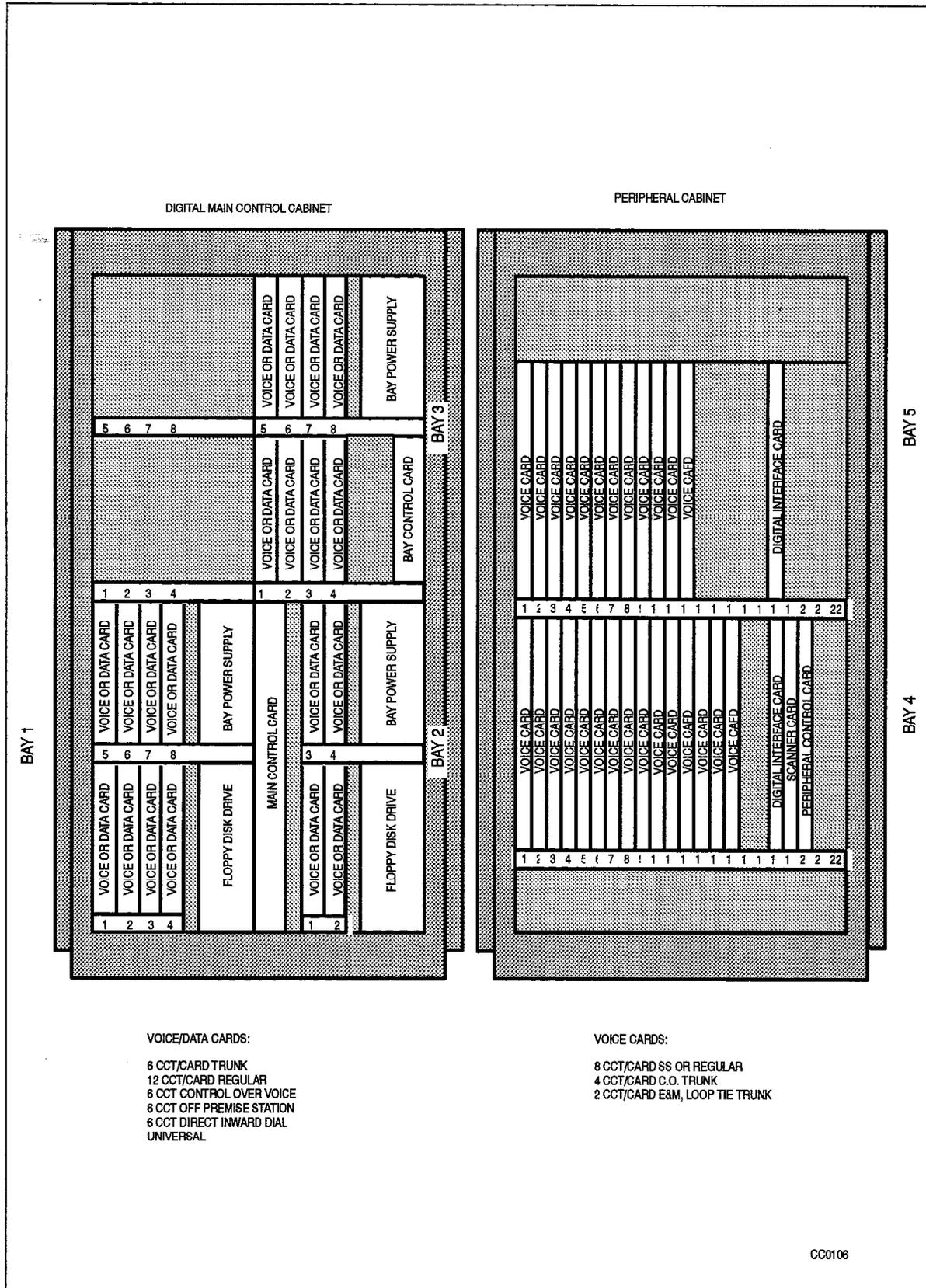
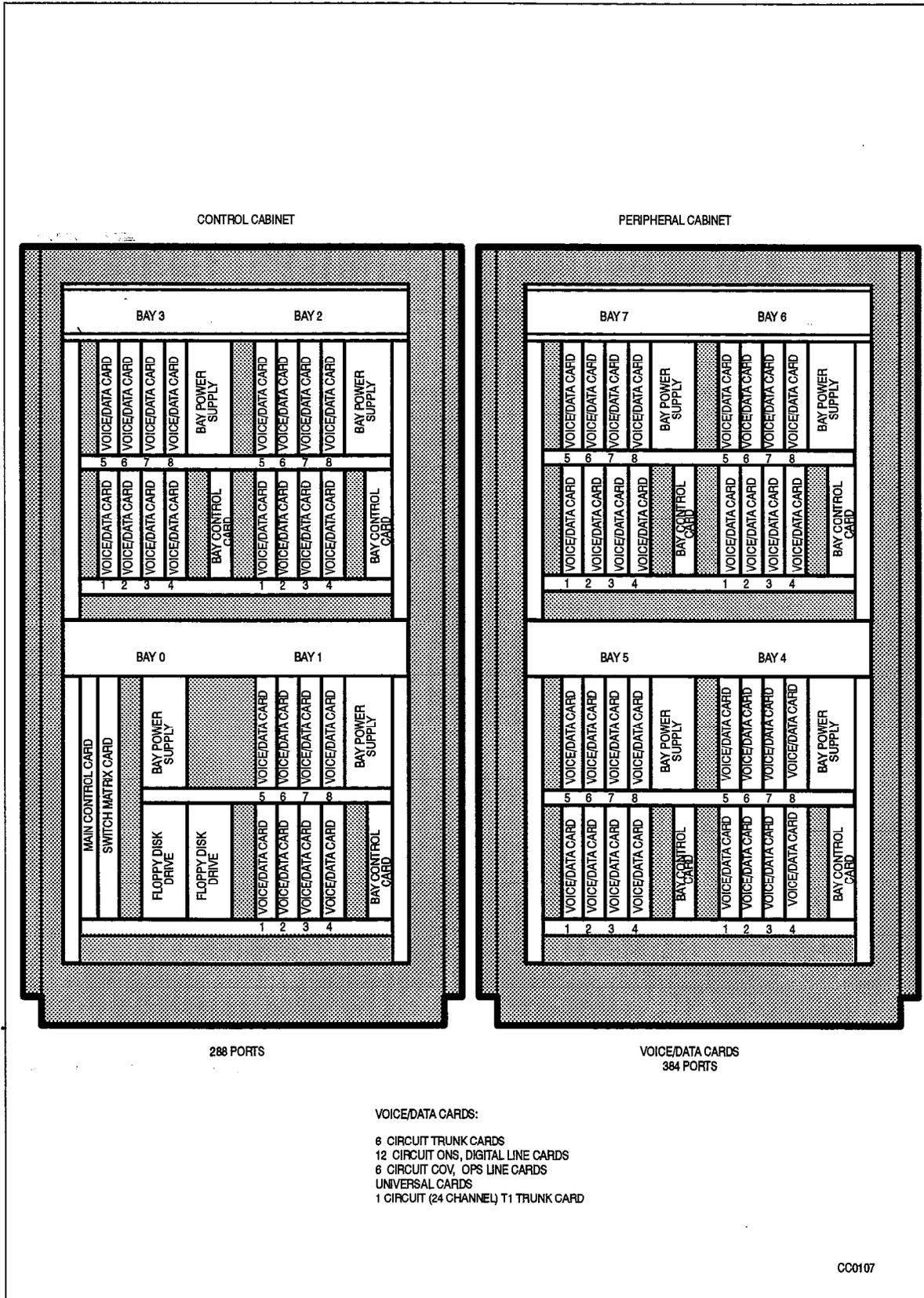
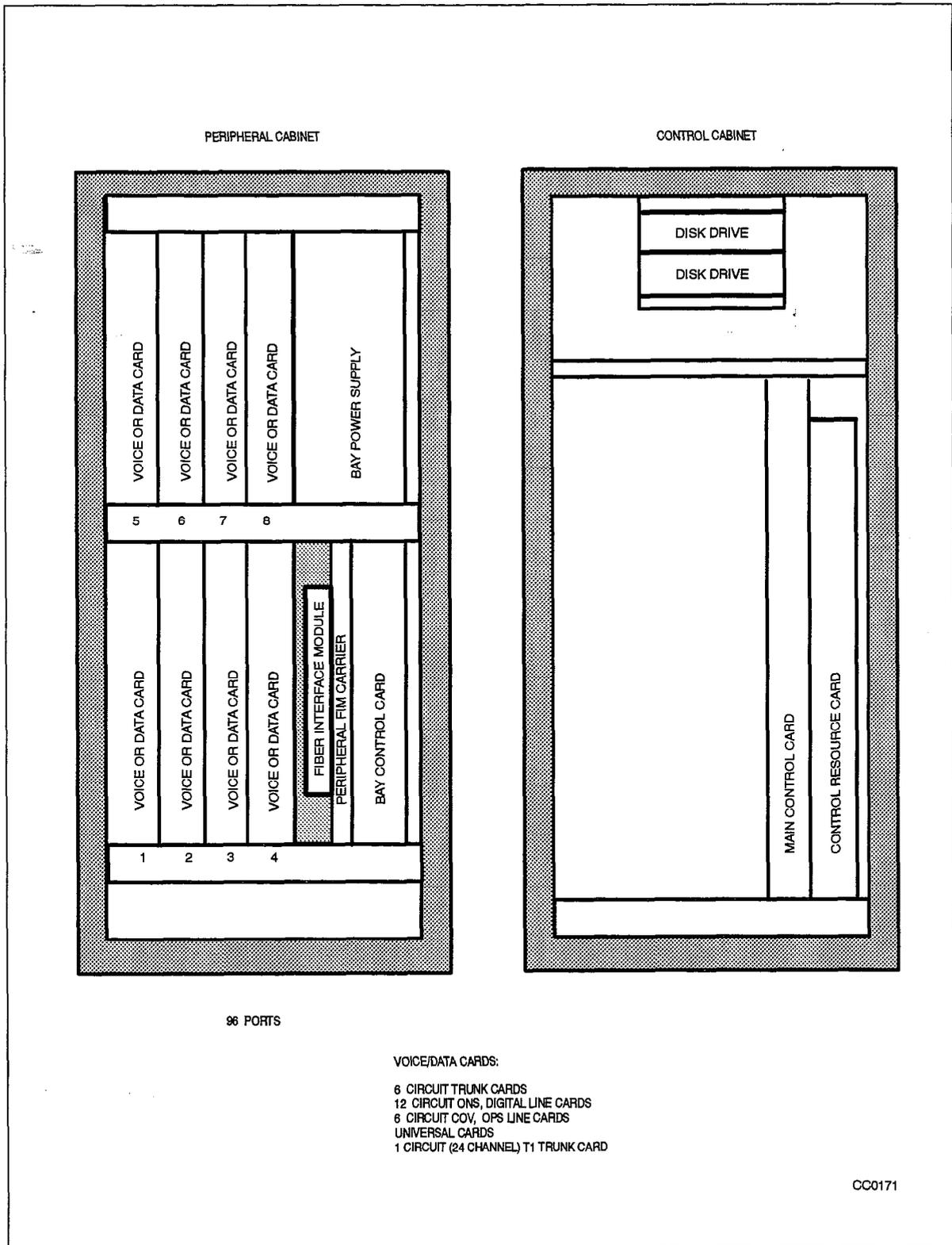


Figure 3-2 Bay and Slot Assignment - 456-Port Configuration



**Figure 3-3 Bay and Slot Assignment – 672-Port Configuration**



**Figure 3-4 Slot Assignment – SX-200 FD – Control and Peripheral Cabinet**



## 4.

## CONFIGURATIONS

### General

- 4.1 The following paragraphs and their associated headers in the tables following describe the various configurations, equipment bays, and associated cards available with *SX-200* DIGITAL PABX and the *SX-200* FD PABX. Each variant can be expanded modularly from a basic to a full configuration.

### Maximum Number of Digital Line Cards

- 4.2 The maximum number of Digital Line Cards (DLC) that can be programmed depends on whether the ports are programmed as "dual" or "single". The "Dual" column, in the tables that follow, represents the number of DLCs if dual port devices are programmed, such as DATASET 1102 or *SUPERSET 3* DN and *SUPERSET 4* DN telephones with a DATASET 1101 cartridge installed. The "Single" column represents the number of DLCs if single port devices are programmed, such as DATASET 1103, or *SUPERSET 3* DN and *SUPERSET 4* DN telephones without a DATASET 1101 cartridge. The *SUPERSET 401*, *SUPERSET 410*, *SUPERSET 420*, and *SUPERSET 430* telephones are also single port devices.

**Note:** Digital Line Cards are not available with Generic 1001.

The upper and lower digital bay shelves have 30 dedicated channels each, and an additional 30 shared channels between them, for a total of 90 channels. DLCs programmed for data should be evenly distributed between the upper and lower shelf to maximize the non-blocking channels available. For example, if 4 DLCs programmed for DATASET 1102 (dual rack mounted, 96 circuits) were placed in the upper shelf of a digital bay, only 60 (30 + 30) channels are available. If the DLCs were evenly distributed, the upper and lower bay would be able to access all 90 channels, thus reducing the blocking probability. The same consideration applies to Bays 1 and 2 of a combo bay of a 336-port *SX-200* DIGITAL, since there are only 62 channels going to each of upper Bay 1, lower Bay 1, and Bay 2.

### Additional Non DLC Ports Available

This is the maximum number of ports per bay that are available after 4 DLCs have been programmed; this figure assumes the highest possible density cards for that bay.

### Maximum Ports

This column identifies the maximum number of ports using high density cards.

- Maximum density non-DLC digital card: 12 ports
- Maximum density Digital Line Card: 24 ports
- Maximum density analog card: 8 ports

### 336-Port Configuration

4.3 The 336-port configuration is completely digital and consists of one cabinet. The Control cabinet for the 336-port system is created by installing a 192-port digital shelf (Bays 3 and 4) above the Control shelf. The configurations are as follows:

Bays 1, 2	Control shelf (digital)
Bays 1, 2, 3	Control shelf plus one digital Peripheral Bay
Bays 1, 2, 3, 4	Control shelf plus two digital Peripheral Bays

**336-Port Equipment** – If a digital shelf is added to the Universal Cabinet, the 336-port configuration can be equipped as follows:

Bay	Control Card(s)	Optional Peripheral Cards (Quantity)
2	MCC, BPS, FDD	ONS, LS/GS, Universal, COV, DID, OPS, DLC, T1 (up to 04)
1	BPS, FDD	ONS, LS/GS, Universal, COV, DID, OPS, DLC, T1 (up to 08)
3	BPS, BCC	ONS, LS/GS, Universal, COV, DID, OPS, DLC, T1 (up to 08)
4	BPS, BCC	ONS, LS/GS, Universal, COV, DID, OPS, DLC, T1 (up to 08)

**Note:** Each bay in use must have all its Control cards present; Peripheral cards are installed as required.

The maximum number of ports available is:

**Table 4-1 336-Port Digital Line Card (DLC) Feature Limitations**

Bay	Available Channels		Max DLC Ports	Non Block Data	Maximum DLC Cards		Additional Non DLC Ports Available (If dual DLC used)	Max Ports
	MOH	no MOH			Dual	Single		
1	124	126	144	144	6	12	72	216
2	62	63						
3	90	91	96	91	4	8	48	144
4	90	91	96	91	4	8	48	144
TOT:	366	371	336	326	14	28	168	504

- 200 Maximum Simultaneous calls
- 371 Maximum Non-Blocking Channels available if music on hold is NOT programmed (refer to section 4.2 )
- 336 Maximum DLC Ports (Voice or Data).
- 504 Maximum ports available depending on card densities (refer to section )
- 163 x 163 Data Users to Host in a 1 to 1 Non Blocking configuration.
- 224 x 112 Data Users to Host ports in a 2 to 1 configuration.

## 456-Port Configuration

- 4.4 The 456-port configuration is available only to upgrade an installed *SX-200* PABX to become an *SX-200* DIGITAL PABX by adding a digital Control cabinet to the existing analog cabinet.

The 456-port system is available in six different configurations. The Control cabinet for the 456-port variant is created by installing a 96-port digital shelf (Bay 3) above the Control shelf and adding a 216-port Peripheral cabinet to the Control cabinet. The configurations are:

Bays 1, 2	Control shelf (digital) only (single cabinet)
Bays 1, 2, 3	Control shelf plus one digital Peripheral Bay
Bays 1, 2, 4	Control shelf and lower shelf of Peripheral cabinet
Bays 1, 2, 4, 5	Control shelf and both shelves of Peripheral cabinet
Bays 1, 2, 3, 4	Control shelf plus digital Peripheral bay and lower shelf of Peripheral cabinet
Bays 1, 2, 3, 4, 5	Control shelf plus digital Peripheral bay and both shelves of Peripheral cabinet

**456-Port Equipment** – The 456-Port configuration can be equipped as follows:

Bay	Control Card(s)	Optional Peripheral Cards (Quantity)
2	MCC, BPS, FDD	ONS, LS/GS, Universal, COV, DID, OPS, DLC, T1 (up to 04)
1	BPS, FDD	ONS, LS/GS, Universal, COV, DID, OPS, DLC, T1 (up to 08)
3	BPS, BCC	ONS, LS/GS, Universal, COV, DID, OPS, DLC, T1 (up to 08)
4	DIC, PCC, Scanner	CO Trk, Line, <i>SUPERSET</i> , E&M Trk, DID/Tie (up to 15)
5	DIC	CO Trk, Line, <i>SUPERSET</i> , E&M Trk, DID/Tie (up to 12)

**Note:** Each bay in use must have all its Control cards present; Peripheral cards are installed as required.

The maximum number of ports available is:

Bay	Available Channels		Max DLC Ports	Non Block Data	Maximum DLC Cards		Additional Non DLC Ports Available (If dual DLC used)	Max Ports
	MOH	no MOH			Dual	Single		
1	124	126	144	144	6	12	72	216
2	62	63						
3	90	91	96	91	4	8	48	144
4	31	31	0	0	0	0	120	120

Page 1 of 2

**Table 4-2 456-Port DLC Feature Limitations  
(continued)**

Bay	Available Channels		Max DLC Ports	Non Block Data	Maximum DLC Cards		Additional Non DLC Ports Available (If dual DLC used)	Max Ports
	MOH	no MOH			Dual	Single		
5	31	31	0	0	0	0	96	96
TOT:	338	342	240	235	10	20	336	576

Page 2, of 2

- 200 Maximum Simultaneous calls
- 342 Maximum Non-Blocking Channels available if music on hold is NOT programmed (refer to section 4.2 )
- 240 Maximum DLC Ports (Voice or Data)
- 576 Maximum ports available depending on card densities (refer to section 4.2 )
- 117 x 117 Data Users to Host ports in a 1 to 1 Non Blocking configuration
- 160 x 80 Data Users to Host ports in a 2 to 1 configuration

**672-Port Configuration**

4.5 The 672-port configuration, (not available with Generic 1001 or Generic 1002) requires a new Control cabinet, consisting of Control Bay 0 and three digital peripheral bays (96 ports per bay). A Digital Peripheral Cabinet with 384-ports can be connected to the PABX.

- Bays 0, 1 Control Bay plus one digital Peripheral Bay
- Bays 0, 1, 2 Control Bay plus two digital Peripheral Bays
- Bays 0, 1, 2, 3 Control Bay plus three digital Peripheral Bays
- Bays 0, 1, 2, 3, 4 Control Bay plus four digital Peripheral Bays
- Bays 0, 1, 2, 3, 4, 5 Control Bay plus five digital Peripheral Bays
- Bays 0, 1, 2, 3, 4, 5, 6 Control Bay plus six digital Peripheral Bays
- Bays 0, 1, 2, 3, 4, 5, 6, 7 Control Bay plus seven digital Peripheral Bays

**672-port configuration** – The 672-port configuration can be equipped as follows:

Bay	Control Card(s)	Optional Peripheral Cards (Quantity)
0	SMC, MCC, BPS, 2 FDD	none
1	BPS, BCC	ONS, LS/GS, Universal, COV, DID, OPS, DLC, T1 (up to 08)
2	BPS, BCC	ONS, LS/GS, Universal, COV, DID, OPS, DLC, T1 (up to 08)
3	BPS, BCC	ONS, LS/GS, Universal, COV, DID, OPS, DLC, T1 (up to 08)
4	BPS, BCC	ONS, LS/GS, Universal, COV, DID, OPS, DLC, T1 (up to 08)
5	BPS, BCC	ONS, LS/GS, Universal, COV, DID, OPS, DLC, T1 (up to 08)

6	BPS, BCC	ONS, LS/GS, Universal, COV, DID, OPS, DLC, T1 (up to 08)
7	BPS, BCC	ONS, LS/GS, Universal, COV, DID, OPS, DLC, T1 (up to 08)

**Note:** Each bay in use must have all its Control cards present; Peripheral cards are installed as required.

The maximum number of ports available is:

Bay	Available Channels		Max DLC Ports	Non Block Data	Maximum DLC Cards		Additional Non DLC Ports Available (if dual DLC used)	Max Ports
	MOH	no MOH			Dual	Single		
1	90	91	96	91	4	8	48	144
2	90	91	96	91	4	8	48	144
3	90	91	96	91	4	8	48	144
4	90	91	96	91	4	8	48	144
5	90	91	96	91	4	8	48	144
6	90	91	96	91	4	8	48	144
7	90	91	96	91	4	8	48	144
TOT:	630	637	672	637	28	56	336	1008

- 248 Maximum Simultaneous calls
- 637 Maximum Non-Blocking Channels available if music on hold is NOT programmed

Assuming a maximum 96 DLC ports per bay:

- 672 Maximum DLC Ports (Voice or Data)
- 400 Maximum DLC Voice Ports
- 1008 Maximum ports available depending on card densities.
- 248 x 248 Data Users to Host in a 1 to 1 Non Blocking configuration (32 Digital Line Cards)
- 448 x 224 Data Users to Host in a 2 to 1 configuration (47 Digital Line Cards)

Assuming no restrictions on Digital Line Cards:

- 1344 Maximum DLC Ports (Voice and Data).
- 400 Maximum DLC Voice Ports (no COV or ONS ports)
- 1344 Maximum ports available depending on card densities
- 248 x 248 Data Users to Host in a 1 to 1 Non Blocking configuration (32 Digital Line Cards)
- 496 x 248 Data Users to Host in a 2 to 1 configuration (52 Digital Line Cards)
- 576 x 192 Data Users to Host in a 3 to 1 configuration (56 Digital Line Cards)

### 672-Port Configuration For SX-200 FD

4.6 The SX-200 FD is available with Generic 1005, Generic 1005 FPKG 1 and Generic 1005 LIT96. With Generic 1005 LIT96, only one peripheral bay is supported. The 672-port configuration consists of a Control Cabinet and seven 96-port Peripheral Bays or Cabinets. The Control Cabinet and the Peripheral Bays are linked by Fiber Optic Cables. This allows for remote locating of the Peripheral Cabinets close to the devices they support reducing installation costs.

Bays 0, 1	Control Cabinet plus one Peripheral Cabinet
Bays 0, 1, 2	Control Cabinet plus two Peripheral Cabinets
Bays 0, 1, 2, 3	Control Cabinet plus three Peripheral Cabinets
Bays 0, 1, 2, 3, 4	Control Cabinet plus four Peripheral Cabinets
Bays 0, 1, 2, 3, 4, 5	Control Cabinet plus five Peripheral Cabinets
Bays 0, 1, 2, 3, 4, 5, 6	Control Cabinet plus six Peripheral Cabinets
Bays 0, 1, 2, 3, 4, 5, 6, 7	Control Cabinet plus seven Peripheral Cabinets

**672-port configuration** – The 672-port configuration can be equipped as follows:

Bay	Control Card(s)	Optional Peripheral Cards (Quantity)
0	SMM, MCC, PS CRC, FIMs, 2 Disk Drives (3.5 in.)	none
1	BPSU, BCC, FIM	ONS, LS/GS, Universal, COV, DID, OPS, DLC, (up to 08)
2	BPSU, BCC, FIM	ONS, LS/GS, Universal, COV, DID, OPS, DLC, T1 (up to 08)
3	BPSU, BCC, FIM	ONS, LS/GS, Universal, COV, DID, OPS, DLC, T1 (up to 08)
4	BPSU, BCC, FIM	ONS, LS/GS, Universal, COV, DID, OPS, DLC, T1 (up to 08)
5	BPSU, BCC, FIM	ONS, LS/GS, Universal, COV, DID, OPS, DLC, T1 (up to 08)
6	BPSU, BCC, FIM	ONS, LS/GS, Universal, COV, DID, OPS, DLC, T1 (up to 08)
7	BPSU, BCC, FIM	ONS, LS/GS, Universal, COV, DID, OPS, DLC, T1 (up to 08)

**Notes:** 1. Each cabinet in use must have all its Control cards present; Peripheral cards are installed as required.

2. Only one T1 card is permitted per Peripheral Cabinet.

The maximum number of ports available is:

Table 4-4 672-Port DLC Feature Limitations (SX-200 FD Specific)								
Per-iph. Cab.	Available Channels		Max DLC Ports	Non Block Data	Maximum DLC Cards		Additional Non DLC Ports Available (If dual DLC used)	Max Ports
	MOH	no MOH			Dual	Single		
1	90	91	96	91	4	8	48	144
2	90	91	96	91	4	8	48	144

**Table 4-4 672-Port DLC Feature Limitations (SX-200 FD Specific)  
(continued)**

Per- iph. Cab.	Available Channels		Max DLC Ports	Non Block Data	Maximum DLC Cards		Additional Non DLC Ports Available (If dual DLC used)	Max Ports
	MOH	no MOH			Dual	Single		
3	90	91	96	91	4	8	48	144
4	90	91	96	91	4	8	48	144
5	90	91	96	91	4	8	48	144
6	90	91	96	91	4	8	48	144
7	90	91	96	91	4	8	48	144
TOT:	630	637	672	637	28	56	336	1008

Page 2 of 2

- 248 Maximum Simultaneous calls
- 637 Maximum Non-Blocking Channels available if music on hold is NOT programmed

Assuming a maximum 96 DLC ports per Peripheral Cabinet:

- 672 Maximum DLC Ports (Voice or Data)
- 400 Maximum DLC Voice Ports
- 1008 Maximum ports available depending on card densities.
- 248 x 248 Data Users to Host in a 1 to 1 Non Blocking configuration (32 Digital Line Cards)
- 448 x 224 Data Users to Host in a 2 to 1 configuration (47 Digital Line Cards)

Assuming no restrictions on Digital Line Cards:

- 1344 Maximum DLC Ports (Voice and Data).
- 400 Maximum DLC Voice Ports (no COV or ONS ports)
- 1344 Maximum ports available depending on card densities
- 248 x 248 Data Users to Host in a 1 to 1 Non Blocking configuration (32 Digital Line Cards)
- 496 x 248 Data Users to Host in a 2 to 1 configuration (52 Digital Line Cards)
- 576 x 192 Data Users to Host in a 3 to 1 configuration (56 Digital Line Cards)

**Note:** Generic 1005 LIT96 supports only one peripheral bay.

## Maximum Number of *SUPERSET 3* and *SUPERSET 4* Telephones per Bay (or Peripheral Cabinet) per System

### 336-Port

Bay 1 (4 High Power Slot x 6 ccts/slot)	= 24	<i>SUPERSET</i>	Telephones
Bay 2 (1 High Power Slot x 6 ccts/slot)	= 6	<i>SUPERSET</i>	Telephones *
Bay 3 (4 High Power Slot x 6 ccts/slot)	= 24	<i>SUPERSET</i>	Telephones
Bay 4 (4 High Power Slot x 6 ccts/slot)	= 24	<i>SUPERSET</i>	Telephones

Total = 78 *SUPERSET* Telephones

### 456-Port

Bay 1 (4 High Power Slots x 6 ccts/slot)	= 24	<i>SUPERSET</i>	Telephones
Bay 2 (1 High Power Slot x 6 ccts/slot)	= 6	<i>SUPERSET</i>	Telephones *
Bay 3 (4 High Power Slots x 6 ccts/slot)	= 24	<i>SUPERSET</i>	Telephones
Bays 4&5 (Power Supply Limited)	= 64	<i>SUPERSET</i>	Telephones

Total = 118 *SUPERSET* Telephones

### 672-Port

Bay 1 (3 high Power Slots x 6 ccts/slot)	= 18	<i>SUPERSET</i>	Telephones *
Bay 2 (4 High Power Slots x 6 ccts/slot)	= 24	<i>SUPERSET</i>	Telephones
Bay 3 (4 High Power Slots x 6 ccts/slot)	= 24	<i>SUPERSET</i>	Telephones
Bay 4 (4 High Power Slots x 6 ccts/slot)	= 24	<i>SUPERSET</i>	Telephones
Bay 5 (4 High Power Slots x 6 ccts/slot)	= 24	<i>SUPERSET</i>	Telephones
Bay 6 (4 High Power Slots x 6 ccts/slot)	= 24	<i>SUPERSET</i>	Telephones
Bay 7 (4 High Power Slots x 6 ccts/slot)	= 24	<i>SUPERSET</i>	Telephones

Total = 162 *SUPERSET* Telephones

\* One Universal Card required

## Automatic Call Distribution (ACD) Configuration Guidelines

**Note:** Automatic Call Distribution is not available with Generic 1001, Generic1002, and Generic 1005 FPKG1.

**RECOMMENDATION:** Configure the ACD portion of the system into the digital bays, where there is no blocking or junctor limitation.

- 4.7 Each Analog Bay has a maximum of 31 junctors available for calls. When all junctors are in use, new calls cannot be established, existing calls cannot be transferred or retrieved from hold, and Recorded Announcement Devices RADs that cannot answer are placed in Do Not Disturb.

With Automatic Call Distribution (ACD), the number, type, and distribution of peripherals located in each analog bay is very important. A junctor must always be available when all Agents are logged in. If a RAD is in the same bay, a junctor must

always be available for it; if no junctor is available, the RAD goes into Do Not Disturb. Set messaging is independent of the junctors; Agent sets will ring but cannot be answered. If no junctor is available for an Agent, the system assumes (when the ringing timer expires) that the Agent did not answer the call and then changes the Agent's status to "Make Busy". If there are other stations in the Bay, junctors must be available for them also.

There is a link to each analog bay for system messaging by which the system sends messages to all peripherals, even if no junctor is available. No set of rules clearly identifies how to configure a given system. There are too many variables; path setup, local switching, numbers of agents, trunks, and RADs, location of RADs, transfers, etc. However, the following rules must be followed.

- The number of ACD Agent *SUPERSET* telephones, RADs, and ACD Trunks assigned in an analog bay running only ACD traffic must be less than 32; otherwise blocking will occur.
- If the number of junctors is reduced due to "busy out" or "removed from service" by Maintenance, the total of Agent sets, trunks, plus RADs must be reduced accordingly.
- For configuration purposes each active ACD Trunk, Agent, and RAD should be allocated a junctor. If an analog bay is configured with 20 *SUPERSET 4* Agent telephones, then 11 junctors would remain for general business traffic in that bay.



## 5.

## TECHNICAL DESCRIPTION

### General

- 5.1 The *SX-200* DIGITAL PABX uses the PCM (Pulse Code Modulation) form of time-division multiplexing as its digital conversion format. The PABX employs both digital peripheral cards and digitally-interfaced analog peripheral cards. System architecture is illustrated in Figure 5-1 through Figure 5-4. The major component blocks are described in the paragraphs below.

### Circuit Switch Links

- 5.2 The subsystems of the *SX-200* DIGITAL PABX communicate over 2,048 kHz serial links. Each link is a continuously repeated data frame comprising 32 channels; each channel contains an 8-bit word which occupies an equal time slot within the frame. Certain channels on some links are segregated into message channels; the remainder are used for circuit switch applications.

Circuit switch links provide paths through the system for the transfer of peripheral-related data; i.e., PCM audio, or TDM data. Each digital peripheral interface card has dedicated to it one-and-one-half circuit switch links which connect the card to the peripheral switch.

### Control

- 5.3 The main processor, which has overall control of the system, is a 16 bit MC68000 CPU. It is supported by up to 4.0 megabytes of Dynamic Random Access Memory, which is used for the storage of system software, programmed devices, abbreviated dial digit strings, ARS digit strings, and *SUPERSET* line appearances. The system also provides 2.48 megabytes (formatted) of disk space; this is used for the permanent storage of the system software and the customer database. The *SX-200* FD provides 2.95 megabytes of disk space on two 3.5 inch Disk Drive Units.

Peripheral processors control the analog cards in the 456-port configuration. These processors are 8 bit MC6809 CPUs, and are supported by 32 kilobytes of static RAM. Each analog bay contains a Digital Interface Card (DIC) which interfaces the analog peripheral cards to the digital end of the system. Controlling each DIC is one 8 bit MC6809 CPU, supported by 8 kilobytes of static RAM. The Bay Control Card in digital bays has 256 kilobytes of RAM and interfaces its bay to the MCC. It is controlled by the MC68008 microprocessor.

The Attendant Console (without RS-232 connector) contains a MC6809 CPU, supported by 16 kilobytes of EPROM and 4 kilobytes of static RAM, which controls the display, and monitors keystrokes. The Console module on the Universal card contains one 8 bit MC68121 CPU supported by 4 kilobytes of EPROM and 2 kilobytes of RAM,

which formats and controls the routing of data between the system PCM bus and the console.

The *SUPERCONSOLE 1000™* Attendant Console interfaces to a Digital Line card by Tip and Ring. It contains a HD6303 CPU, supported by 16 kilobytes of EPROM, and 8 kilobytes of static RAM. A printer can be attached to the console by an RS-232C port. The connector is configured so that the console is data communication equipment (DCE).

On each analog trunk circuit card is an MC6802 CPU with up to 4 kilobytes of PROM that controls low level functions such as seizing and releasing trunk circuits.

## Digital Switching

- 5.4 The *SX-200* DIGITAL PABX uses a custom analog/digital combined integrated circuit to implement the analog-to-digital and digital-to-analog conversion functions. The basis of this encode/decode process is the MT8960 Integrated PCM Filter/Codec (commonly known as a CODEC), which is used throughout the system to convert analog to PCM and PCM to analog. The CODEC combines a low pass filter and an analog-to-digital PCM encoder in the transmit direction (towards the *SX-200* DIGITAL PABX) and a digital-to-analog decoder and low pass filter in the receive direction (towards the peripheral).

The PABX uses another custom VLSI circuit as its main PCM switching matrix element – the 8 link x 32 channel MT8980 Digital Time/Space Crosspoint Switch (DX Chip). The DX chip is arranged with eight incoming links and eight outgoing links; each link comprising 32 channels. Under control of the main CPU, any channel of the incoming links can be connected to any channel of the outgoing links. Thus, one DX chip is equivalent to a 65,536 (256 x 256) crosspoint array. This chip type forms the Circuit Switch and Peripheral Switch Matrices on the Main Control card, and forms part of the interface between the digital PCM links and the analog speech paths in the analog bays.

The 672-port variant of the *SX-200* DIGITAL PABX requires the removal of the DX module from the Main Control Card and the addition of a single Switch Matrix Card (SMC). The circuit switch on the SMC consists of a 24 link by 24 link square array made up of nine DX devices. Each peripheral bay requires 3 links, and several links are required for the HDLC messaging and DSP resources, thus 21 links are available to support up to 7 bays.

The *SX-200FD* PABX uses the Switch Matrix Module (SMM) in place of the DX module and the Switch Matrix Card. The SMM attaches to the Main Control Card. The circuit switch on the SMM is functionally equivalent to the SMC and consists of a 24 link by 24 link square array made up of nine DX devices. Each peripheral cabinet requires 3 links, and several links are required for the HDLC messaging and DSP resources, thus 21 links are available to support up to 7 peripheral cabinets.

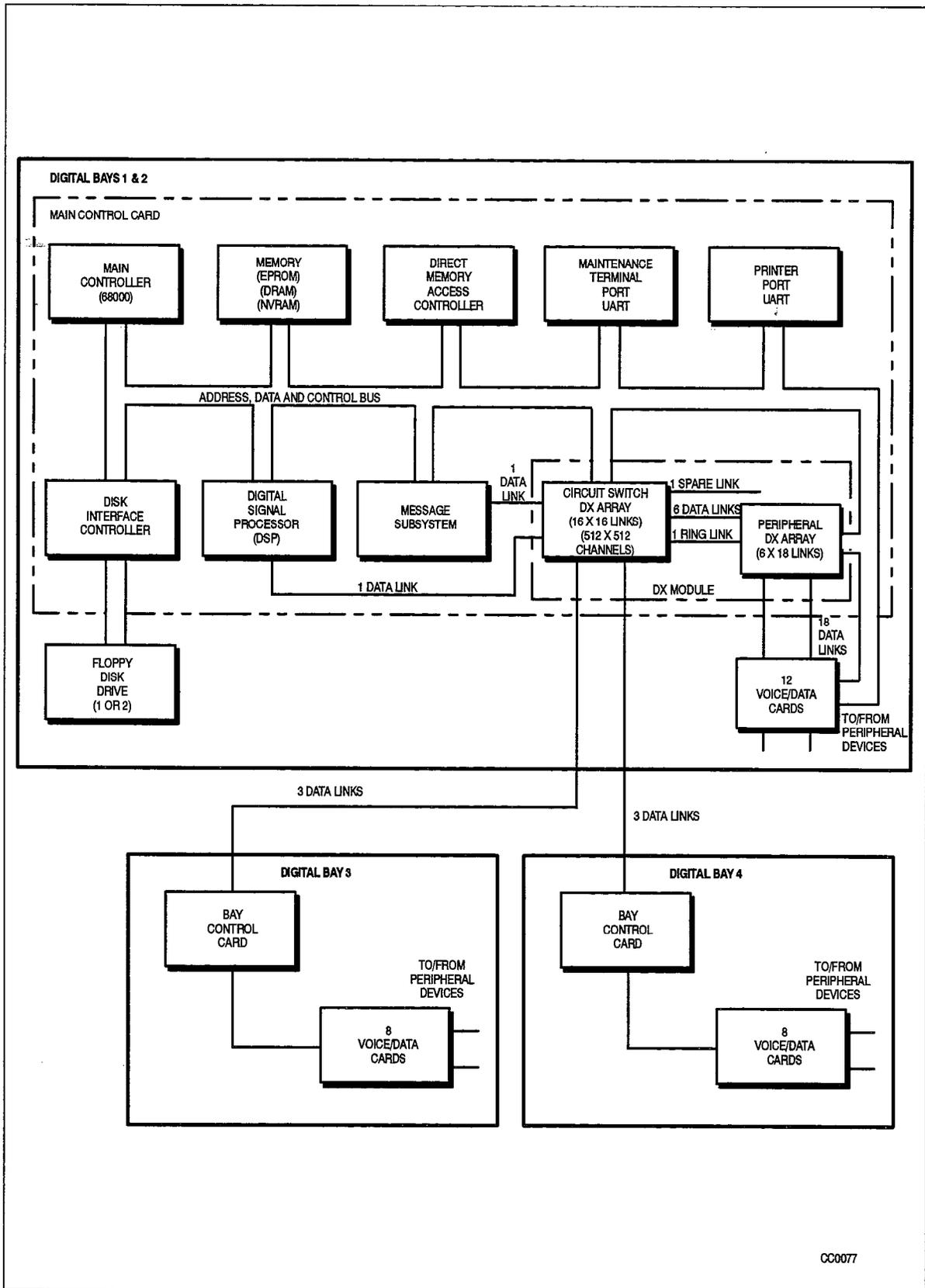
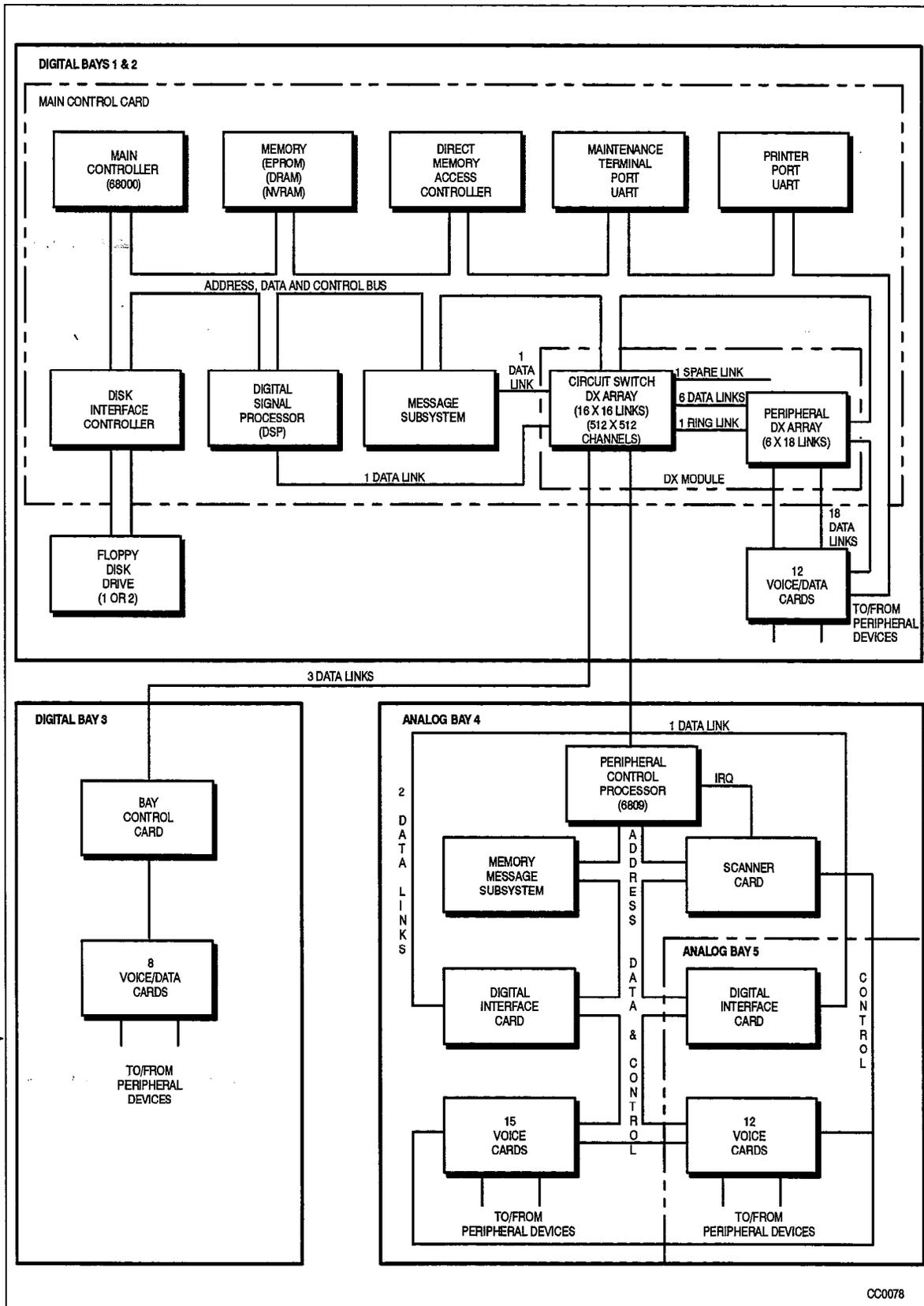
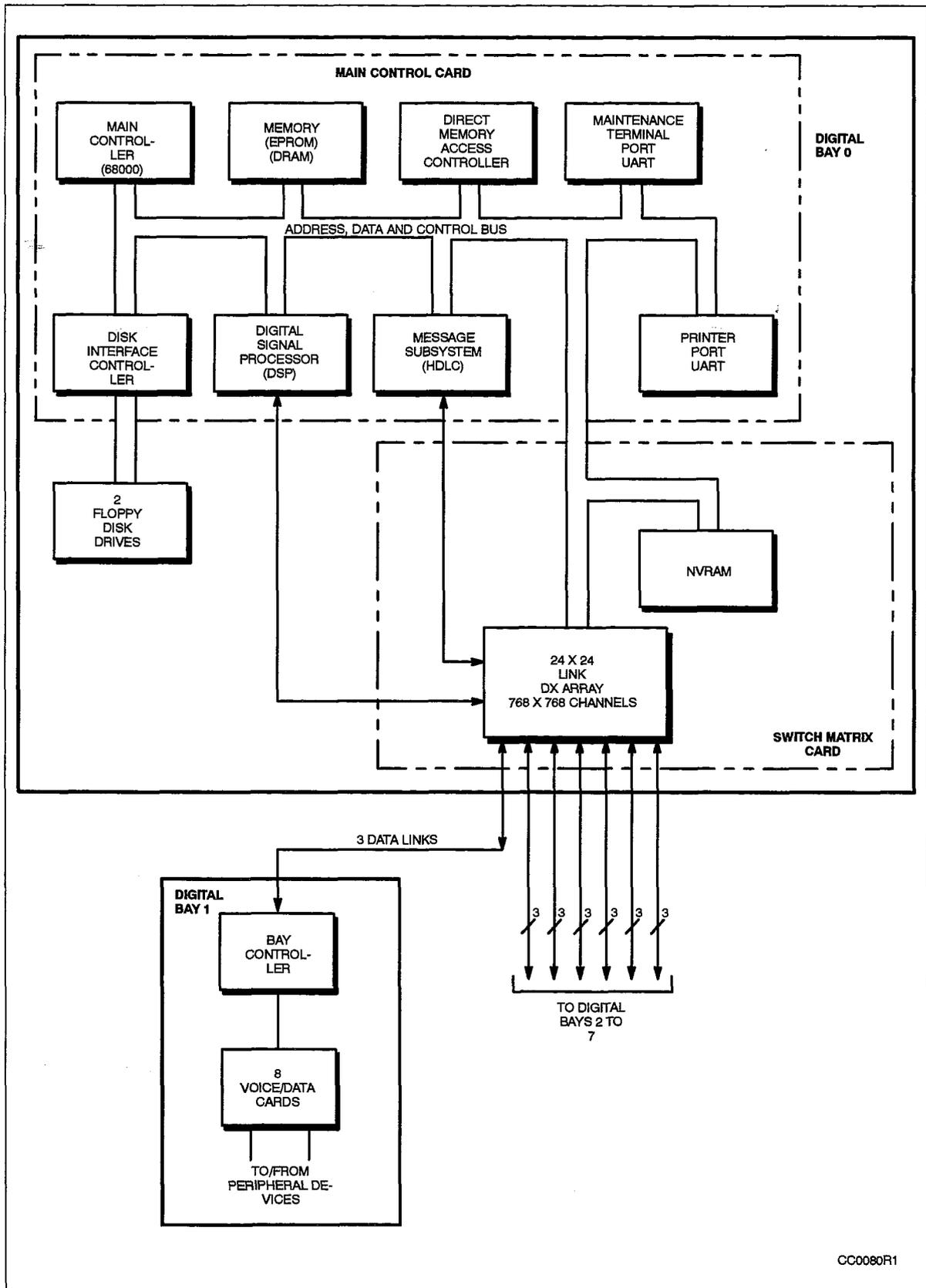


Figure 5-1 System Architecture (336-Port Configuration)



CC0078

Figure 5-2 System Architecture (456-Port Configuration)



CC0080R1

Figure 5-3 System Architecture (672-Port Configuration)

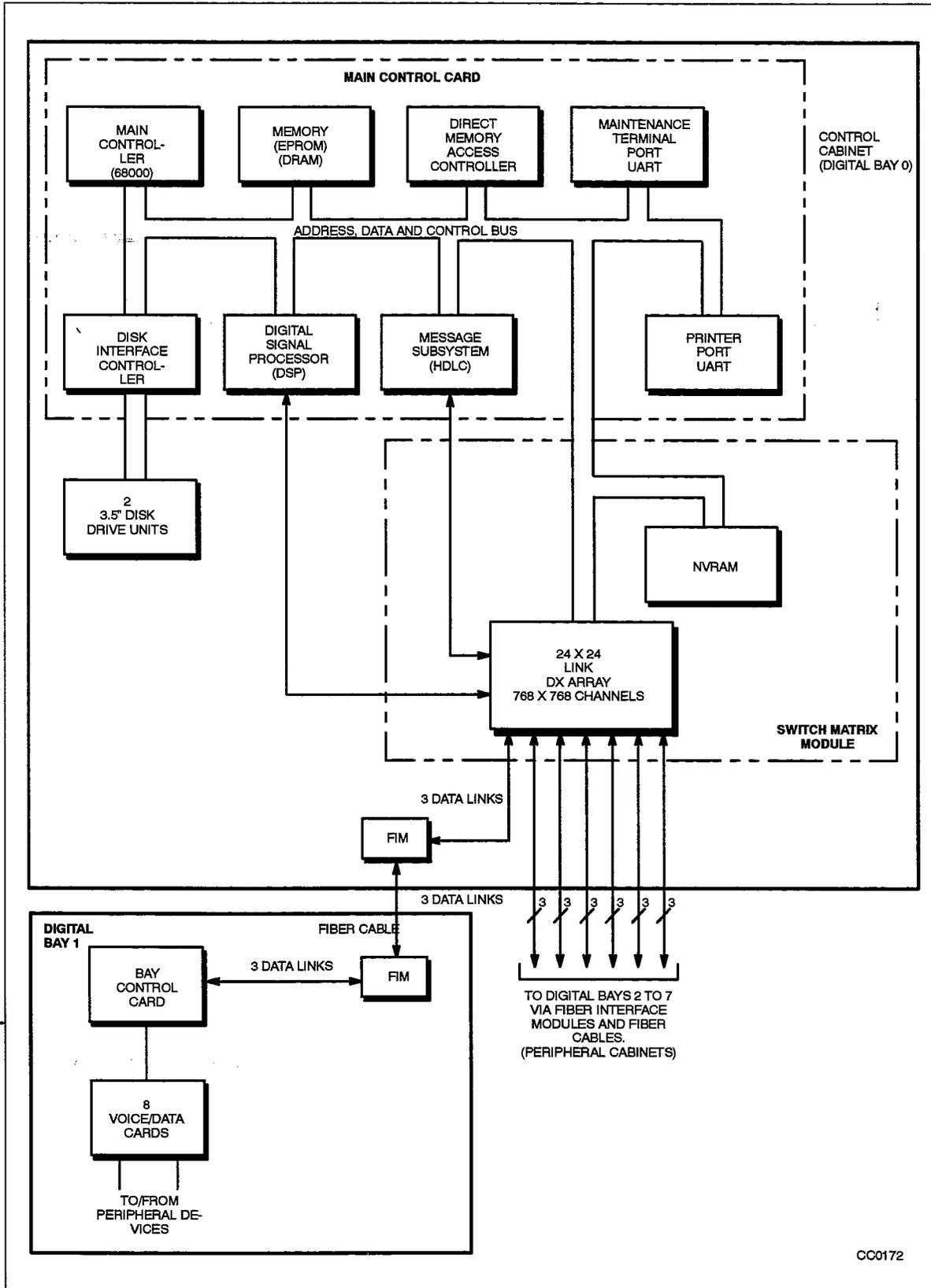


Figure 5-4 SX-200 FD System Architecture (672-Port Configuration)

## Main Control Card

- 5.5 The Main Control card is the highest level in the intelligence hierarchy of the *SX-200 DIGITAL PABX*. It contains the following:
- 68000 CPU
  - EPROM containing system power-up routines
  - Decryption Module
  - Dynamic RAM
  - Floppy disk interface circuitry for two 5.25 inch drives (*SX-200 DIGITAL*), or for two 3.5 inch drives (*SX-200 FD*).
  - Two communication Ports (UARTs)
  - Digital Signal Processor for tone generation/detection and conferencing
  - DX module containing the Circuit Switch Matrix, and the Peripheral Switch Message interface (HDLC)
  - Switch Matrix Module (SMM) (for use in the *SX-200 FD* only).

### Circuit Switch

The circuit switch matrix provides a nonblocking switching matrix which, in conjunction with the peripheral switch, interconnects the digital peripherals (i.e., digital lines and digital trunks) and the links from the analog bays. The matrix comprises four DX chips arranged in tandem such that the matrix has 16 receive links and 16 transmit links. The function of each link is outlined in Table 5-2. As a nonblocking matrix, the circuit switch matrix is fully switchable; i.e., all incoming links have access to all outgoing links, and forms a 256 port bi-directional switching hub.

### Peripheral Switch

The peripheral switch concentrates the circuit switch links from up to 12 digital peripheral cards (and 18 links) on one side, down to the six links provided by the circuit switch matrix on the other side. Note that only Bays 1 and 2 are switched through the peripheral switch. The peripheral switch comprises three DX chips; one concentrates Bay 2 and two concentrate Bay 1.

## Control Resources Card

- 5.6 The Control Resources Card (CRC) provides all the miscellaneous circuitry required for fiber distributed systems. The CRC interfaces to the MCC and the Fiber Interface Modules (FIMs). Powering off or unplugging the CRC will result in system fail transfer becoming active in all peripheral nodes. It will also cause the loss of the fiber maintenance links, the loss of terminal and printer ports, and the loss of the Floppy Disk Drive Units. The CRC is used only with the *SX-200 FD* in Generic 1005.

## Message Subsystem

- 5.7 The message subsystem facilitates the transfer of control messages and program loading between the main Peripheral Control Processor and lower node processors such as Bay Control Cards, *SUPERSET* telephones, and consoles. This transfer of information occurs over the PCM links of the Circuit Switch Matrix (see Table 5-2). The protocol used in the message system is based on the OSI (Open Systems Interconnection) widely used HDLC (High Level Data Link Control) protocol format.

## Switch Matrix Card

- 5.8 The Switch Matrix Card (SMC) is required in a 672-port configuration; it supersedes the DX module on the MCC. The DX module must be removed from the MCC when the Switch Matrix Card is used. The circuit switch and peripheral switch are not used in a 672-port system; each peripheral bay connects through its Bay Control Card to the SMC. The Switch Matrix Card is not required in the *SX-200* DIGITAL FD.

## Switch Matrix Module

- 5.9 The Switch Matrix Module (SMM) is required for the *SX-200* FD. The SMM replaces the DX module on the MCC. The SMM contains the DX Array, the Dial Tone Filter, the SRAM and the Power Backup for the SRAM, and is address mapped identically to the SMC. The SMM is not available with Generic 1001, Generic 1002, Generic 1003, and Generic 1004.

## Analog Switching

- 5.10 The system uses an established LSI circuit to implement a space-division switching matrix in the analog bays. The basis of this space division is the 4-by-8 bit MT8804 Analog Switch Array, which is used throughout the analog bays to connect any one of the 32 analog speech paths to any one (or more) extension or trunk circuit(s).

## Analog Bay Interface

- 5.11 The task of connecting the 32 digital PCM channels from the digital DX network to the 32 analog speech paths (junctors) in the analog bays is performed by the Junctor Interface Circuit (JIC). The JIC converts PCM channels into 4-wire analog signals with a CODEC, and then converts the 4-wire (separate transmit and receive) signals from the CODEC to 2-wire junctor signals.

## Peripheral Interface Cards

- 5.12 Peripheral interface cards provide an interface between the terminations of the *SX-200* DIGITAL PABX (i.e., lines and trunks) and the circuit switch. The card type

depends upon the type of peripheral interfaced to the system; i.e., an E&M Trunk card caters to E&M trunks only.

The number of interface circuits that each card provides varies with the type, complexity, and space requirements of the circuit. A list of peripheral interface cards and the number of circuits on each is provided in Table 5-1.

Operation of the digital peripheral cards in Bays 1 and 2 (COMBO backplane only) is controlled by signals received from the peripheral switch on the MCC. In digital Bays 3 and 4 of a 336-port configuration and digital Bay 3 of a 456-port configuration, digital peripheral cards are controlled by the MCC through the Bay Control Card (BCC). Operation of the analog peripheral cards is controlled by the MCC through the Digital Interface Card and Peripheral Control Card in the associated analog shelf.

In the 672-port configuration for the *SX-200* DIGITAL and the *SX-200* FD, all digital peripheral cards are controlled by the MCC through the BCC.

The clocks provided by the Main Control Card for the digital peripheral cards and the Digital Interface Cards are as follows:

**Frame Pulse.** This signal synchronizes the start of a PCM frame which consists of a complete sequence of 32 channels. It occurs every 125 microseconds (8 kHz).

**244 ns Clock (C244+).** The positive going edge of each clock pulse is used to generate channel counting.

#### **Peripheral Interface Card Distribution (456-Port Configuration)**

Since the digital bays are non-blocking, while the analog bays are blocking, as many trunks as possible should be distributed in the digital bays. Analog type trunks should be evenly distributed throughout the analog bays; then most trunk calls will require only one speech path for completion. Place Direct-In Line (DIL) trunks in the same analog Bay (4, 5) as the extension(s) to which they ring. For example, a fully configured system in a heavy traffic environment might have four to five trunk cards in each of the analog bays.

Table 5-1 Peripheral Interface Cards

Card Name	Card Description	Bay Type	Circuits
ONS Line	On-Premise line interface	digital	12
LS/GS Trunk	Central Office trunk interface	digital	6
COV Line Card	<i>SUPERSET 3 / SUPERSET 4</i> Telephone control over voice line interface	digital	6
OPS Line Card	Off-premise line interface	digital	6
DID Trunk Card	Direct Inward Dial trunk interface	digital	6
E&M Trunk Module	E&M Trunk interface (module on Universal Card)	digital	1
Digital Line Card	<i>SUPERSET 3 DN / SUPERSET 4 DN</i> Telephones, <i>SUPERSET 401 / SUPERSET 410 / SUPERSET 420 / SUPERSET 430</i> Telephones, <i>SUPERCONSOLE 1000</i> , and DATASET 1100 series interface	digital	12
T1 Trunk	Digital trunk interface (24 channels)	digital	1
8 Station Line	On-Premise line interface	analog	8
<i>SUPERSET</i> Line	<i>SUPERSET 3 / SUPERSET 4</i> line interface	analog	8
CO Trunk	Central Office Trunk interface	analog	4
E&M Trunk	E&M Trunk interface	analog	2
DID/Tie Trunk	Direct Inward Dial/Tie trunk interface	analog	2

## Fiber Distributed Systems

- 5.13 The *SX-200* FD Control Cabinet is linked fiber optically to the Peripheral Cabinets. The Fiber Interface Module (FIM) provides the interface. Up to two Quad FIM Carriers may house up to seven FIMs in the Control Cabinet while one FIM is plugged into the Peripheral FIM Carrier in the Peripheral Cabinet.

## Fiber Interface Module (FIM)

- 5.14 The Fiber Interface Module (FIM) provides a fiber optic based communication link between the nodes of a distributed PABX system. The FIM contains a transmit section, a receive section, and a common control section. The FIM is used in the Control Cabinet and in the Peripheral Bays.

## Quad FIM Carrier

- 5.15 The quad FIM Carrier (QFC) provides the physical and electrical interface for up to four FIMs. Two quad FIM carriers can be installed in the Control Cabinet. The QFC connects to the Control Backplane via a ribbon cable.

## Peripheral FIM Carrier

- 5.16 The Peripheral FIM Carrier (PFC) plugs into the module position on the Bay Control Card. It acts as a FIM carrier for one Fiber Interface Module. The PFC provides the interface between the FIM and the BCC. It also provides the following functions:
- RS-232 Port with surge and over voltage protection for the Remote Maintenance Terminal
  - System Fail Transfer contact closure and control circuitry
  - Single ended to balanced conversion of C244 and Frame Pulse to the Bay Controller and the balanced to single ended conversion of the DX Links from the Bay Controller.

## Fiber Link Specifications and Requirements

- 5.17 The following items are the Fiber Link optical and cable specifications and requirements for the Fiber Interface Module used on the *SX-200* FD:
- Transmitter Wavelength: 850 nm
  - Transmitter Source: LED
  - Fiber Link Bit Rate: 20.48 Mbaud (10.24 MHz)
  - Fiber Cable Type: Glass Multi-mode
  - Fiber Diameter: 62.5/125  $\mu$ m
  - Connector System: "ST"
  - Maximum Distance (Cable Length): 1 km
  - Maximum Optical Loss: 10 dB (including splices and connections)
  - The grade or type of cable must be suitable for the installation (i.e., light or heavy duty, plenum, outdoor, etc.) Consult local building codes and your Fiber Cable supplier.

## **SX-200 DIGITAL PCM Circuit Switch Link Assignments**

### **Speech Path Accessing – Digital**

- 5.18 For each digital card, there are 1.5 PCM links allocated, connecting it to the circuit switch matrix on the Main Control card. Under control of the Main Control card (via the message subsystem), the transmit and receive channels of an originating circuit can be connected to the receive and transmit channels of any other circuit through the circuit switch matrix.

In the 672-port configuration there are three links from the Switch Matrix Card (or from the Switch Matrix Module in the *SX-200* FD) to each digital peripheral bay. In the 336-port configuration there are three links from the Main Control Card to Bays 3 and 4.

### **Speech Path Accessing – Analog**

Each speech path is directly wired to an MT8804 on each analog line and analog trunk circuit card in the system. Under control of the Peripheral Control card, any speech path may be connected to any of the circuits on the card. This is illustrated in Figure 5-5.

Table 5-2 PCM Circuit Switch Link Assignments

Link #	PCM Link Assignment
<b>336-Port Configuration</b>	
0	HDLC message system link
1	Digital Signal Processor link
2	Bay 3 voice link (lower shelf), ringing reference
3	Bay 3 voice link (upper shelf), message link (HDLC)
4	Bay 3 voice link (shared)
5	Bay 4 voice link (lower shelf), ringing reference
6	Bay 4 voice link (upper shelf), message link (HDLC)
7	Bay 4 voice link (shared)
8	Bay 1 voice link (lower shelf)
9	Bay 1 voice link (lower shelf)
10	Bay 1 voice link (upper shelf)
11	Bay 1 voice link (upper shelf)
12	Bay 2 voice link (shared)
13	Bay 2 voice link (shared)
14	dial tone, filter, codec, Bays 1 and 2 ringing reference
15	unused
<b>456-Port Configuration</b>	
0	HDLC message system link
1	Digital Signal Processor link
2	Bay 3 voice link (lower shelf), ringing reference
3	Bay 3 voice link (upper shelf), message link (HDLC)
4	Bay 3 voice link (shared)
5	Bay 4 voice link
6	Bay 4 & 5 message link
7	Bay 5 voice link
8	Bay 1 voice link (lower shelf)
9	Bay 1 voice link (lower shelf)
10	Bay 1 voice link (upper shelf)
11	Bay 1 voice link (upper shelf)
12	Bay 2 voice link (shared)
13	Bay 2 voice link (shared)

**Table 5-2 PCM Circuit Switch Link Assignments  
(continued)**

Link #	PCM Link Assignment
14	dial tone, filter, codec, Bays 1 and 2 ringing reference
15	unused
<b>672-Port Configuration</b>	
0	HDLC message link
1	Digital Signal Processor link from MCC
2	Reserved
3	Bay 1 voice link and ringing
4	Bay 1 voice link and messaging
5	Bay 1 voice link and miscellaneous tone
6	Bay 2 voice link and ringing
7	Bay 2 voice link and messaging
8	Bay 2 voice link and miscellaneous tone
9	Bay 3 voice link and ringing
10	Bay 3 voice link and messaging
11	Bay 3 voice link and miscellaneous tone
12	Bay 4 voice link and ringing
13	Bay 4 voice link and messaging
14	Bay 4 voice link and miscellaneous tone
15	Bay 5 voice link and ringing
16	Bay 5 voice link and messaging
17	Bay 5 voice link and miscellaneous tone
18	Bay 6 voice link and ringing
19	Bay 6 voice link and messaging
20	Bay 6 voice link and miscellaneous tone
21	Bay 7 voice link and ringing
22	Bay 7 voice link and messaging
23	Bay 7 voice link and miscellaneous tone
Page 2 of 3	

**Table 5-2 PCM Circuit Switch Link Assignments  
(continued)**

Link #	PCM Link Assignment
<b>672-Port SX-200 FD Configuration</b>	
0	HDLC message link
1	Digital Signal Processor link from MCC
2	Switch Matrix Module Misc., FIM Maintenance
3	Bay 1 voice link and ringing
4	Bay 1 voice link and messaging
5	Bay 1 voice link and miscellaneous tone
6	Bay 2 voice link and ringing
7	Bay 2 voice link and messaging
8	Bay 2 voice link and miscellaneous tone
9	Bay 3 voice link and ringing
10	Bay 3 voice link and messaging
11	Bay 3 voice link and miscellaneous tone
12	Bay 4 voice link and ringing
13	Bay 4 voice link and messaging
14	Bay 4 voice link and miscellaneous tone
15	Bay 5 voice link and ringing
16	Bay 5 voice link and messaging
17	Bay 5 voice link and miscellaneous tone
18	Bay 6 voice link and ringing
19	Bay 6 voice link and messaging
20	Bay 6 voice link and miscellaneous tone
21	Bay 7 voice link and ringing
22	Bay 7 voice link and messaging
23	Bay 7 voice link and miscellaneous tone
Page 3 of 3	

### Software Limitations

- 5.19 Software limitations exist that restrict the number of devices that can be programmed. Refer to Table 5-3 when the number of devices proposed for a system is close to system limits. CDE will prevent the user from programming any more than these amounts.

Table 5-3 Software Limitations

Device	Multiplier Generic 1001	Multiplier Generic 1002	Multiplier Generic 1003	Multiplier Generic 1004 /1005	Number in System	Total
COV Sets	2	2	2	2		
Stations	1	1	1	1		
DNIC Voice	2	2	2	2		
DNIC Data Port	na	1	1	1		
Universal Modules	1	1	1	1		
Receiver Modules	4	4	4	4		
Line Appearance	1	1	1	1		
Trunks	1	1	1	1		
Hunt Groups	1	1	1	1		
Trunk Groups	1	1	1	1		
Cards Programmed	1	1	1	1		
Bay Control Card	1	1	1	1		
ACD Agent	na	na	1	1		
ACD Supervisor	na	na	1	1		
ACD Sr. Supv.	na	na	1	1		
ACD Agent Group	na	na	1	1		
ACD Path	na	na	1	1		
Modem Pool	na	na	1	1		
<b>TOTAL:</b> For Generic 1001, must be less than 1003. For Generic 1002 and 1003, must be less than 1956 for 672-port ACD and 336/456-port D06 and later; less than 942 for 336/456-port pre-D06 software; less than 1966 for 336/456-port D06 and later software; less than 932 for 672-port pre- D06. For Generic 1004 and Generic 1005, must be less than 1956.						

### Dynamic RAM Allocation

The database is 250 kilobytes for 336- and 456-port systems, and 300 kilobytes for 672-port systems; for Generic 1004 and Generic 1005, it is 300 kilobytes for all configurations. Table 5-4 identifies the percentage of RAM used for programmed devices.

To calculate the space required for Speed Call, ARS, Account Code, and Feature Key programming, use Table 5-5.

Table 5-4 RAM Space Limitations						
Device	Multiplier Generic 1001	Multiplier Generic 1002	Multiplier Generic 1003	Multiplier Generic 1004 /1005	Number in System	Total
COV Sets	150	378	378	436		
Stations	110	294	294	320		
DNIC Voice	na	378	378	436		
DNIC Data Port	na	382	382	406		
Console Module	700	915	915	939		
Receiver Modules	368 (4 rx)	780 (4 rx)	780 (4 rx)	812 (4 rx)		
Line Appearance	26	36	36	36		
Trunks	126	296	296	298		
Trunk Group	31	35	35	31		
Hunt Group	25	61	61	52		
ACD Agent	na	na	52	54		
ACD Supervisor	na	na	38	40		
ACD Sr. Supv.	na	na	42	44		
ACD Agent Group	na	na	116	112		
ACD Path	na	na	90	90		
Modem Pool	na	na	366	406		
Key System Page Group	na	na	na	32		
<i>SUPERSET DSS</i>   Module	na	na	303	329		
T1 Trunk Card	na	na	384	378		
Moduled Card	76	100	100	96		
Non-Moduled Cards Programmed	59	84	84	80		

Table 5-4 RAM Space Limitations (continued)						
Device	Multiplier Generic 1001	Multiplier Generic 1002	Multiplier Generic 1003	Multiplier Generic 1004 /1005	Number in System	Total
TOTAL (in bytes)						
Divide this TOTAL as follows: For Generic 1001 by 1053. For Generic 1002 and 1003, by 5868 for 672-port ACD and 336/456-port D06 and later; or by 2355 for 336/456-port pre-D06 software; or by 4915 for 336/456-port D06 and later software; or by 2796 for 672-port pre-D06. For Generic 1004 and Generic 1005, by 5868. This will give the percentage of data base space used for devices. The sum of this figure plus the speed call, ARS digits, and account code percentages must be less than 100%.						%
Page 2 of 2						

Table 5-5 RAM Space Requirements For Features			
Feature	Description	Formula	Total
ARS Digits	Take the total number of ARS digits (D) plus twice the number of ARS entries (S). Add to this a 5% overhead.	$1.05 ( D + 2S )$	
Account Codes	Take the total number of Account Code digits (D) plus twice the number of Account Code entries (S). Add to this a 5% overhead.	$1.05 ( D + 2S )$	
Speed Calls	Take the total number of Speed Call digits (D) plus the number of Speed Call entries (E).	$D + E$	
Feature Keys	Take the number of sets with Feature Keys programmed (S) and multiply by sixteen.	$S \times 16$	
TOTAL (in bytes)			
Divide the TOTAL by 2560 for 336- or 456-port machines, or by 3072 for 672-port machines, to get the percentage of data base space used for features.			%

The sum of the device and feature calculations, Table 5-4 and Table 5-5, must be less than 100%.

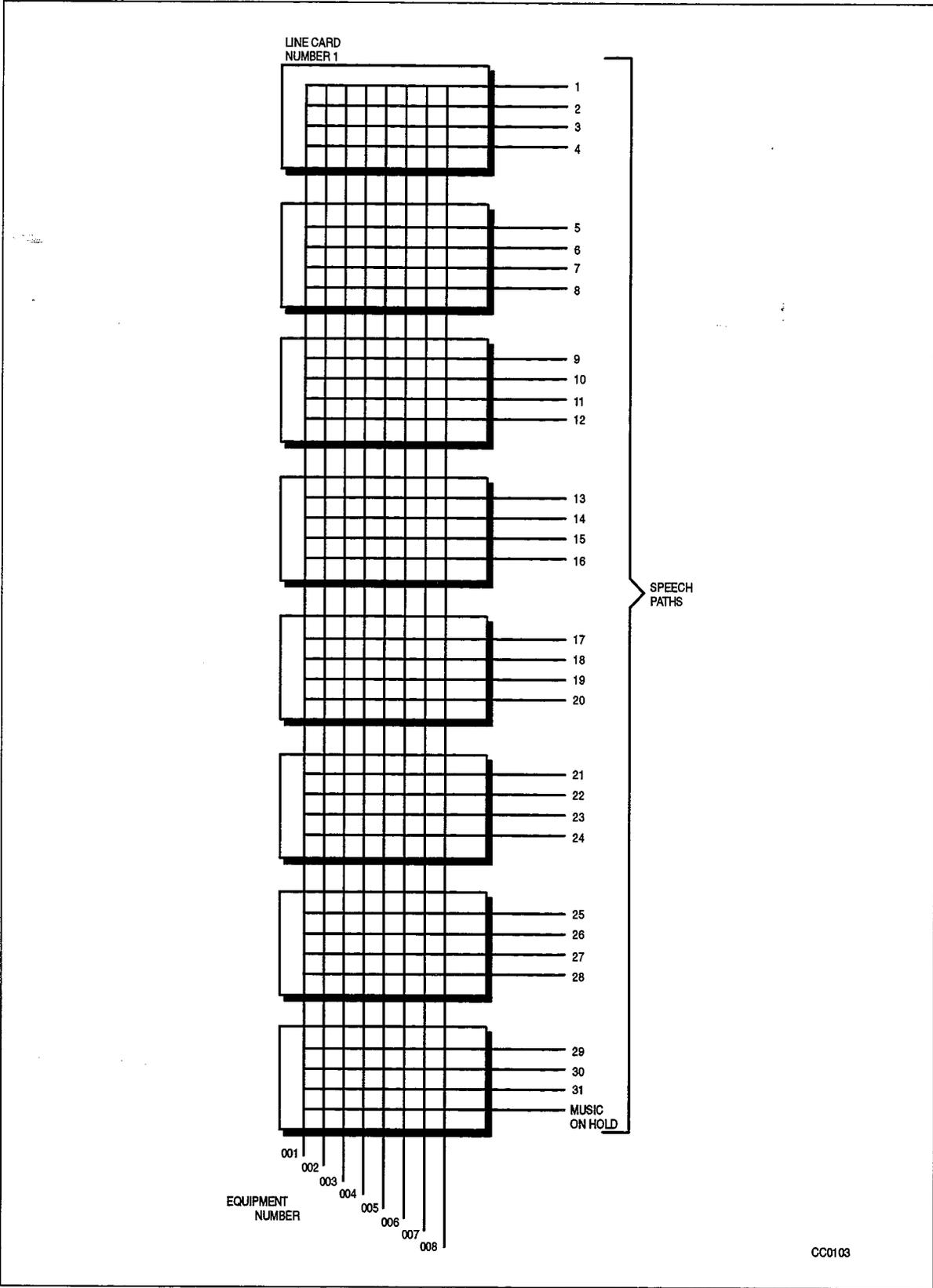


Figure 5-5 Analog Speech Paths



## 6.

## SIGNALING AND SUPERVISION

### General

- 6.1 This Part outlines the signaling and supervision parameters of the *SX-200* DIGITAL PABX.

The standard range of tones are available from the *SX-200* DIGITAL PABX's Digital Signal Processor:

- 12 DTMF sets of tones, as listed in Table 6-1.
- A set of call progress tones as listed in Part 9, which form part of the country's Audible Tone Plan.
- One ringing tone of 20 Hz.

The *SX-200* DIGITAL PABX is capable of accepting and repeating signals from telephone sets which have the parameters shown in Table 6-1, DTMF Tone Parameters and Table 6-2, Dial Pulse Reception Limits.

Where any of the frequencies shown in Part 9 are present at the system input, any other single frequency (200 – 3400 Hz) should be a minimum of 40 dB below the signal frequency. DTMF pulses are registered in the presence of precise dial tone at a level of -10 dBm.

The *SX-200* DIGITAL PABX gives the following output signal conditions:

- Dial Pulse Conditions:

Pulse Rate	: 9 to 11 pps
Break Interval	: 58% to 62%
Interdigit Time	: 800 ms.

- DTMF Dialing Conditions for North America:

Frequency Deviation	: $\pm 1\%$
Tone Duration	: greater than 90 ms
Interdigit Time	: greater than 100 ms
Level, low group	: greater than -4 dBm
Level, high group	: greater than -4 dBm
Level, DTMF signal	: less than -1 dBm
Level, third Harmonic	: better than 40 dB Frequency below DTMF signal
Twist	: 0 dB.

Table 6-1 DTMF Tone Parameters			
Low Frequency (Hz)	High Frequency (Hz)		
	1209	1336	1477
697	1	2	3
770	4	5	6
852	7	8	9
941	*	0	#

Frequency deviation:  $\pm 1.5\%$   
 Signal interval (2 frequency): 40 ms (min)  
 Per frequency, minimum level: -17 dBm on line circuit  
 Twist, maximum (at -10 dBm): +4 to -8 dB (high frequency relative to low frequency)

Table 6-2 Dial Pulse Reception Limits		
Parameter	Min	Max
<b>ONS Line:</b>		
Pulse Rate	8 pps	12 pps
Break Duration	58%	64%
Interdigit Time	300 ms	15 s
<b>8 Station Line:</b>		
Pulse Rate	8 pps	12 pps
Break Duration	50%	80%
Interdigit Time	300 ms	15 s
<b>OPS Line:</b>		
Pulse Rate	8 pps	12 pps
Break Duration	42%	84%
Interdigit Time	300 ms	15 s

## 7.

## TRANSMISSION

## General

7.1 The following descriptions detail some of the transmission characteristics which apply to the *SX-200* DIGITAL PABX.

## Frequency Response

7.2 The frequency response relative to 1004 Hz at 0 dBm for different types of interconnections is shown in Table 7-1.

Table 7-1 Frequency Response			
		Variation in Attenuation with respect to 1004 Hz (dB)	
Interconnection	Frequency (Hz)	minimum	maximum
Line to Line or	60	-20.0	—
	200	0	-5.0
Line to 2-W Analog Trunk or	300	0.5	-1.0
	3000	0.5	-1.0
2-W Analog Trunk to 2-W Analog Trunk	3200	0.5	-1.5
	3400	0	-3.0
Line to 4-W Analog Trunk or	60	-20.0	—
	200	0	-4.0
2-W Analog Trunk to 4-W Analog Trunk	300	0.4	-0.65
	3000	0.4	-0.65
	3200	0.4	-1.5
	3400	0	-3.0
4-W Analog Trunk to 4-W Analog Trunk	60	-16.0	—
	200	0	-3.0
	300	0.3	-0.3
	3000	0.3	-0.3
	3200	0.3	-1.5
	3400	0	-3.0

## Overload – Digitally Switched Analog Card Types

- 7.3 The overload levels shown in Table 7–2 define the maximum signal levels which may be applied to an analog interface before clipping occurs. The Input Overload (IOL) defines the maximum analog input signal level which can be applied to a digital interface circuit before clipping of the encoded PCM word occurs. The Output Overload (OOL) defines the maximum analog output signal which can be produced at the output of an interface by the application of a 3 dBm0 digital signal to the input.

## Overload – Locally Switched Analog Card Types

- 7.4 The change in attenuation when the level of a 1004 Hz signal is increased from –9 to +7 dBm shall not exceed 0.4 dB.

**Table 7–2 Overload Levels – Digitally Switched Analog Card Types**

		Overload Point (dB)	
Interface Type	Connecting Circuit	IOL	OOL
ONS(A)	any circuit	6.0	0
ACO(A)	ONS(D)	0	3.0
ACO(A)	any trunk	3.0	3.0

## Quantization Distortion

- 7.5 The quantization distortion of a connection is a measure of the signal to distortion ratio as the input signal is varied. Note that this parameter does not apply to the analog card types. For 95% of connections the signal to distortion ratio will exceed the limits shown in Table 7–3.

**Table 7–3 Signal To Distortion Ratio**

1004 Hz Input Level (dBm0)	Signal/Distortion Ratio (dB) 95% of all connections
0 to –30	33
–40	27
–45	22

## Intermodulation Distortion

- 7.6 Intermodulation (harmonic) distortion is measured using two pairs of equal level tones (851/863 Hz and 1372/1388 Hz), at a total composite input power of  $-13.0$  dBm0. Table 7-4 shows the second and third order products for the different types of connections. 95% of the connections in each category shall exceed the stated limits.

Connection Type	Second Order Product (dB)	Third Order Product (dB)
Line to Line	40	43
Line to Trunk	45	53
Trunk to Trunk	45	53

## Return Loss

- 7.7 The ERL and SFRL return losses for different types of interconnection or idle states are shown in Table 7-5.

Connection Type	Terminal Balance		Through Balance		Transhybrid Loss		Non-Talking (dB)
	ERL (dB)	SFRL (dB)	ERL (dB)	SFRL (dB)	200 – 3400 Hz	500 – 2500 Hz	
Line to Line	18	12					
Line to 4-W Trunk	24	14					
4-W Trunk to Line	24	14					
Line to 2-W Trunk	18	12					
2-W Trunk to Line	18	12					
4-W Trunk to 2-W Trunk	28	14					
2-W Trunk to 4-W Trunk	28	14					
4-W Trunk to 4-W Trunk			27	20			
ONS(D) Line					17	19	
2-W Trunk					18	21	
Loop Start LS/GS Trunk (2-W)							6
Ground Start LS/GS Trunk (2-W)							2
Line to Line *	20	14					
Trunk to Trunk *	24	14	27	20			10
Line to Trunk *							5

\* denotes analog card type

### Crosstalk

7.8 The crosstalk attenuation, or coupling loss, between any two transmission paths, at any frequency between 200 and 3200 Hz is greater than 75 dB for 95% of all connections.

### Echo Path Delay

7.9 The round trip echo path delay with a frequency of 1500 Hz does not exceed the stated values for the following types of interconnection:

- Line to Line: 3.0 ms
- Line to Trunk: 3.0 ms
- Trunk to Trunk: 3.0 ms.

### Envelope Delay Distortion

7.10 Table 7-6 details the maximum envelope delay distortion for the digital card types. These objectives are met by 95% of all connections. For the analog card types, the envelope delay distortion is less than 200 microseconds between 400 and 3200 Hz, for all connections.

<b>Table 7-6 Envelope Delay Distortion</b>		
<b>Connection Type</b>	<b>Frequency Band (Hz)</b>	<b>Envelope Delay Distortion (microseconds)</b>
Line to Line	1000 – 3000	less than 280
	400 – 3200	less than 560
Line to Trunk	1000 – 3000	less than 140
	400 – 3200	less than 280
Trunk to Trunk	1000 – 3000	less than 140
	400 – 3200	less than 280

## Longitudinal Balance

7.11 All connections (except ONS) meet the longitudinal balance requirements outlined in Table 7-7. Note that these apply to OFF-HOOK circuits only.

<b>Table 7-7 Longitudinal Balance</b>		
<b>Frequency (Hz)</b>	<b>Longitudinal Balance (dB)</b>	
	<b>Minimum</b>	<b>Average</b>
200	58	63
500	58	63
1000	58	63
3000	53	58

## System Impedances

7.12 System impedances are as follows:

- Station
  - 9109-010 : 600 ohms input impedance  
600 ohms DC loop resistance
  - 9110-110 : 600 ohms input impedance  
1200 ohms DC loop resistance.
- LS/GS Trunk Loop : 600 ohms input impedance, 1600 ohms loop range.
- LS/GS Trunk T/R to ground Resistance ( – both in the IDLE state ) :
  - greater than 30 Kohms (ground start)
  - greater than 10 Mohms (loop start)
- Analog type lines: 600 ohms ac input impedance, nominal
- Analog type trunks: 600/900 ohms ac input impedance, nominal

## Idle Channel Noise – C Message

7.13 The idle channel C message noise will not exceed the following values for any type of interconnection:

- Average: 16 dBrnC
- 95% of all interconnections: 20 dBrnC

### Idle Channel Noise – 3 kHz Flat

7.14 The idle channel noise for 3 kHz flat noise requirements do not exceed the following values for any type of interconnection:

- 95% of all interconnections: 39 dBrn0
- 50% of all interconnections: 35 dBrn0

## 8.

## LOSS AND LEVEL PLAN

### General

- 8.1 This Part describes the loss and level plan for North American applications of the *SX-200* DIGITAL PABX. A large number of interconnections are possible, ranging from interconnections between on-premises (ONS) line circuits, to the interconnection of remotely located satellite PABXs with the *SX-200* DIGITAL PABX. This part describes the principles of the loss and level plans, their application to the *SX-200* DIGITAL PABX, and the arrangements for setting the transmission levels.

### North American Loss and Level Plans

- 8.2 The purpose of a transmission loss and level plan is to provide an acceptable transmission grade of service to all subscribers in the telephone network. At present, two loss plans exist for the public switched network in North America. They are the VIA NET LOSS (VNL) plan and the SWITCHED DIGITAL NETWORK (SDN) plan.

#### VNL Plan

The VNL plan consists of two parts: a fixed loss portion and a variable loss portion as follows:

- **Fixed Portion.** A minimum fixed amount of loss is introduced into all Toll connections. This loss is equal to 5 dB and is split equally between the two end trunks connected to the Toll network.
- **Variable Portion.** In addition to the fixed portion, a variable loss is introduced into all trunks involved in a connection. This loss, known as VNL, is proportional to the trunk length and its propagation delay. The loss ranges from a minimum of 0.5 dB to a maximum of 3.0 dB, and covers trunk lengths from 0 to about 2900 km (0 to 1800 miles). Trunks in excess of this length employ echo suppressors and are designed to zero loss.

The loss objectives for Toll connections using the VNL plan range from a minimum of 5.5 dB to a maximum of 8.0 dB between end-to-end CO offices (CL5 to CL5). This is illustrated in Table 8-2.

#### SDN Loss Plan

The Switched Digital Network (SDN) loss plan was developed to meet the needs of the evolving digital public switched network. This plan does not assign losses to intermediate links in a connection. Under the plan, the local area public network (local CO to local CO) is operated at zero loss. This feature eliminates the need to introduce digital padding on intermediate digital trunk links and maintains data transparency throughout the network. Control of echo and noise with this plan is achieved by inserting fixed amounts of loss at the end points where the conversion to analog takes place. A

compromise value of 6 dB was selected for line-to-line connections over the Toll network. This loss is inserted in the receive (RX) direction of transmission (D-A) under software control. This is illustrated in Figure 8-2.

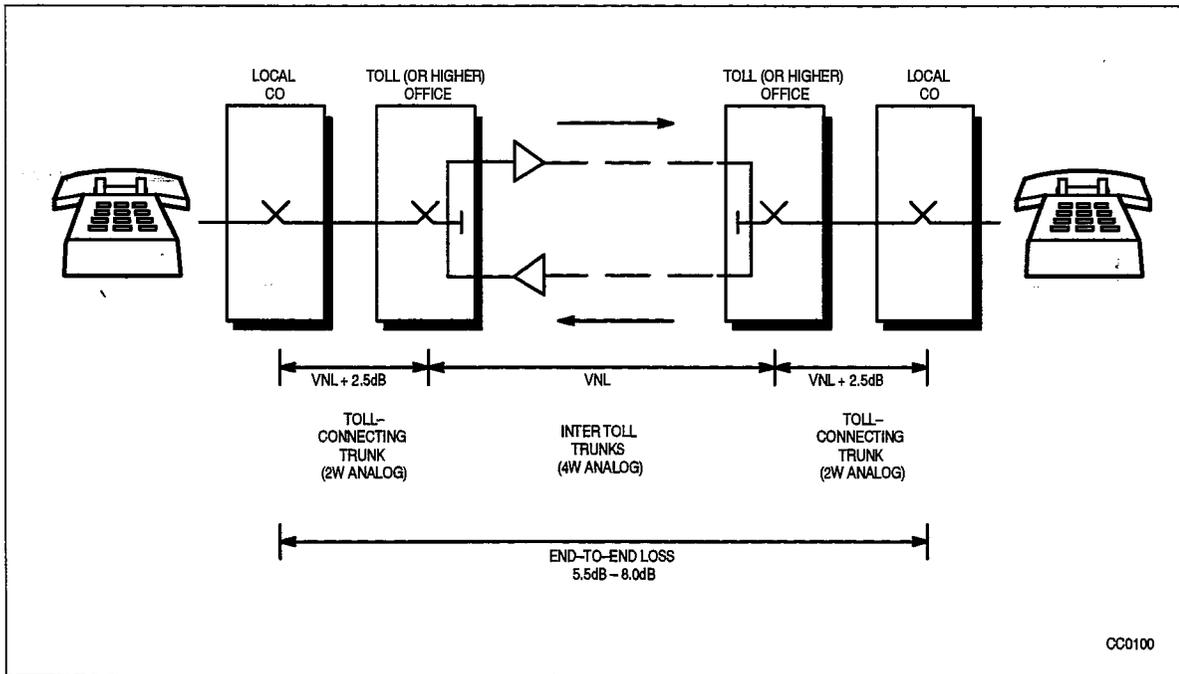


Figure 8-1 Local to Local Central Offices VNL Objectives

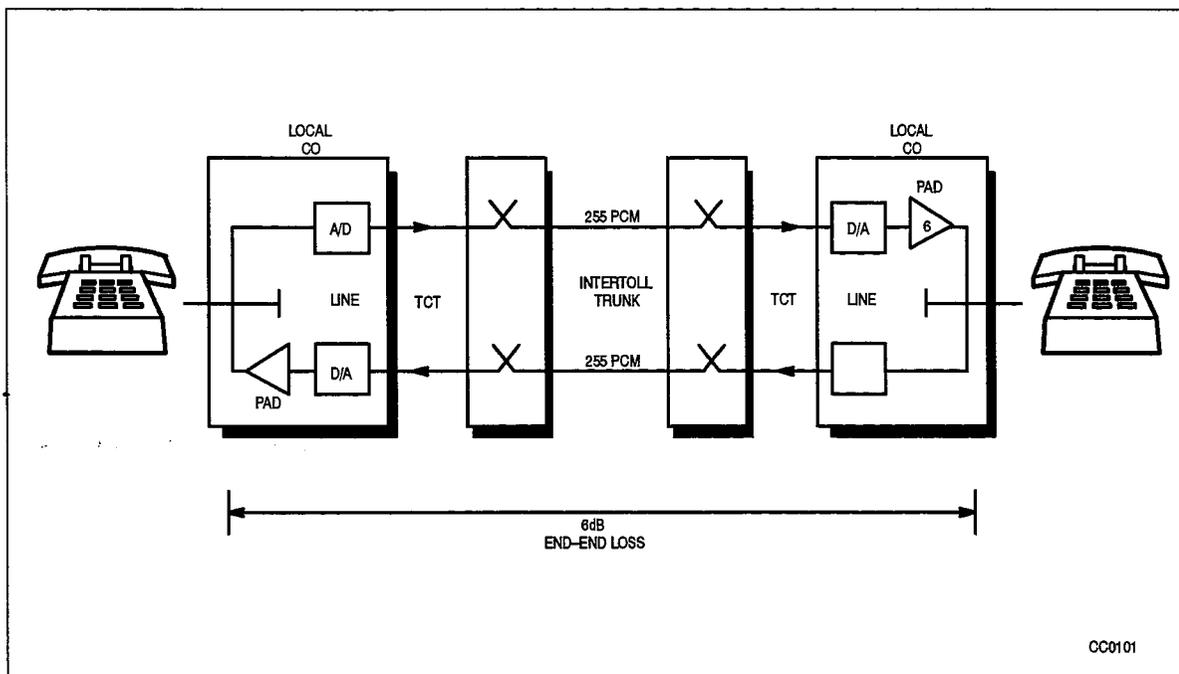


Figure 8-2 Local to Local Central Offices Fixed Loss Plan Objectives

### SX-200 DIGITAL PABX Loss And Level Plan

To illustrate the loss and level plan used for the SX-200 DIGITAL PABX, reference is made to the layout illustrated in Figure 8-3. This layout is not intended to be a typical network, but is drawn to show the different types of trunk and line interfaces which the SX-200 DIGITAL PABX will accommodate.

Table 8-1 explains the terms used for the different types of peripheral interfaces.

Table 8-1 Interface References		
Circuit Ref	Description	Card Type (Part No.)
ONS	An industry-standard telephone set may be connected to the SX-200 DIGITAL PBX by means of the following card types:	
ONS(D)	ONS Line card	9109-010
ONS(A)	8 Station Line card	9110-011
OPSS	An industry-standard telephone set located off premises may be connected to the SX-200 DIGITAL PABX via this card type:	
	• OPS Line card	9109-020
OPSL	An industry-standard telephone set located outside the range of the ONS circuit (over 2 kilometers) may be connected to the SX-200 DIGITAL PABX via this card type:	
	• OPS Line card	9109-020
ACO	An Analog CO (ACO) trunk can be connected to the SX-200 DIGITAL PABX by means of one of the following types of trunk interface cards:	
ACO(D)	LS/GS Trunk card	9109-011
ACO(A)	CO Trunk card	9110-211
ACO(A)	DID/Tie Trunk card	9110-031
ACO(D)	DID Trunk card	9109-031
ATO	An Analog Toll Office (ATO) trunk may be connected to the SX-200 DIGITAL PABX by means of one of the following trunk interface cards:	
ATO(D)	LS/GS Trunk card	9109-011
ATO(A)	CO Trunk card	9110-211
ATO(A)	E&M Trunk card	9110-013
ATO(D)	E&M Trunk module	9109-013
ATT	An Analog Tie Trunk (ATT) can be connected between the SX-200 DIGITAL PABX and another PBX, over a 2- or 4-wire analog trunk by means of one of the following trunk cards:	

**Table 8-1 Interface References  
(continued)**

<b>Circuit Ref</b>	<b>Description</b>	<b>Card Type (Part No.)</b>
ATT(A)	E&M Trunk card	9110-013
ATT(D)	E&M Trunk module	9109-013
ATT(A)	DID/Tie Trunk card	9110-031
ATT(D)	DID Trunk card	9109-031
DCO	A Digital Central Office Trunk (DCO) connects a Digital CL5 office over digital facilities.	
DTO	A Digital Toll Office Trunk (DTO) connects a Digital PABX to a Digital CL4 or higher office over digital facilities.	
DTT	A Digital Tie Trunk (DTT) connects a Digital PABX to a Digital PABX over digital facilities.	
T1 Trunk	• Digital T1 Trunk card.	9109-021
CTT	A Combination Tie Trunk connects a Digital PABX to a remote channel bank over digital facilities. The remote channel bank usually interfaces to an analog PBX and provides the A/D & D/A conversion.	
SATT SDTT SCTT	This designation refers to a "satellite" tie trunk which connects a Main PBX to a Satellite PBX. The type of trunk cards used to interface are the same as those for the ATT, DTT, and CTT interfaces described above.	

Page 2 of 2

To implement the required loss objectives (Table 8-2) of the plan, combinations of fixed and software selectable analog and digital transmission pads are provided. All analog padding is provided by Mitel 8960 series combined Codec/Filter integrated circuits, over a 7 dB range in 1 dB increments. Padding is provided in both the Transmit (TX) and Receive (RX) directions (see Part C).

### **Satellite PABX**

A satellite PABX (shown in Figure 8-3) is defined as a PABX which has no direct connection to the serving central office for incoming traffic. It has no directory number, and receives all incoming calls through the main PABX over satellite trunks. The satellite PABX is usually in the same local area as its main PABX. Note that the Loss Plan differs for "SATELLITE" trunks in the main PABX from "SATELLITE" trunks in the satellite PABX.

### **Analog Transmission Pad Arrangements – Digital Interfaces**

The analog transmit pad (A/D) setting defines the input level required to produce a 0 dBm0 digital signal, as well as the overload point of the interface (approximately 3 dB

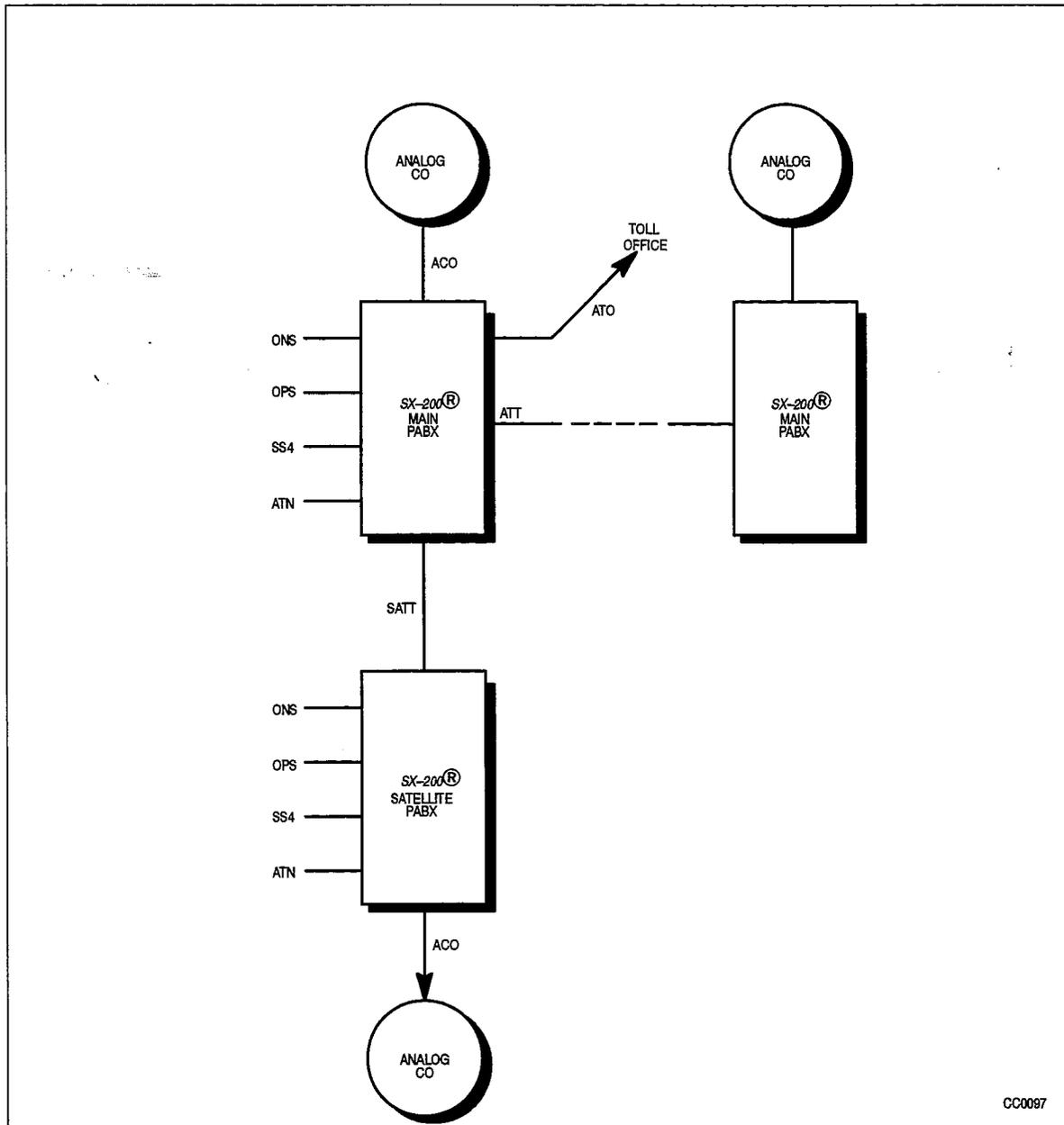
above the 0 dBm0 signal level). The Tx pad comprises a fixed portion and a variable portion. The fixed portion is incorporated into the analog interface to the codec/filter. The variable portion (0 to 7 dB) is incorporated into the codec/filter.

The analog receive pad (D/A) defines the output level produced by a digital milliwatt input signal. The Rx pad comprises a fixed portion which is part of the analog interface to the codec/filter, and a variable portion (0 to -7 dB) which is incorporated into the codec/filter. This pad arrangement is illustrated in Figure 8-4.

### **Analog Transmission Pad Arrangements – Analog Interfaces**

The transmit pads for the analog type cards consist of a variable or fixed portion on the card itself, a fixed portion on the Digital Interface card, and a variable portion in the codec/filter. The variable transmit pad on the analog ONS line card may be set to either -6.0 dB or -10.7 dB. The fixed transmit pad on the analog trunk cards is set to -6.0 dB. The fixed portion on the Digital Interface card is set to 1.8 dB while the variable portion in the codec/filter can be set to anything between 0 dB and 7 dB, in 1 dB steps. The input signal level and overload level are defined by the sum of the fixed and variable pads described in the Digital Interfaces paragraphs.

The receive pads for the analog type cards consist of a fixed portion on the analog card itself, a fixed portion on the Digital Interface card, and a variable portion in the codec/filter. The fixed portions are set to 5.7 dB and -1.9 dB respectively, while the variable portion can be set from 0 to -7 dB in 1 dB steps. The output signal level and overload level are defined by the sum of the fixed and variable pads as described in the Digital Interfaces paragraphs. This pad arrangement is illustrated in Figure 8-5.



**Figure 8-3 Types of Trunk and Line Interfaces**

**Local Switching Loss Plan**

To maximize the traffic performance of the *SX-200* DIGITAL PABX, connections between analog interface circuits which are in the same analog equipment bay may be made by connecting both interfaces to the same analog speech path (juncture), without passing through the digital switching network in the Control shelf. This type of connection is known as a "locally switched connection". The port-to-port losses for locally switched connections are shown in Table 8-3.

All analog interfaces may be represented by the block diagram Figure 8-6 when they are locally switched.

Table 8-2 SX-200 DIGITAL PABX Loss Plan

Originating Circuit	Connecting Circuit	Loss (dB) Tx Direction	Loss (dB) Rx Direction
ONS(D)	ONS(D)	-6.0	-6.0
	ONS(A)	-5.2	-5.2
	OPSS	-6.0	-6.0
	OPSL	-3.0	-3.0
	ACO(D)	0	0
	ACO(A)	-0.2	-0.2
	ATT(A)	-3.2	-3.2
	ATT(D)	-3.0	-3.0
	ATO(A)	-6.2	-6.2
	ATO(D)	-6.0	-6.0
	DCO	-3.0	-3.0
	DTO	-3.0	-9.0
	DTT	-3.0	-9.0
	sATT	-3.0	-3.0
	sDTT	-3.0	-3.0
sCTT	-3.0	-9.0	
ONS(A)	ONS(D)	-6.0	-6.0
	ONS(A)	-5.4	-5.4
	OPSS	-5.2	-5.2
	OPSL	-3.2	-3.2
	ACO(D)	-0.2	-0.2
	ACO(A)	-0.4	-0.4
	ATT(A)	-3.4	-3.4
	ATT(D)	-3.2	-3.2
	ATO(A)	-6.4	-6.4
	ATO(D)	-6.2	-6.2
	DCO	-3	-3
	DTO	-3.2	-9.2
	DTT	-3	-9
	sATT	-3.2	-3.2
	sDTT	-3	-3
sCTT	-3	-9	
OPSS	ONS(D)	-6.0	-6.0
	ONS(A)	-5.2	-5.2
	OPSS	-6.0	-6.0

**Table 8-2 SX-200 DIGITAL PABX Loss Plan  
(continued)**

Originating Circuit	Connecting Circuit	Loss (dB) Tx Direction	Loss (dB) Rx Direction
	OPSL	-3.0	-3.0
	ACO(D)	0	0
	ACO(A)	-0.2	-0.2
	ATT(D)	-3.0	-3.0
	ATT(A)	-3.2	-3.2
	ATO(D)	-6.0	-6.0
	ATO(A)	-6.2	-6.2
	DCO	-3	-3
	DTO	-3	-9
	sATT	-3.0	-3.0
	sCTT	-3.0	-9.0
	sDTT	-3	-3
OPSL	ONS(D)	-3.0	-3.0
	ONS(A)	-3.2	-3.2
	OPSL	0	0
	OPSS	-3.0	-3.0
	ACO(D)	0	0
	ACO(A)	-0.2	-0.2
	ATT(D)	-2.0	-2.0
	ATT(A)	-2.2	-2.2
	ATO(D)	-3.0	-3.0
	ATO(A)	-3.2	-3.2
	DCO	0	0
	DTO	0	-6
	DTT	0	-6
	sATT	-2.0	-2.0
	sDTT	-2	-2
	sCTT	0	-6
ACO(D)	ONS(D)	0	0
	ONS(A)	-0.2	-0.2
	OPSS	0	0
	OPSL	0	0
	ACO(D)	0	0
	ACO(A)	-0.2	-0.2
	ATT(D)	-2.0	-2.0

**Table 8-2 SX-200 DIGITAL PABX Loss Plan  
(continued)**

Originating Circuit	Connecting Circuit	Loss (dB) Tx Direction	Loss (dB) Rx Direction
	ATT(A)	-2.2	-2.2
	ATO(D)	-3.0	-3.0
	ATO(A)	-3.2	-3.2
	DCO	0	0
	DTO	0	-6
	DTT	0	-6
	sATT	0	0
	sDTT	0	0
	sCTT	3	-3
ACO(A)	ONS(D)	-0.2	-0.2
	ONS(A)	-0.4	-0.4
	OPSS	-0.2	-0.2
	OPSL	-0.2	-0.2
	ACO(D)	-0.2	-0.2
	ACO(A)	-0.4	-0.4
	ATT(D)	-2.2	-2.2
	ATT(A)	-2.4	-2.4
	ATO(D)	-3.2	-3.2
	ATO(A)	-3.4	-3.4
	DCO	-0.2	-0.2
	DTO	-0.2	-6.2
	DTT	-0.2	-6.2
	sATT	-0.2	-0.2
	sDTT	-0.2	-0.2
	sCTT	2.8	-3.2
ATT(A)	ONS(D)	-3.2	-3.2
	ONS(A)	-3.4	-3.4
	OPSS	-3.2	-3.2
	OPSL	-2.2	-2.2
	ACO(D)	-2.2	-2.2
	ACO(A)	-2.4	-2.4
	ATT(D)	-0.2	-0.2
	ATT(A)	-0.4	-0.4
	ATO(D)	-0.2	-0.2
	ATO(A)	-0.4	-0.4

**Table 8-2 SX-200 DIGITAL PABX Loss Plan  
(continued)**

Originating Circuit	Connecting Circuit	Loss (dB) Tx Direction	Loss (dB) Rx Direction
	DCO	-2.2	-2.2
	DTO	2.8	-3.2
	DTT	2.8	-3.2
	sATT	-0.2	-0.2
	sDTT	-0.2/-2.2	-0.2/2.2
	sCTT	2.8	-3.2
ATT(D)	ONS(D)	-3.0	-3.0
	ONS(A)	-3.2	-3.2
	OPSS	-3.0	-3.0
	OPSL	-2.0	-2.0
	ATT(D)	0	0
	ATT(A)	-0.2	-0.2
	DCO	-2	-2
	DTO	3	-3
	DTT	3	-3
	sATT	0	0
	ACO(D)	-2.0	-2.0
	ACO(A)	-2.2	-2.2
	ATO(D)	0	0
	ATO(A)	-0.2	-0.2
sDTT	0/-2	0/-2	
sCTT	3	-3	
ATO(A)	ONS(D)	-6.2	-6.2
	ONS(A)	-6.4	-6.4
	OPSS	-6.2	-6.2
	OPSL	-3.2	-3.2
	ACO(D)	-3.2	-3.2
	ACO(A)	-3.4	-3.4
	ATT(D)	-0.2	-0.2
	ATT(A)	-0.4	-0.4
	ATO(D)	-0.2	-0.2
	ATO(A)	-0.4	-0.4
	DCO	-3.2	-3.2
	DTO	2.8	-3.2
	DTT	2.8	-3.2

**Table 8-2 SX-200 DIGITAL PABX Loss Plan  
(continued)**

Originating Circuit	Connecting Circuit	Loss (dB) Tx Direction	Loss (dB) Rx Direction
	sATT	-3.2	-3.2
	sDTT	-3.2	-3.2
	sCTT	2.8	-3.2
ATO(D)	ONS(D)	-6.0	-6.0
	ONS(A)	-6.2	-6.2
	OPSS	-6.0	-6.0
	OPSL	-3.0	-3.0
	ACO(D)	-3.0	-3.0
	ACO(A)	-3.2	-3.2
	ATT(D)	0	0
	ATT(A)	-0.2	-0.2
	ATO(D)	0	0
	ATO(A)	-0.2	-0.2
	DCO	-3	-3
	DTO	3	-3
	DTT	3	-3
	sATT	-3.0	-3.0
	sDTT	-3	-3
sCTT	3	-3	
sATT	ONS(D)	-3.0	-3.0
	ONS(A)	-3.2	-3.2
	OPSS	-3.0	-3.0
	OPSL	-2.0	-2.0
	ACO(D)	0	0
	ACO(A)	-0.2	-0.2
	ATT(D)	0	0
	ATT(A)	-0.2	-0.2
	ATO(D)	-3.0	-3.0
	ATO(A)	-3.2	-3.2
	DCO	0	0
	DTO	0	-6
	DTT	0	-6
	sATT	0	0
	sDTT	0	0
sCTT	0	-6	

**Table 8-2 SX-200 DIGITAL PABX Loss Plan  
(continued)**

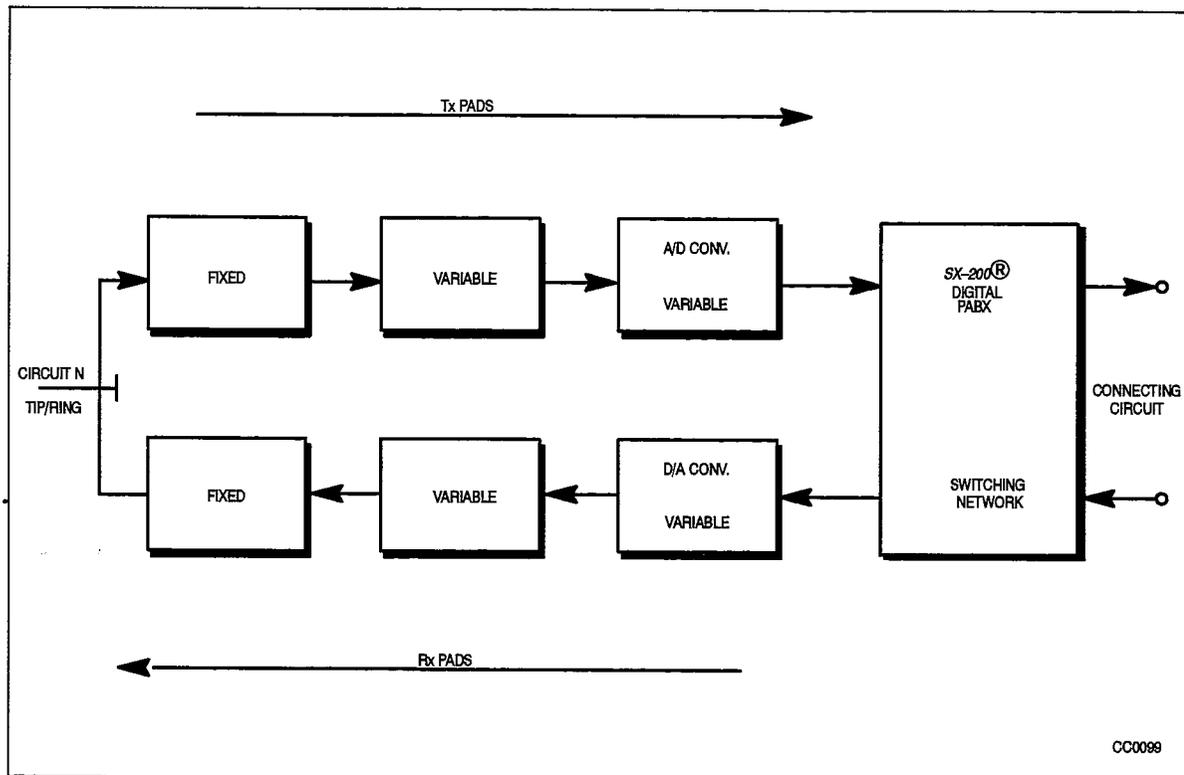
Originating Circuit	Connecting Circuit	Loss (dB) Tx Direction	Loss (dB) Rx Direction
DCO	ONS(D)	-3	-3
	ONS(A)	-3	-3
	OPSS	-3	-3
	OPSL	0	0
	ACO(D)	0	0
	ACO(A)	-0.2	-0.2
	ATT(D)	-2	-2
	ATT(A)	-2.2	-2.2
	ATO(D)	-3	-3
	ATO(A)	-3.2	-3.2
	DCO	0	0
	DTO	0	-6
	DTT	0	-6
	sATT	0	0
	sDTT	0	0
sCTT	0	-6	
DTO	ONS(D)	-9	-3
	ONS(A)	-9.2	-3.2
	OPSS	-9	-3
	OPSL	-6	0
	ACO(D)	-6	0
	ACO(A)	-6.2	-0.2
	ATT(D)	-3	3
	ATT(A)	-3.2	2.8
	ATO(D)	-3	3
	ATO(A)	-3.2	2.8
	DCO	-6	0
	DTO	0	0
	DTT	0	0
	sATT	-6	0
	sDTT	-6	0
sCTT	0	0	
DTT	ONS(D)	-9	-3
	ONS(A)	-9.2	-3.2
	OPSS	-9	-3

**Table 8-2 SX-200 DIGITAL PABX Loss Plan  
(continued)**

Originating Circuit	Connecting Circuit	Loss (dB) Tx Direction	Loss (dB) Rx Direction
	OPSL	-6	0
	ACO(D)	-6	0
	ACO(A)	-6.2	-0.2
	ATT(D)	-3	3
	ATT(A)	-3.2	2.8
	ATO(D)	-3	3
	ATO(A)	-3.2	2.8
	DCO	-6	0
	DTO	0	0
	DTO	0	0
	DTT	0	0
	sATT	-6	0
	sDTT	-6	0
	sCTT	0	0
SCTT	ONS(D)	-9	-3
	ONS(A)	-9.2	-3.2
	OPSS	-9	-3
	OPSL	-6	0
	ACO(D)	-3	3
	ACO(A)	-3.2	2.8
	ATT(D)	-3	3
	ATT(A)	-3.2	2.8
	ATO(D)	-3	3
	ATO(A)	-3.2	2.8
	DCO	-6	0
	DTO	0	0
	DTO	0	0
	DTT	0	0
	sATT	-6	0
sDTT	-6	0	
sCTT	0	0	
sDTT	ONS(D)	-3	-3
	ONS(A)	-3.2	-3.2
	OPSS	-3	-3
	OPSL	-2	-2

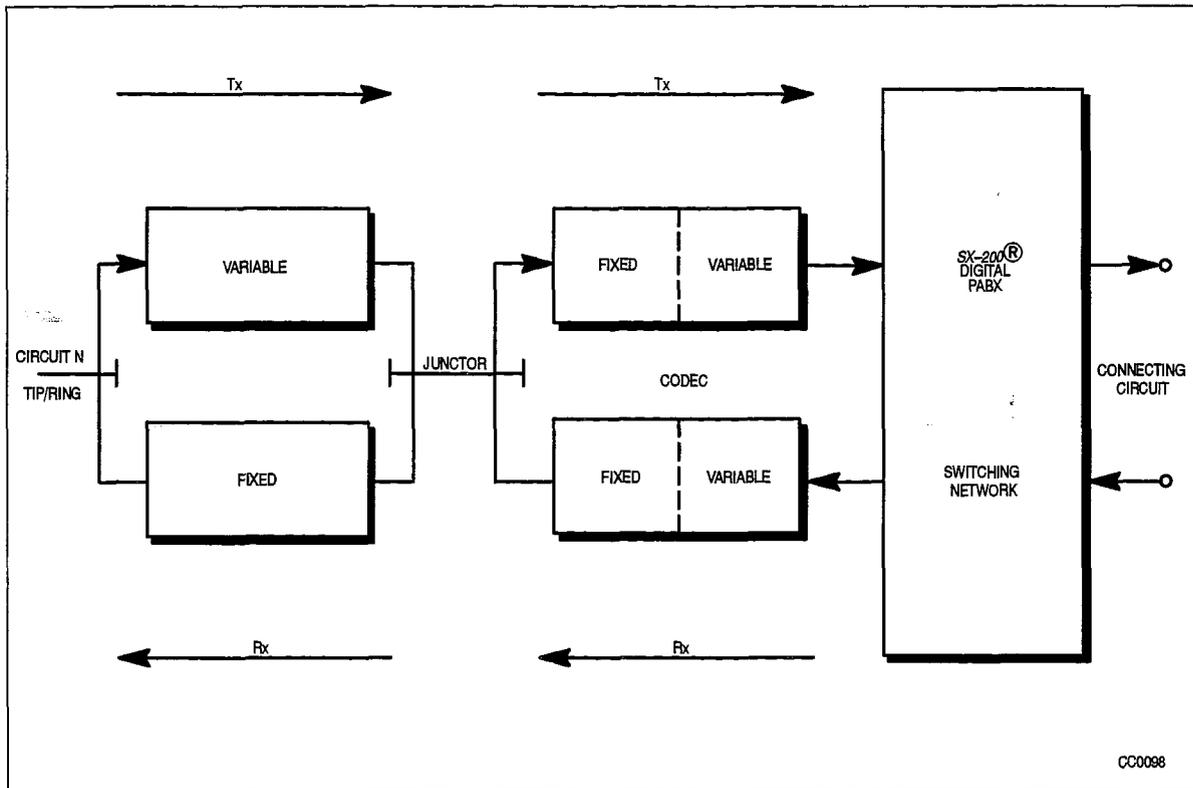
**Table 8-2 SX-200 DIGITAL PABX Loss Plan (continued)**

Originating Circuit	Connecting Circuit	Loss (dB) Tx Direction	Loss (dB) Rx Direction
	ACO(D)	0	0
	ACO(A)	-0.2	-0.2
	ATT(D)	0/-2	0/-2
	ATT(A)	-0.2/-2.2	-0.2/-2.2
	ATO(D)	-3	-3
	ATO(A)	-3.2	-3.2
	DCO	0	0
	DTO	0	-6
	DTT	0	-6
	sATT	0	0
	sDTT	0	0
	sCTT	0	-6



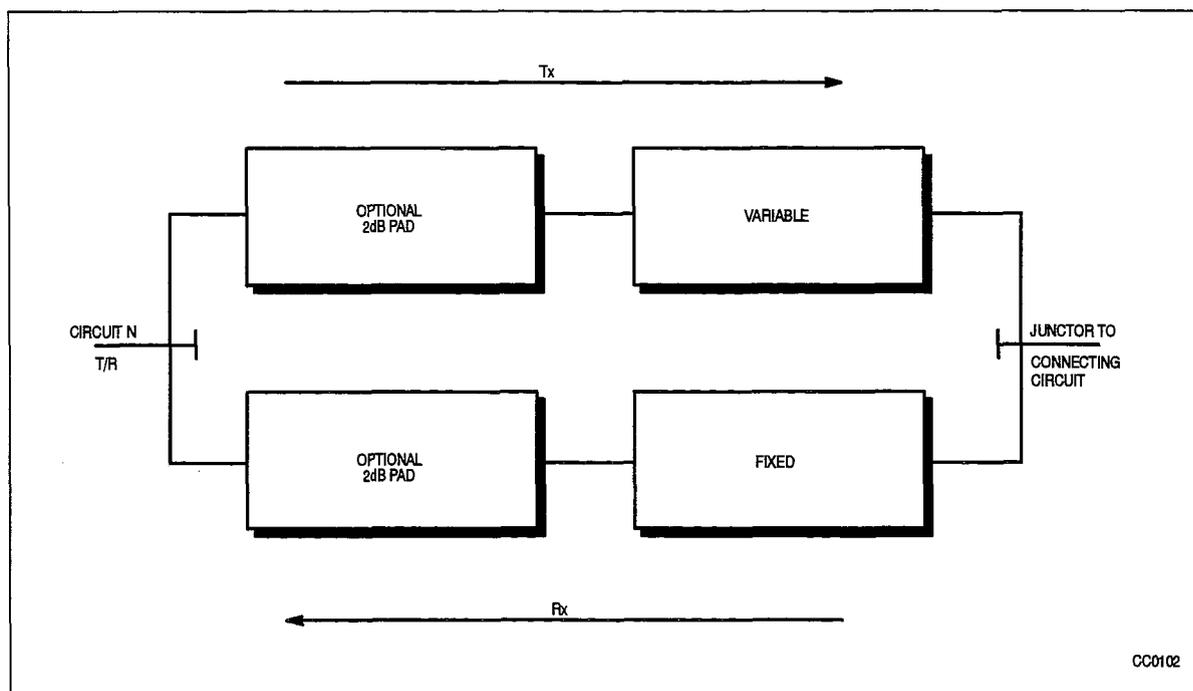
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**Figure 8-4 Analog Pad Arrangements – Configuration A**



CC0098

Figure 8-5 Analog Pad Arrangements – Configuration B



CC0102

Figure 8-6 Local Switching Analog Pad Arrangements

**Table 8-3 SX-200 DIGITAL PABX Local Switching Loss Plan**

Originating Circuit	Connecting Circuit	Loss (dB) Tx Direction	Loss (dB) Rx Direction
ONS(A)	ONS(A)	-5.0	-5.0
	ACO(A)	-0.3	-0.3
	ATT(A)	-2.3	-2.3
	ATO(A)	*	*
ACO(A)	ONS(A)	-0.3	-0.3
	ACO(A)	-0.3	-0.3
	ATT(A)	-2.3	-2.3
	ATO(A)	*	*
ATT(A)	ONS(A)	-2.3	-2.3
	ACO(A)	-2.3	-2.3
	ATT(A)	-0.3	-0.3
	ATO(A)	*	*

\* The ATO trunk cannot be locally switched. The ATO trunk can be implemented with an analog CO trunk interface, but it does not have the 2 dB pad required to meet part of the loss plan for local switching.

**Conferencing Loss Plan**

8.3 Any SX-200 DIGITAL PABX will have at least one 18 port conference circuit (Digital Signal Processor). The conferencing circuit, on a frame-by-frame basis, compares the level of all conferees and sends the loudest signal to all other parties in the conference. The party which is the loudest receives audio from the second loudest party. The conference loss plan is outlined in Table 8-4.

**Table 8-4 Conferencing Loss Plan**

Originating Circuit	Connecting Circuit	Loss (dB) Tx Direction	Loss (dB) Rx Direction
ONS(D)	ONS(D)	-6.0	-6.0
	ONS(A)	-6.2	-6.2
	OPSS	-6.0	-6.0
	OPSL	-3.0	-3.0
	ACO(D)	-4.0	-4.0

Table 8-4 Conferencing Loss Plan (continued)			
Originating Circuit	Connecting Circuit	Loss (dB) Tx Direction	Loss (dB) Rx Direction
	ACO(A)	-3.2	-3.2
	ATT(D)	-5.0	-5.0
	ATT(A)	-5.2	-5.2
	ATO(D)	-6.0	-6.0
	ATO(A)	-6.2	-6.2
	DCO	-3.0	-3.0
	DTO	-3.0	-9.0
	DTT	-3.0	-9.0
	sATT	-3.0	-3.0
	sDTT	-3.0	-3.0
	sCTT	-3.0	-9.0
ONS(A)	ONS(D)	-6.2	-6.2
	ONS(A)	-6.4	-6.4
	OPSS	-6.2	-6.2
	OPSL	-3.2	-3.2
	ACO(D)	-4.2	-4.2
	ACO(A)	-3.4	-3.4
	ATT(D)	-5.2	-5.2
	ATT(A)	-5.4	-5.4
	ATO(D)	-6.2	-6.2
	ATO(A)	-6.4	-6.4
	DCO	-3.2	-3.2
	DTO	-3.2	-9.2
	DTT	-3.2	-9.2
	sATT	-3.2	-3.2
sDTT	-3.2	-3.2	
sCTT	-3.2	-9.2	
OPSS	ONS(D)	-6.0	-6.0
	ONS(A)	-6.2	-6.2
	OPSS	-6.0	-6.0
	OPSL	-3.0	-3.0
	ACO(D)	-4.0	-4.0
	ACO(A)	-3.2	-3.2
	ATT(D)	-5.0	-5.0

**Table 8-4 Conferencing Loss Plan  
(continued)**

Originating Circuit	Connecting Circuit	Loss (dB) Tx Direction	Loss (dB) Rx Direction
	ATT(A)	-5.2	-5.2
	ATO(D)	-6.0	-6.0
	ATO(A)	-6.2	-6.2
	DCO	-3.0	-3.0
	DTO	-3.0	-9.0
	DTT	-3.0	-9.0
	sATT	-3.0	-3.0
	sDTT	-3.0	-3.0
	sCTT	-3.0	-9.0
OPSL	ONS(D)	-3.0	-3.0
	ONS(A)	-3.2	-3.2
	OPSL	0	0
	OPSS	-3.0	-3.0
	ACO(D)	-1.0	-1.0
	ACO(A)	-0.2	-0.2
	ATT(D)	-2.0	-2.0
	ATT(A)	-2.2	-2.2
	ATO(D)	-3.0	-3.0
	ATO(A)	-3.2	-3.2
	DCO	0	0
	DTO	0	-6.0
	DTT	0	-6.0
	sATT	0	0
	sDTT	0	0
sCTT	0	-6.0	
ACO(D)	ONS(D)	-4.0	-4.0
	ONS(A)	-4.2	-4.2
	OPSS	-4.0	-4.0
	OPSL	-1.0	-1.0
	ACO(D)	-2.0	-2.0
	ACO(A)	-1.2	-1.2
	ATT(D)	-2.2	-2.2
	ATT(A)	-3.2	-3.2
	ATO(D)	-4.0	-4.0

**Table 8-4 Conferencing Loss Plan  
(continued)**

Originating Circuit	Connecting Circuit	Loss (dB) Tx Direction	Loss (dB) Rx Direction
	ATO(A)	-4.2	-4.2
	DCO	-1.0	-1.0
	DTO	-1.0	-7.0
	DTT	-1.0	-7.0
	sATT	-1.0	-1.0
	sDTT	-1.0	-1.0
	sCTT	-1.0	-7.0
ACO(A)	ONS(D)	-3.2	-3.2
	ONS(A)	-3.4	-3.4
	OPSS	-3.2	-3.2
	OPSL	-0.2	-0.2
	ACO(D)	-1.2	-1.2
	ACO(A)	-0.4	-0.4
	ATT(D)	-2.2	-2.2
	ATT(A)	-2.4	-2.4
	ATO(D)	-3.2	-3.2
	ATO(A)	-3.4	-3.4
	DCO	-0.2	-0.2
	DTO	-0.2	-6.2
	DTT	-0.2	-6.2
	sATT	-0.2	-0.2
	sDTT	-0.2	-0.2
sCTT	-0.2	-0.2	
ATT(A)	ONS(D)	-5.2	-5.2
	ONS(A)	-5.4	-5.4
	OPSS	-5.2	-5.2
	OPSL	-2.2	-2.2
	ACO(D)	-3.2	-3.2
	ACO(A)	-2.4	-2.4
	ATT(D)	-5.2	-5.2
	ATT(A)	-4.4	-4.4
	ATO(D)	-5.2	-5.2
	ATO(A)	-5.4	-5.4
	DCO	-2.2	-2.2

**Table 8-4 Conferencing Loss Plan  
(continued)**

Originating Circuit	Connecting Circuit	Loss (dB) Tx Direction	Loss (dB) Rx Direction
	DTO	-2.2	-8.2
	DTT	-2.2	-8.2
	sATT	-2.2	-2.2
	sDTT	-2.2	-2.2
	sCTT	-2.2	-8.2
ATT(D)	ONS(D)	-5.0	-5.0
	ONS(A)	-5.2	-5.2
	OPSS	-5.0	-5.0
	OPSL	-2.0	-2.0
	ATT(D)	-4.0	-4.0
	ATT(A)	-4.2	-4.2
	ACO(D)	-3.0	-3.0
	ACO(A)	-2.2	-2.2
	ATO(D)	-5.0	-5.0
	ATO(A)	-5.2	-5.2
	DCO	-2.0	-2.0
	DTO	-2.0	-8.0
	DTT	-2.0	-8.0
	sATT	-2.0	-2.0
sDTT	-2.0	-2.0	
sCTT	-2.0	-8.0	
ATO(A)	ONS(D)	-6.2	-6.2
	ONS(A)	-6.4	-6.4
	OPSS	-6.2	-6.2
	OPSL	-3.2	-3.2
	ACO(D)	-4.2	-4.2
	ACO(A)	-3.4	-3.4
	ATT(D)	-5.2	-5.2
	ATT(A)	-5.4	-5.4
	ATO(D)	-6.2	-6.2
	ATO(A)	-6.4	-6.4
	DCO	-3.2	-3.2
	DTO	-3.2	-9.2
DTT	-3.2	-9.2	

Table 8-4 Conferencing Loss Plan (continued)			
Originating Circuit	Connecting Circuit	Loss (dB) Tx Direction	Loss (dB) Rx Direction
	sATT	-3.2	-3.2
	sDTT	-3.2	-3.2
	sCTT	-3.2	-9.2
ATO(D)	ONS(D)	-6.0	-6.0
	ONS(A)	-6.2	-6.2
	OPSS	-6.0	-6.0
	OPSL	-3.0	-3.0
	ACO(D)	-4.2	-4.2
	ACO(A)	-3.2	-3.2
	ATT(D)	-5.0	-5.0
	ATT(A)	-5.2	-5.2
	ATO(D)	-6.0	-6.0
	ATO(A)	-6.2	-6.2
	DCO	-3.0	-3.0
	DTO	-3.0	-9.0
	DTT	-3.0	-9.0
	sATT	-3.0	-3.0
	sDTT	-3.0	-3.0
sCTT	-3.0	-9.0	
SATT	ONS(D)	-3.0	-3.0
	ONS(A)	-3.2	-3.2
	OPSS	-3.0	-3.0
	OPSL	0	0
	ACO(D)	-1.0	-1.0
	ACO(A)	-0.2	-0.2
	ATT(D)	-2.0	-2.0
	ATT(A)	-2.2	-2.2
	ATO(D)	-3.0	-3.0
	ATO(A)	-3.2	-3.2
	DCO	0	0
	DTO	0	-6.0
	DTT	0	-6.0
	sATT	0	0
	sDTT	0	0

**Table 8-4 Conferencing Loss Plan  
(continued)**

Originating Circuit	Connecting Circuit	Loss (dB) Tx Direction	Loss (dB) Rx Direction
	sCTT	0	-6.0
SDTT	ONS(D)	-3.0	-3.0
	ONS(A)	-3.2	-3.2
	OPSS	-3.0	-3.0
	OPSL	0	0
	ACO(D)	-1.0	-1.0
	ACO(A)	-0.2	-0.2
	ATT(D)	-2.0	-2.0
	ATT(A)	-2.2	-2.2
	ATO(D)	-3.0	-3.0
	ATO(A)	-3.2	-3.2
	DCO	0	0
	DTO	0	-6.0
	DTT	0	-6.0
	sATT	0	0
	sDTT	0	0
sCTT	-6.0	-6.0	
SCTT	ONS(D)	-9.0	-3.0
	ONS(A)	-9.2	-3.2
	OPSS	-9.0	-3.0
	OPSL	-6.0	0
	ACO(D)	-7.0	-1.0
	ACO(A)	-6.2	-0.2
	ATT(D)	-8.0	-2.0
	ATT(A)	-8.2	-2.2
	ATO(D)	-9.0	-3.0
	ATO(A)	-9.2	-3.2
	DCO	-6.0	0
	DTO	-6.0	-6.0
	DTT	-6.0	-6.0
	sATT	-6.0	0
	sDTT	-6.0	0
sCTT	-6.0	-6.0	
	ONS(D)	-3.0	-3.0

Table 8-4 Conferencing Loss Plan (continued)			
Originating Circuit	Connecting Circuit	Loss (dB) Tx Direction	Loss (dB) Rx Direction
DCO	ONS(A)	-3.2	-3.2
	OPSS	-3.0	-3.0
	OPSL	0	0
	ACO(D)	-1.0	-1.0
	ACO(A)	-0.2	-0.2
	ATT(D)	-2.0	-2.0
	ATT(A)	-2.2	-2.2
	ATO(D)	-3.0	-3.0
	ATO(A)	-3.2	-3.2
	DCO	0	0
	DTO	0	-6.0
	DTT	0	-6.0
	sATT	0	0
	sDTT	0	0
	sCTT	0	-6.0
DTO	ONS(D)	-9.0	-3.0
	ONS(A)	-9.2	-3.2
	OPSS	-9.0	-3.0
	OPSL	-6.0	0
	ACO(D)	-7.0	-1.0
	ACO(A)	-6.2	-0.2
	ATT(D)	-8.0	-2.0
	ATT(A)	-8.2	-2.2
	ATO(D)	-9.0	-3.0
	ATO(A)	-9.2	-3.2
	DCO	-6.0	0
	DTO	-6.0	-6.0
	DTT	-6.0	-6.0
	sATT	-6.0	0
	sDTT	-6.0	0
sCTT	-6.0	-6.0	
DTT	ONS(D)	-9.0	-3.0
	ONS(A)	-9.2	-3.2
	OPSS	-9.0	-3.0

**Table 8-4 Conferencing Loss Plan  
(continued)**

Originating Circuit	Connecting Circuit	Loss (dB) Tx Direction	Loss (dB) Rx Direction
	OPSL	-6.0	0
	ACO(D)	-7.0	-1.0
	ACO(A)	-6.2	-0.2
	ATT(D)	-8.0	-2.0
	ATT(A)	-8.2	-2.2
	ATO(D)	-9.0	-3.0
	ATO(A)	-9.2	-3.2
	DCO	-6.0	0
	DTO	-6.0	-6.0
	DTT	-6.0	-6.0
	sATT	-6.0	0
	sDTT	-6.0	0
	sCTT	-6.0	-6.0

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## Tone Levels

- 8.4 All of the tones used by the *SX-200* DIGITAL PABX are provided by the Digital Signal Processor on the Main Control card. The system provides eight tone channels, each of which can generate either a dual or single frequency tone. One channel is used to generate a signal which controls the frequency and amplitude of the ringing generator output. Three channels are used for DTMF tone generation, and the remaining four are used to generate the system call progress tones.

Most call progress and DTMF tones require that the receive gain pad in the line or trunk circuit interface codec be set to a specific value for the duration of the tone. The exception is the camp-on/override tone, which does not require any adjustment of the pads. The interface settings for the call progress tones are outlined in Table 8-5. The DTMF levels and interface settings are outlined in Table 8-6 and Table 8-7 respectively.

Table 8-5 Call Progress Tone Interface Levels

Tone	Interface	Interface Level (dBm)
Dial Tone	ONS(D)	-13.75
	ONS(A)	-13.95
	OPSS	-13.75
	OPSL	-13.75
	ACO(D)	-13.75
	ACO(A)	-13.95
	ATT(A)	-13.95
	ATT(D)	-13.75
	ATO(A)	-13.95
	ATO(D)	-13.75
	DCO	-13.75
	DTO	-13.75
	DTT	-13.75
	sATT	-13.75
	sDTT	-13.75
sCTT	-13.75	
Reorder/Busy	ONS(D)	-24.0
	ONS(A)	-23.2
	OPSS	-24.0
	OPSL	-24.0
	ACO(D)	-18.0
	ACO(A)	-18.2
	ATT(A)	-18.2
	ATT(D)	-18.0
	ATO(A)	-18.2
	ATO(D)	-18.0
	DCO	-20.0
	DTO	-20.0
	DTT	-20.0
	sATT	-18.0
	sDTT	-20.0
sCTT	-20.0	
Ringback	ONS(D)	-19.0
	ONS(A)	-18.2
	OPSS	-19.0

**Table 8-5 Call Progress Tone Interface Levels  
(continued)**

Tone	Interface	Interface Level (dBm)
	OPSL	-19.0
	ACO(D)	-13.0
	ACO(A)	-13.2
	ATT(A)	-13.2
	ATT(D)	-13.0
	ATO(A)	-13.2
	ATO(D)	-13.0
	DCO	-15.0
	DTO	-15.0
	DTT	-15.0
	sATT	-13.0
	sDTT	-15.0
	sCTT	-15.0
Camp-on / Executive Override	ONS(D)	-20.0
	ONS(A)	-19.2 to -20.2
	OPSS	-20.0
	OPSL	-17.0 to -19.0
	ACO(D)	-14.0 to -20.0
	ACO(A)	-14.2 to -20.2
	ATT(A)	-17.2 to -20.2
	ATT(D)	-17.0 to -20.0
	ATO(A)	-17.2 to -20.0
	ATO(D)	-17.0 to -20.0
	DCO	-17.0
	DTO	-17.0
	DTT	-17.0
	sATT	-17.0 to -19.0
sDTT	-17.0 to -19.0	
sCTT	-17.0	

**Table 8-6 DTMF Levels – Trunk Interface Into 600 Ohms**

Nominal level – single frequency: -4.0 dBm

Nominal level – frequency pair : -1.0 dBm

Nominal twist : 0.0 dBm

**Table 8-7 DTMF Tone Interface Levels**

Interface	Interface Level (dBm)
ONS(D)	n/a
ONS(A)	n/a
OPSS	n/a
OPSL	n/a
ACO(D)	-1.0
ACO(A)	-1.2
ATT(A)	-1.2
ATT(D)	-1.0
ATO(A)	-1.2
ATO(D)	-1.0
DCO	-1.0
DTO	-1.0
DTT	-1.0
sATT	-1.0
sDTT	-1.0
sCTT	-1.0



## 9.

## CALL PROGRESS TONES AND RINGING CADENCES

This Part describes the different call progress tones and ringing cadences that are available to support PABX requirements.

### North America

#### Tone Plan

9.1 Table 9-1 identifies the tones that are generated by the PABX in North America.

Table 9-1 North America Tone Generation Table			
Tone	Frequency 1	Frequency 2	Level With No Interface Gain/Loss
Ringing	20 Hz	—	90 Vrms
Dial tone	350 Hz	440 Hz	-10.75 dBm0
Busy tone	480 Hz	620 Hz	-20.00 dBm0
Ringback tone	440 Hz	480 Hz	-15.00 dBm0
Miscellaneous tone	440 Hz	—	-17.00 dBm0
Modem connect tone	2025 Hz	—	-15.00 dBm0

- Notes:**
1. Ringing voltage is measured at source.
  2. Dial Tone passes through a filter with 7 dB attenuation.
  3. Busy Tone has +2 dB added at trunk interface for network connectivity.
  4. Ringback Tone has +2 dB added at trunk interface for network connectivity.
  5. Miscellaneous Tone (440 Hz at -17.02 dBm0) is used for the maintenance test tone.

#### Ringer Cadencing

Table 9-2 and Table 9-3 identify the ringer cadencing that is provided by the PABX in North America.

**Table 9-2 North America Digital Bay Ringer Cadencing**  
Discriminating Ring (Option 17) enabled and Discriminating Ring Always (Option 18) disabled

ONS/OPS Internal (standard)	ONS/OPS External (discriminating)	<i>SUPERSET</i> Telephones Internal (standard)	<i>SUPERSET</i> Telephones External (discriminating)
.9 on 3.1 off	.350 on .200 off	1 on 3 off	.400 on .200 off
repeating	.350 on 3.1 off	repeating	.400 on 3.0 off
	repeating		repeating

**Table 9-3 North America Analog Bay Ringer Cadencing**  
Discriminating Ring (Option 17) enabled and Discriminating Ring Always (Option 18) disabled

ONS/OPS Internal (standard)	ONS/OPS External (discriminating)	<i>SUPERSET</i> Telephones Internal (standard)	<i>SUPERSET</i> Telephones External (discriminating)
1 on 3 off	.400 on .200 off	1 on 3 off	.400 on .200 off
repeating	.400 on 3.0 off	repeating	.400 on 3.0 off
	repeating		repeating

## Mexico

### Tone Plan

9.2 Table 9-4 identifies the tones that are generated by the PABX in Mexico.

**Table 9-4 Mexico Tone Generation Table**

Tone	Frequency 1	Frequency 2	Level With No Interface Gain/Loss
Ringling	25 Hz	—	70 Vrms
Dial tone	440 Hz	—	-10.00 dBm0
Busy tone	440 Hz	—	-10.00 dBm0
Ringback tone	440 Hz	—	-10.00 dBm0
Miscellaneous tone	440 Hz	—	-10.00 dBm0
Modem connect tone	2025 Hz	—	-15.00 dBm0

- Notes:**
1. Ringing voltage is measured at source.
  2. Dial Tone passes through a filter with 7 dB attenuation.
  3. Busy Tone has +2 dB added at trunk interface for network connectivity.

4. Ringback Tone has +2 dB added at trunk interface for network connectivity.
5. Miscellaneous Tone (440 Hz at -17.02 dBm0) is used for the maintenance test tone.

### Ringer Cadencing

Table 9-5 and Table 9-6 identify the ringer cadencing that is provided by the PABX in Mexico.

<b>Table 9-5 Mexico Digital Bay Ringer Cadencing</b> Discriminating Ring (Option 17) enabled and Discriminating Ring Always (Option 18) disabled			
<b>ONS/OPS Internal (standard)</b>	<b>ONS/OPS External (discriminating)</b>	<b>SUPERSET Telephones Internal (standard)</b>	<b>SUPERSET Telephones External (discriminating)</b>
.9 on 4.1 off	.350 on .200 off	1 on 4 off	.400 on .200 off
repeating	.350 on 4.1 off	repeating	.400 on 4.0 off
	repeating		repeating

<b>Table 9-6 Mexico Analog Bay Ringer Cadencing</b> Discriminating Ring (Option 17) enabled and Discriminating Ring Always (Option 18) disabled			
<b>ONS/OPS Internal (standard)</b>	<b>ONS/OPS External (discriminating)</b>	<b>SUPERSET Telephones Internal (standard)</b>	<b>SUPERSET Telephones External (discriminating)</b>
1 on 4 off	.400 on .200 off	1 on 4 off	.400 on .200 off
repeating	.400 on 4.0 off	repeating	.400 on 4.0 off
	repeating		repeating

## Hong Kong / Taiwan

### Tone Plan

9.3 Table 9–7 identifies the tones that are generated by the PABX in Hong Kong and Taiwan.

<b>Table 9–7 Hong Kong / Taiwan Tone Generation Table</b>			
<b>Tone</b>	<b>Frequency 1</b>	<b>Frequency 2</b>	<b>Level With No Interface Gain/Loss</b>
Ringling	20 Hz	—	90 Vrms
Dial tone	380 Hz	—	–10.00 dBm0
Busy tone	480 Hz	620 Hz	–10.00 dBm0
Ringback tone	440 Hz	480 Hz	–10.00 dBm0
Miscellaneous tone	440 Hz	—	–10.00 dBm0
Modem connect tone	2025 Hz	—	–10.00 dBm0

- Notes:**
1. Ringling voltage is measured at source.
  2. Dial Tone passes through a filter with 7 dB attenuation.
  3. Busy Tone has +2 dB added at trunk interface for network connectivity.
  4. Ringback Tone has +2 dB added at trunk interface for network connectivity.
  5. Miscellaneous Tone (440 Hz at – 17.02 dBm0) is used for the maintenance test tone.

### Ringer Cadencing

Table 9–8 and Table 9–9 identify the ringer cadencing that is provided by the PABX in Hong Kong and Taiwan.

<b>Table 9–8 Hong Kong / Taiwan Digital Bay Ringer Cadencing</b> Discriminating Ring (Option 17) enabled and Discriminating Ring Always (Option 18) disabled			
<b>ONS/OPS Internal (standard)</b>	<b>ONS/OPS External (discriminating)</b>	<b>SUPERSET Telephones Internal (standard)</b>	<b>SUPERSET Telephones External (discriminating)</b>
.9 on 3.1 off	.350 on .200 off	1 on 3 off	.400 on .200 off
repeating	.350 on 3.1 off	repeating	.400 on 3.0 off
	repeating		repeating

<b>Table 9-9 Hong Kong / Taiwan Analog Bay Ringer Cadencing</b> Discriminating Ring (Option 17) enabled and Discriminating Ring Always (Option 18) disabled			
<b>ONS/OPS Internal (standard)</b>	<b>ONS/OPS External (discriminating)</b>	<b>SUPERSET Telephones Internal (standard)</b>	<b>SUPERSET Telephones External (discriminating)</b>
1 on 3 off	.400 on .200 off	1 on 3 off	.400 on .200 off
repeating	.400 on 3.0 off	repeating	.400 on 3.0 off
	repeating		repeating

## Malaysia

### Tone Plan

9.4 Table 9-10 identifies the tones that are generated by the PABX in Malaysia.

<b>Table 9-10 Malasia Tone Generation Table</b>			
<b>Tone</b>	<b>Frequency 1</b>	<b>Frequency 2</b>	<b>Level With No Interface Gain/Loss</b>
Ringing	25 Hz	—	70 Vrms
Dial tone	350 Hz	440 Hz	-9.00 dBm0
Busy tone	480 Hz	620 Hz	-12.00 dBm0
Ringback tone	440 Hz	480 Hz	-12.00 dBm0
Miscellaneous tone	440 Hz	—	-12.00 dBm0
Modem connect tone	2025 Hz	—	-15.00 dBm0

- Notes:**
1. Ringing voltage is measured at source.
  2. Dial Tone passes through a filter with 7 dB attenuation.
  3. Busy Tone has +2 dB added at trunk interface for network connectivity.
  4. Ringback Tone has +2 dB added at trunk interface for network connectivity.
  5. Miscellaneous Tone (440 Hz at -17.02 dBm0) is used for the maintenance test tone.

### Ringer Cadencing

Table 9-11 thru Table 9-14 identify the ringer cadencing that is provided by the PABX in Malaysia.

**Table 9–11 Malasia Digital Bay Ringer Cadencing**  
Discriminating Ring (Option 17) enabled and Discriminating Ring Always (Option 18) enabled

<b>ONS/OPS Internal (standard)</b>	<b>ONS/OPS External (discriminating)</b>	<b><i>SUPERSET</i> Telephones Internal (standard)</b>	<b><i>SUPERSET</i> Telephones External (discriminating)</b>
.350 on .200 off	.350 on .200 off	.400 on .200 off	.400 on .200 off
.350 on 2.1 off	.350 on 2.1 off	.400 on 2.0 off	.400 on 2.0 off
repeating	repeating	repeating	repeating

**Table 9–12 Malasia Digital Bay Ringer Cadencing**  
Discriminating Ring (Option 17) enabled and Discriminating Ring Always (Option 18) disabled

<b>ONS/OPS Internal (standard)</b>	<b>ONS/OPS External (discriminating)</b>	<b><i>SUPERSET</i> Telephones Internal (standard)</b>	<b><i>SUPERSET</i> Telephones External (discriminating)</b>
.9 on 5.1 off	.350 on .200 off	1 on 5 off	.400 on .200 off
repeating	.350 on 2.1 off	repeating	.400 on 2.0 off
	repeating		repeating

**Table 9–13 Malasia Analog Bay Ringer Cadencing**  
Discriminating Ring (Option 17) enabled and Discriminating Ring Always (Option 18) enabled

<b>ONS/OPS Internal (standard)</b>	<b>ONS/OPS External (discriminating)</b>	<b><i>SUPERSET</i> Telephones Internal (standard)</b>	<b><i>SUPERSET</i> Telephones External (discriminating)</b>
.400 on .200 off	.400 on .200 off	.400 on .200 off	.400 on .200 off
.400 on 2.0 off	.400 on 2.0 off	.400 on 2.0 off	.400 on 2.0 off
repeating	repeating	repeating	repeating

<b>Table 9-14 Malasia Analog Bay Ringer Cadencing</b> Discriminating Ring (Option 17) enabled and Discriminating Ring Always (Option 18) disabled			
<b>ONS/OPS Internal (standard)</b>	<b>ONS/OPS External (discriminating)</b>	<b><i>SUPERSET</i> Telephones Internal (standard)</b>	<b><i>SUPERSET</i> Telephones External (discriminating)</b>
1 on 5 off	.400 on .200 off	1 on 5 off	.400 on .200 off
repeating	.400 on 2.0 off	repeating	.400 on 2.0 off
	repeating		repeating



# 10. XXXXXXXXXX

## TRAFFIC CONSIDERATIONS

### General

10.1 This part details traffic limitations for all configurations available with the SX-200 DIGITAL PABX. Information includes:

- Busy Hour Call Attempt (BHCA)
- System Traffic Capacity
- Grade of Service
- Receiver Provisioning
- Trunk Distribution.

### Traffic Limitations

10.2 Traffic capacities are specified on a per line basis in terms of calls per hour, erlangs, and CCS.

#### 336-Port Configuration

A basic system consists of 225 lines and 39 trunks. This configuration has been specified to meet the following heavy traffic characteristics:

Busy Hour Call Attempts	System (BHCA)	
	Mean	99.9 % Peak
Per Second	0.258	0.410
Per Hour	928	1475

Bothway Traffic Capacity		
Calls/Hour	Erlang	CCS
1259	42.47	1529.0

Typical configured system quantities as per ATT 48002 are:

Light – 10 %		Medium – 50 %		Heavy – 90 %	
Lines	Trunks	Lines	Trunks	Lines	Trunks
<b>300</b>	<b>17</b>	<b>300</b>	<b>30</b>	<b>300</b>	<b>48</b>
<b>275</b>	<b>16</b>	<b>275</b>	<b>28</b>	<b>275</b>	<b>45</b>
<b>250</b>	<b>15</b>	<b>250</b>	<b>26</b>	<b>250</b>	<b>42</b>
<b>225</b>	<b>14</b>	<b>225</b>	<b>24</b>	<b>225</b>	<b>39</b>
<b>200</b>	<b>13</b>	<b>200</b>	<b>22</b>	<b>200</b>	<b>36</b>
<b>175</b>	<b>12</b>	<b>175</b>	<b>21</b>	<b>175</b>	<b>32</b>
<b>150</b>	<b>11</b>	<b>150</b>	<b>19</b>	<b>150</b>	<b>29</b>
<b>125</b>	<b>10</b>	<b>125</b>	<b>17</b>	<b>125</b>	<b>26</b>
<b>100</b>	<b>9</b>	<b>100</b>	<b>14</b>	<b>100</b>	<b>22</b>
<b>75</b>	<b>8</b>	<b>75</b>	<b>12</b>	<b>75</b>	<b>19</b>
<b>50</b>	<b>6</b>	<b>50</b>	<b>10</b>	<b>50</b>	<b>15</b>

Bolded areas indicate possible configurations using T1/D4 digital trunks to replace analog trunk cards.

**456-Port Configuration**

A basic system consists of 250 lines and 42 trunks. This configuration has been specified to meet the following heavy traffic characteristics:

Busy Hour Call Attempts	System (BHCA)	
	Mean	99.9 % Peak
Per Second	0.286	0.446
Per Hour	1029	1605

Bothway Traffic Capacity		
Calls/Hour	Erlang	CCS
1401	47.00	1692.0

Typical configured system quantities as per ATT 48002 are:

Light – 10 %		Medium – 50%		Heavy – 90 %	
Lines	Trunks	Lines	Trunks	Lines	Trunks
<b>325</b>	<b>18</b>	<b>325</b>	<b>31</b>	<b>325</b>	<b>51</b>
<b>300</b>	<b>17</b>	<b>300</b>	<b>30</b>	<b>300</b>	<b>48</b>
275	16	275	28	275	45
250	15	250	26	250	42
225	14	225	24	225	39
200	13	200	22	200	36
175	12	175	21	175	32
150	11	150	19	150	29
125	10	125	17	125	26
100	9	100	14	100	22
75	8	75	12	75	19
50	6	50	10	50	15

Bolded areas indicate possible configurations using T1/D4 digital trunks to replace analog trunk cards.

### 672-Port Configuration

A basic system consists of 500 lines and 71 trunks. This configuration has been specified to meet the following heavy traffic characteristics:

Busy Hour Call Attempts	System (BHCA)	
	Mean	99.9 % Peak
Per Second	0.554	0.768
Per Hour	1993	2765

Bothway Traffic Capacity		
Calls/Hour	Erlang	CCS
2758	95.50	3438.0

Typical configured system quantities as per ATT 48002 are:

Light – 10 %		Medium – 50 %		Heavy – 90 %	
Lines	Trunks	Lines	Trunks	Lines	Trunks
500	24	500	43	500	71
475	24	475	42	475	69
450	23	450	40	450	66
425	22	425	38	425	63
400	21	400	36	400	60
375	20	375	35	375	57
350	19	350	33	350	54
325	18	325	31	325	51
300	17	300	30	300	48
275	16	275	28	275	45
250	15	250	26	250	42
225	14	225	24	225	39
200	13	200	22	200	36
175	12	175	21	175	32
150	11	150	19	150	29
125	10	125	17	125	26
100	9	100	14	100	22
75	8	75	12	75	19
50	6	50	10	50	15

**Grade of Service**

10.3 The SX-200 DIGITAL PABX Grade of Service (GOS) in terms of blocking is outlined in Table 10-1.

Table 10-1 SX-200 DIGITAL PABX Grade Of Service (GOS)	
Link/Resource Blocking	Blocking Probability
Link Blocking:	
Peripheral to Network	< 0.1%
Network to Network	0.0%
Resource Blocking	
Software	< 0.01%
DTMF Receivers, Trunks	provisioning dependent

### Receiver Provisioning

10.4 The number of receivers required to be installed in the PABX is dependent on various factors, such as the number of lines and trunks installed, the amount of traffic flow estimated for the system and the desired grade of service. In order to arrive at the quantity of receivers required the following assumptions were made:

- Average receiver holding time for intercom call is 6 seconds
- Average receiver holding time for a trunk call is 17.4 seconds
- Holding time for receivers is exponential
- Call originations are Poisson distribution
- Call holding times are exponential
- Receivers are provisioned in multiples of 4.

For a given load (heavy, medium and light traffic), the minimum number of required receivers was determined for the following grades of service (ABSBH):

- **ABSBH = 99.0:** 99.0 % of all receiver requests serviced within 3 seconds
- **ABSBH = 99.99 :** 99.99 % of all receiver requests serviced within 3 seconds

The following calculations are used to generate Table 10-2, Table 10-3, and Table 10-4:

Receiver Holding Time (h) = 6 x (% intercom traffic) + 17.4 x (% trunk traffic) Seconds

Receiver Traffic (A) =

$$\frac{(\text{Originating Calls per hour}) \times (\text{Receiver holding time (sec)})}{3600} \text{ Erlangs}$$

$$\text{Multiple of holding time (t)} = \frac{3 \text{ (s)}}{h \text{ (s)}}$$

$$\text{Probability of delay greater than t (P(>t))} = 1 - \text{ABSBH} / 100$$

Using Erlang C formula delay curves, knowing t, A, P(>t), the minimum number of receivers can be obtained.

### Trunk Distribution

10.5 Since the digital bays are non-blocking, while the analog bays are blocking, as many trunks as possible should be distributed in the digital bays. Analog type trunks should be evenly distributed throughout the analog bays. For example, a fully configured system in a heavy traffic environment might have four to five trunk cards in each of the analog bays.

**Table 10-2 Heavy Traffic**

No. of Lines	CCS/Line	Total CCS	In CCS	Out CCS	Intra CCS	In Calls	Out Calls	Intra Calls	Orig Calls	In Trks	Out Trks	2 Way Trks	Receivers Required for ABSBH = 99.0%	Receivers Required for ABSBH = 99.99%
60	5.94	356	150	140	67	85	103	77	180	11	9	16	8	8
80	5.77	462	190	178	93	108	132	106	238	12	11	19	8	12
100	5.67	567	230	216	120	131	160	136	296	14	13	228	8	12
120	5.60	672	269	254	149	153	189	167	356	16	14	25	12	12
140	5.55	777	308	292	177	174	216	198	414	17	15	28	12	16
160	5.51	882	346	329	207	196	244	229	473	19	17	30	12	16
180	5.48	986	384	365	237	217	272	261	533	20	18	33	12	16
200	5.46	1092	422	402	267	238	299	292	591	21	20	36	12	16
220	5.44	1197	460	439	298	258	327	324	651	23	21	38	12	16
240	5.43	1303	497	476	330	279	355	356	711	24	22	41	16	20
260	5.41	1407	534	511	362	299	382	388	770	25	23	43	16	20
280	5.40	1512	570	547	394	319	409	420	829	27	25	46	16	20
300	5.39	1617	607	583	426	338	436	452	888	28	26	48	16	20
320	5.38	1722	643	619	459	357	463	483	946	29	27	51	16	20
340	5.38	1829	680	655	493	376	491	516	1007	31	28	53	16	24
360	5.37	1933	716	691	526	395	518	547	1065	32	30	55	20	24

Table 10-3 Medium Traffic

No. of Lines	CCS/Line	Total CCS	In CCS	Out CCS	Intra CCS	In Calls	Out Calls	Intra Calls	Orig Calls	In Trks	Out Trks	2 Way Trks	Receivers Required for ABSBH = 99.0%	Receivers Required for ABSBH = 99.99%
60	3.23	194	81	76	37	46	56	42	98	7	6	11	4	8
80	3.14	251	103	97	51	59	72	58	130	8	8	13	8	8
100	3.09	309	125	118	66	71	87	74	161	9	8	14	8	8
120	3.05	366	147	138	81	83	103	91	194	10	9	16	8	12
140	3.02	423	168	159	96	95	118	108	126	11	10	18	8	12
160	3.00	480	188	179	113	107	133	125	258	12	11	19	8	12
180	2.99	538	210	199	129	118	148	142	290	13	12	21	8	12
200	2.98	596	230	220	146	130	163	160	323	14	13	22	8	12
220	2.97	653	251	240	163	141	178	177	355	15	13	24	8	12
240	2.96	710	271	259	180	152	193	194	387	16	14	25	12	16
260	2.95	767	291	279	197	163	208	212	220	16	15	27	12	16
280	2.94	823	311	298	214	174	223	229	452	17	16	28	12	16
300	2.94	882	331	318	233	185	238	246	484	18	16	30	12	16
320	2.93	938	350	337	250	195	252	263	512	19	17	31	12	16
340	2.93	996	371	357	269	205	267	281	548	19	18	32	12	16
360	2.93	1055	391	377	287	215	283	298	581	20	19	34	12	16
380	2.92	1110	409	395	305	225	297	315	612	21	19	35	12	16
400	2.92	1168	429	415	324	235	312	332	644	22	20	36	12	16

Table 10-4 Light Traffic

No. of Lines	CCS/Line	Total CCS	In CCS	Out CCS	Intra CCS	In Calls	Out Calls	Intra Calls	Orig Calls	In Trks	Out Trks	2 Way Trks	Receivers Required for ABSBH = 99.0%	Receivers Required for ABSBH = 99.99%
60	1.41	85	36	33	16	20	24	18	42	5	4	7	4	8
80	1.41	113	46	44	23	26	32	26	58	6	5	8	4	8
100	1.41	141	57	54	30	33	40	34	74	6	5	9	4	8
120	1.41	169	68	64	37	38	47	42	89	7	6	10	4	8

**Table 10-4 Light Traffic  
(continued)**

No. of Lines	CCS /Line	Total CCS	In CCS	Out CCS	Intra CCS	In Calls	Out Calls	Intra Calls	Orig Calls	In Trks	Out Trks	2 Way Trks	Receivers Required for ABSBH = 99.0%	Receivers Required for ABSBH = 99.99%
140	1.41	197	78	74	45	44	55	50	105	7	6	11	8	8
160	1.41	226	89	84	53	50	62	59	121	8	7	12	8	8
180	1.41	254	99	94	61	56	70	67	137	8	7	12	8	8
200	1.41	282	109	104	69	61	77	75	152	9	8	13	8	8
220	1.41	310	119	114	77	67	85	84	169	9	8	14	8	8
240	1.41	338	129	123	86	72	92	93	185	10	9	15	8	12
260	1.41	367	139	133	94	78	99	101	200	10	9	16	8	12
280	1.41	395	149	143	103	83	107	110	217	10	10	16	8	12
300	1.41	423	159	153	112	89	114	118	232	11	10	17	8	12
320	1.41	451	169	162	120	94	121	127	248	11	10	19	8	12
340	1.41	479	178	172	129	99	129	135	264	12	11	19	8	12
360	1.41	508	188	181	138	104	136	144	280	12	11	19	8	12
380	1.41	536	198	191	147	109	143	152	295	13	11	20	8	12
400	1.41	564	207	200	156	114	150	160	310	13	12	21	8	12

# 11. XXXXXXXXXX

## SYSTEM CHARACTERISTICS

### General

11.1 This section describes the environmental, electrical, and operational characteristics of the SX-200 DIGITAL PABX.

### Environmental Conditions

11.2 The systems are designed to operate within the environmental conditions outlined in Table 11-1.

<b>Table 11-1 System Environmental Operating Conditions</b>	
<b>Specification</b>	<b>Range</b>
Temperature	10° C to 40° C (50° F to 104° F) for SX-200 DIGITAL
	0° C to 40° C (32° F to 104° F) for SX-200 FD
	0° C to 30° C (32° F to 86° F) for console
Relative humidity	20% to 80% noncondensing
Acoustic noise	The system radiates less than 50 dB SPL, "A" weighted, measured 1524 mm (60 in.) from the center of the cabinet.
Maximum Altitude	4000 metres

### Heat Dissipation

11.3 A fully configured SX-200 DIGITAL PABX will dissipate heat in the following manner (figures are approximate):

Digital Bays (each):	500 BTU/hr
Analog Bay 4 (peripheral cabinet):	1000 BTU/hr
Analog Bay 5 (peripheral cabinet):	750 BTU/hr
Control Cabinet (SX-200 FD)	275 BTU/hr
Peripheral Bay/Cabinet (SX-200 FD)	500 BTU/hr

**Note:** The Control Cabinet for the SX-200 FD is cooled by the Power Supply Fan.

## Shipping and Storage

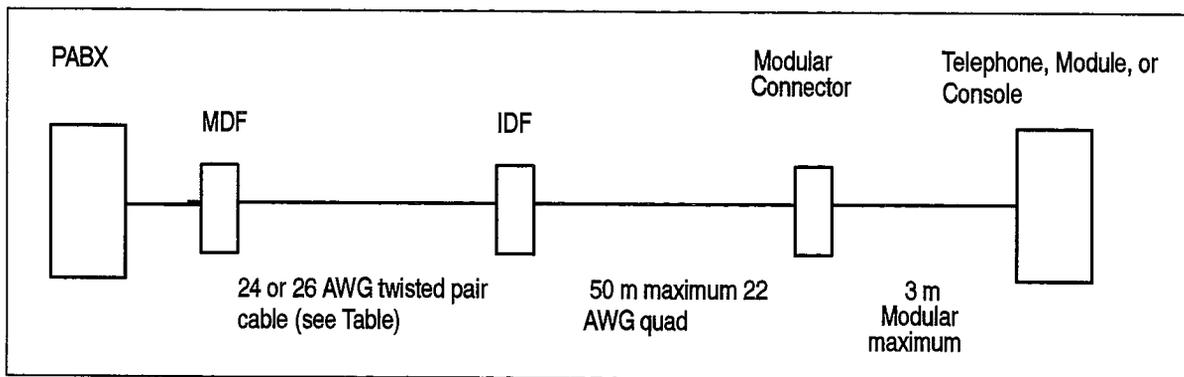
- 11.4 The equipment is designed to withstand shipping by truck, rail, air, or sea without damage, when packaged in conventional shipping containers of the manufacturer. The range of environmental conditions that the equipment is capable of withstanding in storage is shown in Table 11-2.

<b>Table 11-2 Storage Conditions</b>	
<b>Specification</b>	<b>Range</b>
Temperature range	-50° C to 71° C (-58° F to 159.8° F) for the system 10° C to 40° C (50° F to 104° F) for the floppy disk -20° C to 60° C (-4° F to 140° F) for the console
Relative humidity	Up to 100 % RH at 18° C (64.4° F) 10 to 70% RH for the console
Vibration	0.5 g (4.903 m/s <sup>2</sup> ) (sinusoidal) 5 to 1000 Hz 1.5 g (14.7 m/s <sup>2</sup> ) (sinusoidal) 100 to 500 Hz
Shock	Up to 75 cm (30 in.) drop depending upon package
Mechanical Shock	Up to 20 cm (8 in.) drop on any face or corner (SX-200 DIGITAL) Up to 61 cm (24 in.) drop on any face or corner (SX-200 FD)
Low pressure	87 mm Hg 15,152 m (50,000 ft)
Temperature shock	-40° C to 21° C (-40° F to 70° F) in 5 minutes 66° C to 21° C (150° F to 70° F) in 5 minutes

## Loop Lengths and Cable Lengths

- 11.5 The following rules for loop lengths between the Digital Line Card within the PABX and the *SUPERSET 3 DN* telephone, *SUPERSET 4 DN* telephone, *SUPERSET 401* telephone, *SUPERSET 410* telephone, *SUPERSET 420* telephone, *SUPERSET 430* telephone, *SUPERSET DSS™* module, or *SUPERCONSOLE 1000™* Attendant Console must be followed for proper operation of the device:

Maximum loop length (twisted pair) 24 or 26 AWG	see Table
Maximum length of quad cable (22 AWG)	50 m (160 ft)
Modular Line Cord	3 m (10 ft)



Peripheral Device	Maximum Loop Length	
	Without Bridge Tap	With Bridge Tap
<i>SUPERSET 3 DN</i> Mk1 (9183-000-001)	1000 m	not permitted
<i>SUPERSET 3 DN</i> Mk2 (9183-000-200)	1000 m	1000 m
<i>SUPERSET 4 DN</i> Mk1 (9184-000-001)	1000 m	not permitted
<i>SUPERSET 4 DN</i> Mk2 (9184-000-200)	1000 m	1000 m
<i>SUPERSET 401</i>	1000 m	1000 m
<i>SUPERSET 410</i>	1000 m	1000 m
<i>SUPERSET 420</i>	1000 m	1000 m
<i>SUPERSET 430</i>	1000 m	1000 m
<i>SUPERSET DSS</i> Module	1000 m	1000 m
Dataset 1101	1000 m	1000 m
Dataset 1102	2000 m	1000 m
Dataset 1103	2000 m	1000 m
<i>MiLink</i> Data Module	2000 m	1000 m
Dataset 2102	2000 m	1000 m
Dataset 2103	2000 m	1000 m
<i>SUPERCONSOLE 1000</i> console	1000 m	1000 m

Loop lengths for various cards are given in Table 11-3:

<b>Table 11-3 Loop Lengths</b>		
<b>Card Type</b>	<b>Wire Gauge (AWG)</b>	<b>Loop Length</b>
COV Card	22	2010 m 6600 ft
	24	1524 m 5000 ft
	26	1006 m 3300 ft
SUPERSET Line Card	22	840 m 2750 ft
	24	610 m 2000 ft
	26	470 m 1550 ft
DLIC Console Interface	26	305 m 1000 ft
DNIC line card (Digital set)	24	1006 m 3300 ft
	26	1006 m 3300 ft
(DNIC Console)	24	1006 m 3300 ft
	26	1006 m 3300 ft
ONS Card	22	3560 m 11700 ft
	24	2250 m 7400 ft
	26	1400 m 4600 ft
OPS Card	22	18290 m 60000 ft
	24	11520 m 37800 ft
	26	7225 m 23700 ft
E&M Trunk	22	2715 m 8900 ft
	24	1708 m 5600 ft
	26	1068 m 3500 ft
T1 Trunk – see Note	na	na
DID Trunk Card – CO Trunk resistance	na	2240 ohms
LS/GS Trunk Card – CO Trunk resistance	na	1600 ohms

**Note:** These are cable lengths, not loop lengths for 22 gauge (AWG) wire. Set DIP switches on T1 Trunk card for correct equalization depending on cable length between the T1 Trunk and the Channel Service Unit (CSU)..

<b>Loop Length</b>	<b>Switch Setting</b>
0 – 45.8 m (0 – 150 ft)	S1 only closed
45.8 – 137.3 m (150 – 450 ft)	S2, S3, S4 closed
137.3 – 200.5 m (450 – 655 ft)	S5, S6, S7 closed

## 12. **POWER SUPPLIES**

This Part gives details of the electrical characteristics of the power supplies for the SX-200 DIGITAL and the SX-200 FD. Two power supplies are available:

- The Bay Power Supply (BPS) is card mounted and is located in the upper right slot of each Digital Bay (SX-200 DIGITAL) and each Peripheral Bay (SX-200 FD).
- A 200 Watt standard PC Power Supply is mounted at the top rear of the Control Cabinet of the SX-200 FD. (Generic 1005 only).

The electrical power characteristics are summarized in Table 12-1.

<b>Table 12-1 Electrical Input Power Characteristics</b>	
<b>Characteristic</b>	<b>Details</b>
Input Voltage	102 Vac to 135 Vac (pn 9109-008-000-SA) 90 Vac to 132 Vac (pn 9400-300-200-NA) 204 Vac to 270 Vac (pn 9109-008-002-NA)
Frequency	47 Hz to 63 Hz
Holdover Time	Minimum of: 40 ms at 120 Vac or 20 ms at 102 Vac delivering full rated load
Input Current	Maximum of: 2.0 Amps at 120 Vac or 1.1 Amps at 240 Vac

### Electrical Characteristics

12.1 All power is derived from either a commercial ac source or an Uninterruptible Power Supply (UPS). The BPS is preset at the factory to one of two input voltage ranges.

<b>Table 12-2 Bay Power Supply Specifications</b>			
	<b>Commercial power</b>	<b>Inverter power</b>	<b>Current</b>
Low range	102 Vrms to 135 Vrms.	102 Vrms to 135 Vrms.	2.0 A rms max.
High range	204 Vrms to 270 Vrms.	204 Vrms to 270 Vrms.	1.1 A rms max.
Frequency	47 Hz to 63 Hz.	47 Hz to 63 Hz.	-
Waveform	Sinusoidal, 5% THD max.	Quasi-square wave, 0.71 duty cycle.	-

**Table 12-3 SX-200 FDControl Cabinet Power Supply Specifications**

	Commercial power	Inverter power	Current
Range	90 Vrms to 132 Vrms.	90 Vrms to 132 Vrms.	3.5 A rms max.
Frequency	47 Hz to 63 Hz.	47 Hz to 63 Hz.	—
Waveform	Sinusoidal, 5% THD max.	Quasi-square wave, 0.71 duty cycle.	—

### Bay Power Supply

12.2 A Bay Power Supply is card-mounted; one is located in the upper right slot of each Digital bay (SX-200 DIGITAL) and in the upper right slot of each Peripheral bay (SX-200 FD). The Bay Power Supply (BPS) connects to the backplane through a card-edge connector at the rear of the card; also at the rear is an IEC receptacle which connects to a line cord from the system ac distribution (see Figure 12-1). The dimensions of the BPS are as follows:

Width	5.1 cm	(2.0 in.)
Height	15.7 cm	(6.2 in.)
Depth	36.8 cm	(14.5 in.)

The Bay Power Supply output voltages, current, and power rating for which the unit will operate within its design specifications are shown in Table 12-4; test points are shown in Table 12-5.

**Table 12-4 Bay Power Supply Output Ratings**

Output	Maximum Current	Power
12 Vdc	2.5 A	30 W
+5 Vdc	15.0 A	75 W
+5 V (PC)	TRANSIENT	—
-5 Vdc	1.0 A	5 W
-12 Vdc	2.0 A	24 W
-28 Vdc	1.6 A	45 W
-48 Vdc	1.5 A	72 W
90 V-RING	0.1 A rms	10 W
TOTAL POWER	(see Note)	140 W

**Note:** The maximum power supply output is 140 watts; therefore the output is partially exclusive. Maximum current values in Table 12-4 are for each individual rail; however, the total power cannot exceed 140 watts.

Table 12-5 Bay Power Supply Test Point Voltages

Voltage	Range
+ 5 Vdc	+ 5.07 to +5.23
+12 Vdc	+10.8 to +13.2
-12 Vdc	-13.2 to -10.8
- 5 Vdc	-5.5 to -4.5
-28 Vdc	-30.8 to -23.8
-48 Vdc	-53.76 to -40.8
90 Vac	63.0 to 99.0

### Controls and Indicators

The ON/OFF switch is mounted on the front of the BPS and is used to turn the power on or off to the unit. Two LEDs are also on the front; the upper LED indicates that the BPS is operating, and the lower LED is ON when the ringing amplifier is producing power (flashing in cadence with it).

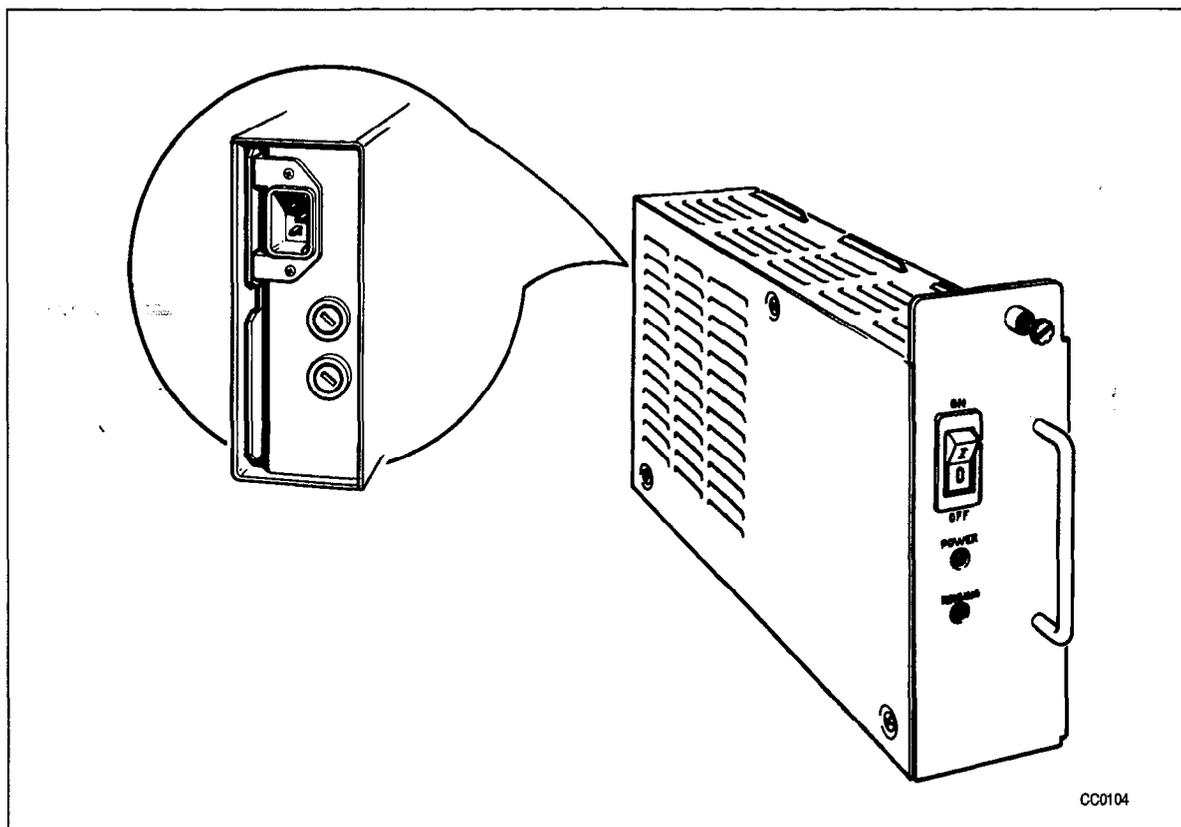
### Input and Output Protection

The input to the converter is protected by a fuse, and by low voltage protection which shuts off the converter if the input voltage falls below the specified minimum. The converter will not be re-enabled until the input voltage returns to the specified minimum. The input also includes protection which limits the peak inrush current to 20 A.

Each output is protected against short circuits, overloads, and overvoltage. The overload/short circuit protection is self-resetting.

### Power Fail Sense

The converter has a single alarm signal, PFS (power fail sense), which is driven low when the incoming ac falls below its minimum specified value. At this point there will be approximately 10 ms before the outputs fall out of regulation.



**Figure 12-1 Bay Power Supply**

**SX-200 FD Control Cabinet Power Supply**

12.3 The Control Cabinet Power Supply is a standard slim type 200 Watt PC Power Supply. It is factory installed at the top rear of the Control Cabinet (see Figure 12-2). The dimensions of the PC Power Supply are as follows:

Length	14.0 cm	(5.5 in.)
Height	8.6 cm	(3.4 in.)
Width	15.0 cm	(5.9 in.)

The PC Power Supply output voltages, current, and power rating for which the unit will operate within its design specifications are shown in Table 12-6; test points are shown in Table 12-7.

Table 12-6 PC Power Supply Output Ratings

Output	Maximum Current	Power
+5 Vdc	20.0 A	100.0 W
-5 Vdc	.3 A	1.5 W
+5 V (PC)	TRANSIENT	-
12 Vdc	6.0 A	72.0 W
-12 Vdc	.3 A	3.6 W
TOTAL POWER	(see Note)	200.0 W

**Note:** The maximum power supply output is 200.0 watts; therefore the output is partially exclusive. Maximum current values in Table 12-6 are for each individual rail; however, the total power cannot exceed 200.0 watts.

Table 12-7 PC Power Supply Test Point Voltages

Voltage	Range
+ 5 Vdc	+ 4.75 to +5.25
+12 Vdc	+11.4 to +12.6
-12 Vdc	-13.2 to -10.8
- 5 Vdc	-5.5 to -4.5

### Power Cord and Switches

The Power Cord plugs into the AC input connector (lower connector) at the rear of the cabinet as shown in Figure 12-2. The AC service connector (see Figure 12-2) is not used. The ON/OFF switch mounted on the rear of the Control Cabinet (top right hand corner) is used to turn power ON or OFF to the unit. The voltage selector (preset from the factory) is located between the two AC connectors.

### Input and Output Protection

An AC fuse provides input protection. It is located internally to the Power Supply and can be replaced only at the factory. Overvoltage protection is provided on +5V output.

Each output is protected against short circuits, overloads, and overvoltage. The overload/short circuit protection is self-resetting after 15 seconds.

### Power Fail Sense

The converter has a single alarm signal, PFS (power fail sense), which is driven low when the incoming ac falls below its minimum specified value. At this point there will be approximately 10 ms before the outputs fall out of regulation.

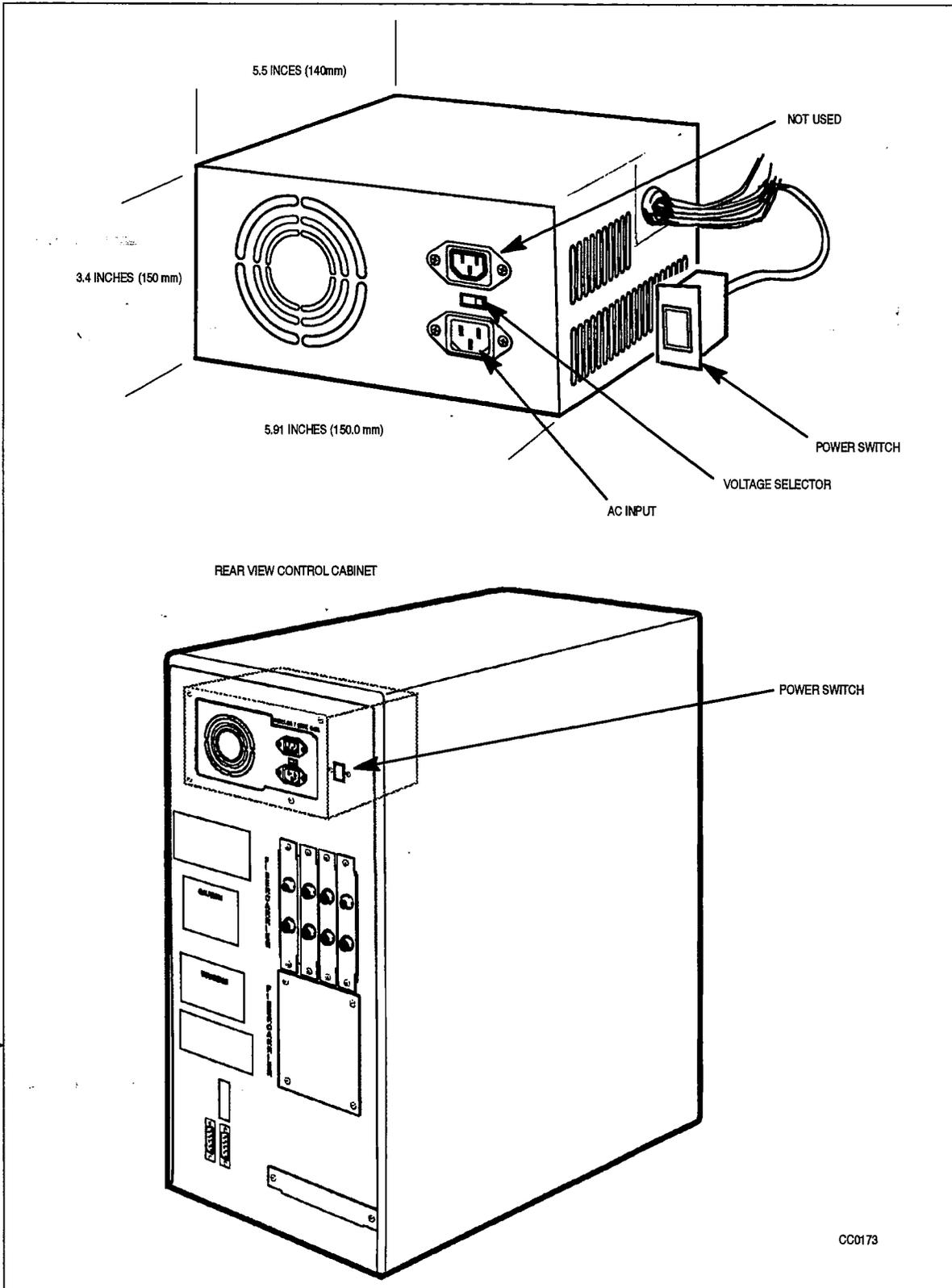


Figure 12-2 SX-200 FD Control Cabinet Power Supply

## 13. **RESERVE POWER SUPPLY**

The reserve power supply for the Control cabinet is a stand-alone Uninterruptible Power Supply (UPS) or Standby Power Supply (SPS) comprising a battery pack, a charger, and an inverter; it is not manufactured by Mitel Corporation. The UPS or SPS backup time is dependent upon the unit selected and the capacity of the batteries provided. The unit must meet the specifications provided below.

The Peripheral cabinet can have its own standard reserve power supply (in the base of the cabinet of the *SX-200 DIGITAL*), or can be supported by an additional UPS or SPS. The UPS and SPS are assemblies not manufactured by MITEL Corporation.

Please note that compliance to electrical, installation, and building codes is the responsibility of the purchaser of the equipment. Consult local municipal and electrical utility authorities before proceeding with the installation of equipment.

The UPS should be a true Uninterruptible Power Supply (except for an SPS recommended by MITEL) which always supplies the output load from its inverter and which includes a reverse transfer switch to automatically bypass the UPS if it fails. The UPS must be capable of driving rectifier capacitor loads.

Rating	1.5 kVA minimum
Input Voltage	120 Vrms +10%, -15%, 60 Hz 15%
Output Voltage	120 Vrms +10%, -15%, 60 Hz 5%
Output Waveform	Sinewave or Quasi square wave (not square wave)
Transfer time	Less than 30 ms (includes fail detection and transfer time)
Output Receptacle	NEMA 15 A 3-pin grounded
Holdup/Recharge Times	Per customer requirements.

An Uninterruptible Power Supply (UPS) can have an external connection (from an internal relay) which provides a closed contact to remotely indicate status or condition. Conditions which may be indicated include:

- an ALARM condition is present within the UPS
- the UPS is operating from its batteries (probably because commercial ac power has been interrupted).

The relay contact may be connected to a remote alarm or to a "Contact Monitor" line circuit to promptly indicate the condition.

Refer to the Manufacturer's Installation Manual, which describes conditions that are indicated. Refer to Practice 9109-096-105-NA, Features Description, for a description of "Contact Monitor" line circuit operation.



# 14. **POWER FAIL TRANSFER**

## PFT Operation

14.1 In the event of a major alarm condition on the *SX-200* DIGITAL, the power fail transfer relays located on the Power Fail Transfer (PFT) card, will connect Central Office (CO) trunks to selected station lines. Calls in progress when PFT occurs will be dropped; however calls made while in PFT mode will not be dropped when the system returns to normal operation, but will terminate normally at the end of the call. No PABX features are available while PFT is in effect. Any of the following conditions will cause power fail transfer:

- Commercial power failure (if no reserve power supply is used)
- Common control failure
- Manual transfer from control cabinet

The maximum number of Power Fail Transfer circuits for the various system sizes is shown below:

System Size	In Control Cabinet	In Peripheral Cabinet	Total Circuits
456-port	18 maximum	12 maximum	30 maximum
336-port	18 maximum	n/a	18 maximum
672-port	18 maximum	18 maximum	36 maximum

The PFT card is not supported in the *SX-200* FD, therefore an external System Fail Transfer (SFT) Unit is required. Control (relay contact) and Power (-48V) is provided from the Peripheral Bay (Peripheral FIM Carrier).

