

Feature Package 3

# STARPLUS<sup>®</sup> DHS<sup>™</sup> / DHS-E<sup>™</sup>



*The Answer To Your  
Company's Growing  
Communication Needs*

## Technical Manual

---

---

*FEATURE PACKAGE 3*

*STARPLUS<sup>®</sup> DHS<sup>™</sup> and DHS-E<sup>™</sup>*

# **Technical Manual**

Issue 2—March 2000

Part Number: SP7050-03

---

---

Issue	Release Date	Changes
1	2-99	<input type="checkbox"/> Feature Package 2 enhancements have been added. <input type="checkbox"/> Manual content contains extensive revisions.
2	3-00	<input type="checkbox"/> Feature Package 3 enhancements have been added. <input type="checkbox"/> Manual content contains extensive revisions.

**LIFE SUPPORT APPLICATIONS POLICY**

**VODAVI Technology, Inc.** products are not authorized for and should not be used within Life Support applications. Life Support systems are equipment intended to support or sustain life and whose failure to perform when properly used in accordance with instructions provided can be reasonably expected to result in significant personal injury or death.

**VODAVI Technology, Inc.** warranty is limited to replacement of defective components and does not cover injury to persons or property or other consequential damages.

**Copyright © 2000 VODAVI Technology, Inc.**

**All Rights Reserved**

This material is copyrighted by VODAVI Technology, Inc. Any unauthorized reproductions, use or disclosure of this material, or any part thereof, is strictly prohibited and is a violation of the Copyright Laws of the United States (17 U.S.C. Section 101 et. seq.).

VODAVI reserves the right to make changes in specifications at any time and without notice. The information furnished by VODAVI in this material is believed to be accurate and reliable, but is not warranted to be true in all cases.

*STARPLUS*<sup>®</sup> and *DHS and DHS-E*<sup>™</sup> are registered trademarks of VODAVI Technology, Inc.

CLD/2000

---

---

# Contents

## 1 Introduction

Regulatory Information (U.S.A.) .....	1-1
Telephone Company Notification .....	1-1
Incidence of Harm .....	1-1
Changes in Service .....	1-2
Maintenance Limitations .....	1-2
Hearing Aid Compatibility .....	1-2
UL/CSA Safety Compliance .....	1-2
Notice of Compliance .....	1-2
Toll Fraud and DISA Disclaimer .....	1-3

## 2 DHS Description and Installation

DHS General Description .....	2-1
System Technology .....	2-1
System Components .....	2-1
External Components .....	2-2
System Administration .....	2-3
Key Service Unit (KSU) .....	2-3
Power Supply .....	2-4
Central Processor Unit (CPU) .....	2-4
3 x 8 Module .....	2-4
6-Port CO Module .....	2-5
Standard MOH/BGM Module .....	2-6
Option Module .....	2-6
Digital Key Telephones .....	2-7
Direct Station Selector (DSS) Console <FP3> .....	2-10
2-Port Analog Adapter .....	2-11
Two-Port Analog Expander .....	2-12
DHS Technical Specification Tables .....	2-13
Preparation for DHS Installation .....	2-22
Installation Overview .....	2-22
General Site Considerations .....	2-23
Necessary Tools and Supplies .....	2-23
DHS Installation .....	2-25
System Check-Out .....	2-53
Power Up Sequence .....	2-53
Feature Upgrade Procedure .....	2-54

---

---

### 3 DHS-E Description and Installation

DHS-E Description .....	3-1
System Technology .....	3-1
KSU Components .....	3-1
Telephone Components .....	3-2
System Administration .....	3-3
Key Service Unit .....	3-3
Power Supply .....	3-4
Central Processor Unit (CPU) .....	3-4
Modem .....	3-4
3 x 8 Module .....	3-4
DHS-E Technical Specification Tables .....	3-6
DHS-E Installation .....	3-14
Installation Overview .....	3-14
Necessary Tools and Supplies .....	3-15
DHS-E Installation .....	3-17
System Check-Out .....	3-37
Power Up Sequence .....	3-37

### 4 Keystation Features and Operation

General Conventions .....	4-1
Soft Button Prompts .....	4-2
Account Code .....	4-8
Unforced/Unverified .....	4-8
ADP Modular Jack .....	4-9
Alarm - Station .....	4-9
Canceling an Alarm .....	4-10
Alarm - System .....	4-11
Alternate Answering Position .....	4-11
Attendant .....	4-12
Attendant Administration .....	4-12
Authority Code - Traveling Class of Service .....	4-14
Automatic Busy Redial .....	4-15
Automatic Line Selection .....	4-16
Canceling an Automatic Line Selection .....	4-16
Background Music .....	4-17
Busy Lamp Field (BLF) .....	4-17
Combination DSS/BLF .....	4-17
Call Back .....	4-18
Call Forward .....	4-19
Display <FP3> .....	4-19
Station .....	4-20
Call Forward Modes .....	4-20

---

No Answer .....	4-21
Busy .....	4-21
Busy/No Answer .....	4-21
Idle .....	4-21
Direct (All Call) .....	4-21
Follow Me .....	4-22
Cancel .....	4-22
Caller Identification (ICLID) .....	4-24
Name/Number Caller ID <FP3> .....	4-25
Calling Number/Name SMDR .....	4-27
Answered Call Table <FP3> .....	4-28
Unanswered Call Table .....	4-29
Call Park .....	4-30
Answer .....	4-31
Call Pickup .....	4-31
Direct .....	4-32
Group .....	4-32
Call Waiting .....	4-32
Camp On .....	4-33
Busy CO Line .....	4-33
Busy Station .....	4-35
Class of Service .....	4-36
Day/Night .....	4-36
CO Line Group Assignment .....	4-36
CO Line Pool .....	4-37
CO Line Signaling .....	4-38
CO Line Type Assignment .....	4-38
Conference .....	4-39
Supervised .....	4-39
Unsupervised .....	4-40
Dial Pulse to DTMF Conversion .....	4-41
Direct Inward System Access (DISA) .....	4-42
Attendant Access .....	4-42
Directory Dial <FP3> .....	4-44
Distinctive Ringing - Station <FP3> .....	4-45
Do Not Disturb (DND) .....	4-46
DND Override .....	4-47
Drop Time-Out .....	4-48
DSS Console <FP3> .....	4-48
Emergency Numbers .....	4-52
End-to-End Signaling .....	4-52
External Call Forward (ECF) .....	4-53
Flash .....	4-53
Feature Button Inquiry .....	4-54

---

Feature Button Programming .....	4-55
Flexible Line Assignment .....	4-58
Flexible Receive Assignment .....	4-59
Flexible Ring Assignment .....	4-59
Forced Intercom Call Forward .....	4-59
Forced Tone Ringing .....	4-60
Headset Mode .....	4-61
Hold .....	4-62
Abandon (Loop Supervision) .....	4-62
Automatic .....	4-63
Call Answer/Select .....	4-63
Exclusive .....	4-64
Reminder Time .....	4-64
System .....	4-64
Hour Mode Selection .....	4-65
Station Hunt Groups .....	4-65
I-Hold Indication .....	4-65
I-Use Indication .....	4-66
Intercom Call .....	4-66
Last Number Redial (LNR) .....	4-67
Letter Scheme .....	4-69
Loud Bell Control (Optional) .....	4-69
Message .....	4-70
Outgoing .....	4-70
Executive Notify .....	4-72
Message Waiting .....	4-73
Music-on-Hold (MOH) .....	4-75
Mute .....	4-75
Muted Ringing .....	4-75
Name In Display .....	4-76
Night Service .....	4-76
On Hook Dialing .....	4-77
Page .....	4-77
External .....	4-79
Allow/Deny .....	4-79
Meet Me .....	4-80
Pause .....	4-81
PBX Compatibility .....	4-81
Station Lock/Unlock .....	4-82
Privacy .....	4-84
Privacy Release .....	4-84
Private Line .....	4-85
Pulse To Tone Switch-Over .....	4-85
Recall (Transfer Recall) .....	4-86

---

Reminder Tones .....	4-86
Ringing Line Priority .....	4-87
Save Dialed Number (SDN) .....	4-87
Station Message Detail Recording (SMDR) .....	4-88
Resource - SMDRX_RATE .....	4-90
Speed Dialing .....	4-90
Station Feature Status Check .....	4-92
Station Groups .....	4-93
Station Numbering Plan .....	4-93
System Time .....	4-93
Toll Restriction .....	4-94
Tone Detector .....	4-94
Tone/Inter-Digit Duration .....	4-94
Transfer .....	4-95
User Name Programming .....	4-96
User Saved Number Redial (USNR) .....	4-96
Voice Announce (Hands-Free or Privacy) .....	4-97
Voice Mail Button .....	4-98
Voice Mail Integration .....	4-98
Voice Mail Monitor .....	4-100
Voice Over Busy .....	4-101
Voice Recorder .....	4-103
Volume Control .....	4-103
Warning Tone .....	4-104

## 5 SLT Features and Operation

Authority Code .....	5-4
Call Back .....	5-4
Cancel .....	5-4
Call Brokering .....	5-5
Call Forward .....	5-5
Busy .....	5-5
Busy/No Answer .....	5-5
Cancel .....	5-6
Direct (All Call) .....	5-6
Follow Me Forward .....	5-6
Idle .....	5-6
No Answer .....	5-6
Call Operator (Call Attendant) .....	5-6
Call Park Answer .....	5-7
Call Pickup .....	5-7
Direct .....	5-7
Group .....	5-7
Camp On .....	5-8



---

Busy Station .....	5-8
Busy CO Line .....	5-8
CO Line Access .....	5-8
Line Group .....	5-8
Specific Line .....	5-9
Do Not Disturb (DND) .....	5-9
Flash .....	5-10
Hold .....	5-10
Flash .....	5-10
Retrieve .....	5-11
Retrieve from Another Station .....	5-11
Hot Line (Ring Down) .....	5-12
Cancel .....	5-13
Intercom Call .....	5-13
Last Number Redial (LNR) .....	5-13
Message Waiting .....	5-14
Cancel .....	5-14
Send .....	5-14
Paging .....	5-14
Meet Me Answer (Meet Me Page) .....	5-14
Port Numbering .....	5-15
2-port Analog Adapter .....	5-17
Speed Dialing .....	5-18
Dialing .....	5-18
Storing .....	5-18
Station Alarm .....	5-18
Set .....	5-18
Cancel .....	5-19
Station Lock .....	5-19
Password Change .....	5-19
Unlock .....	5-19
Transfer .....	5-20

## **6 System Programming**

PC Programming .....	6-1
Keyset Programming .....	6-1
Soft Button Prompts .....	6-1
Program Mode Entry .....	6-2
Database Programming Procedural Flow .....	6-8
Station Programming .....	6-13
System Type .....	6-13
Station Parameters .....	6-13
Day Class of Service (COS) .....	6-13
Night COS .....	6-14
CO Line Assign .....	6-14
Receive Assign .....	6-14
Ring Assign .....	6-14

---

Account Code Forced .....	6-15
Station Groups .....	6-15
Warning Tone .....	6-15
Drop Time-Out .....	6-16
Station Position .....	6-16
Voice Mail Port .....	6-16
DSS Owner .....	6-16
CO Line Configuration .....	6-17
CO Line Parameters .....	6-17
Dialing Type Selection .....	6-17
Call Abandon .....	6-17
CO Line Type Assignment .....	6-18
Loud Bell Control .....	6-18
CO Line Group Assignment .....	6-18
Private To .....	6-19
Toll Override .....	6-19
Distinct Tone <FP3> .....	6-19
ICLID Port .....	6-19
Call Handling Configuration .....	6-20
Privacy Release .....	6-20
Privacy Release Tone .....	6-20
Exclusive Hold Time .....	6-21
Flash Time .....	6-21
Reminder Time .....	6-21
Park Remind .....	6-21
Pause Time .....	6-22
PBX Code .....	6-22
PBX Auto Pause .....	6-22
Dialing Ratio .....	6-22
VM Dialing Ratio .....	6-23
Warning Time .....	6-23
Recall Time .....	6-23
SLT Hook Flash .....	6-23
Direct Inward System Access (DISA) .....	6-24
EXT Call Forward (ECF) .....	6-25
UNS Conference Time .....	6-26
Operator Code .....	6-26
UNS Conference .....	6-26
Auto Busy Redial .....	6-26
Call Abandon Time .....	6-27
Ring ALT Position .....	6-27
CO Line Preset Forward .....	6-27
Wait (ICLID) .....	6-28
VM Monitor Time .....	6-28

---

Resource Configuration .....	6-29
Ring Scheme .....	6-29
Letter Type .....	6-29
Attendant .....	6-30
Alternate Attendant .....	6-30
System Alarm .....	6-31
Nite Start .....	6-31
Nite End .....	6-31
Database Password .....	6-31
User Password .....	6-32
User Names .....	6-32
Preprogrammed Messages .....	6-33
System Speed Dialing .....	6-33
Background Music (BGM) .....	6-34
CO Line Copy .....	6-34
Station Copy .....	6-34
Feature Button Copy .....	6-34
System Time .....	6-35
Account Code Table .....	6-35
Directory Dial <FP3> .....	6-35
Distinctive Ringing <FP3> .....	6-35
Data Link .....	6-36
RMT X_RATE .....	6-36
SMDR X_RATE .....	6-36
Hour Mode Selection .....	6-36
Dial Tone Detect .....	6-36
Dial Wait Time .....	6-37
KSU Revision .....	6-37
Modem Port Number (DHS-E Only) .....	6-37
Restriction Configuration .....	6-37
CO Call Discrimination .....	6-37
System Applications .....	6-39
Station Hunt Groups .....	6-39
Voice Mail .....	6-40
Numbering Plan (DHS-E Only) .....	6-42

## **7 Maintenance/ Troubleshooting**

Introduction .....	7-1
KSU .....	7-1
CPU/Power LED .....	7-1

## **A Database Programming Forms**

Programming Work Sheets .....	A-1
-------------------------------	-----

## **B Part Numbers**

### **Index**

# Figures

DHS Unit (cover removed) .....	2-3
3 x 8 Module .....	2-5
6-Port CO Module .....	2-5
MOH/BGM Module .....	2-6
Option Module .....	2-6
Basic Key Telephone .....	2-7
Enhanced Key Telephone .....	2-8
Executive Key Telephone .....	2-9
DSS Console .....	2-10
2-Port Analog Adapter .....	2-11
2-Port Analog Expander .....	2-12
DHS Components .....	2-29
3 x 8 Module .....	2-30
6-Port CO Module .....	2-31
KSU Expansion Module Installation .....	2-32
Option Module .....	2-34
KSU Option Module Installation .....	2-35
Standard MOH/BGM Module .....	2-36
Wiring Designations for 3 x 8 Modules .....	2-37
High Profile Mount .....	2-41
Wall Mount .....	2-41
Low Profile Mount .....	2-42
Key Telephone Modular Jack Locations .....	2-43
Caller ID Connection .....	2-46
1/8 in. Phono Jack .....	2-47
External Paging Equipment Installation .....	2-48
Loud Bell Control Installation .....	2-50
2-Port Analog Adapter .....	2-52
DHS Components .....	2-55
DHS-E KSU .....	3-3
Firmware Caution .....	3-5
3 x 8 Module .....	3-5
<i>DHS-E</i> CPU Board .....	3-20
3 x 8 Module .....	3-22
High Profile Mount .....	3-26
Wall Mount .....	3-26
Low Profile Mount .....	3-27
Key Telephone Modular Jack Locations .....	3-28
Caller ID Connection .....	3-31

---

1/8 in. Phono Jack .....	3-32
Motherboard Components .....	3-33
Loud Bell Control Installation .....	3-34
2-Port Analog Adapter .....	3-36
Motherboard .....	3-38
Soft Buttons .....	4-1
System Configuration .....	4-24
F3 Soft Button .....	4-25
Database Programming Functions—Station and CO Line .....	6-9
Database Programming Functions—Call Handling .....	6-10
Database Programming Functions—Resource .....	6-11
Database Programming Functions—Restriction and System Application .....	6-12

---

---

# Tables

FCC Compliance .....	1-1
System Configurations .....	2-2
Digital Hybrid System Capacities .....	2-13
Electrical Specifications .....	2-16
Environmental Specifications .....	2-17
Unit Specifications .....	2-18
Maximum Cable Length .....	2-19
Dialing Specifications .....	2-19
FCC Registration Numbers .....	2-19
Audible Signals .....	2-20
Mean Time Between Failure Analysis .....	2-21
Battery Sizing Chart .....	2-27
CO Lines Connections, 6-Port CO Module .....	2-38
Station Location Cable Terminations .....	2-40
RS-232C DB-9 Connector .....	2-45
System Configurations .....	3-2
Digital Hybrid System Capacities .....	3-6
Electrical Specifications .....	3-9
Environmental Specifications .....	3-9
Unit Specifications .....	3-10
Maximum Cable Length .....	3-11
Dialing Specifications .....	3-11
FCC Registration Numbers .....	3-11
Audible Signals .....	3-12
Mean Time Between Failure Analysis .....	3-13
Battery Sizing Chart .....	3-18
66M1-50 Wiring Designations for the 3 x 8 Modules .....	3-23
Station Location Cable Terminations .....	3-25
RS-232C DB-9 Connector .....	3-30
Feature Access Codes .....	4-3
System Numbering Plan .....	4-8
Call Forward Programming .....	4-20
Call Pickup Priority List .....	4-31
CO Line Flex Button Codes .....	4-49
CO Line Feature Button Codes .....	4-56
Letter Scheme Characters .....	4-69
Dial Pad Key Programming .....	4-71
Available Outgoing Pre-Programmed Messages .....	4-71
Available Executive Notify Pre-programmed Messages .....	4-72

---

---

SMDR (Data Examples) .....	4-89
Voice Announce .....	4-97
SLT Feature Access Codes .....	5-1
SLT Port Numbering (DHS) .....	5-15
SLT Port Numbering (DHS-E) .....	5-16
Database Programming Table .....	6-4
System Ring Scheme .....	6-29
Letter Type .....	6-30
User Name Programming .....	6-32
Restriction Data (Example) .....	6-38
Central Processor Unit (CPU) .....	7-2
Key Telephone / SLT Telephones Dead .....	7-3
Erratic Key Telephone Operation .....	7-4
Key Telephone (cannot be heard) .....	7-4
Key Telephone (cannot hear) .....	7-5
Speakerphone (cannot be heard) .....	7-5
No Sound From Speaker .....	7-5
Static/Noise During Conversation .....	7-6
CO Line Problems .....	7-7
Lines Stay Busy .....	7-7
Btn Programming is Lost/Changed at Key Telephone .....	7-8
System Type .....	A-1
System Application Numbering Plan (DHS-E only) .....	A-1
CO Line Data .....	A-2
Station Data (DHS) .....	A-3
Station Data (DHS-E) .....	A-5
Call Handling Data .....	A-8
CO Line Attributes .....	A-9
CO Line Attributes .....	A-9
External Call Forward - Auto Busy Redial Parameters .....	A-10
System Application Data .....	A-11
Restriction Data .....	A-13
Resource Data .....	A-17
System Speed Dial .....	A-21
Account Codes (up to 8-digits) .....	A-22
<b>STARPLUS<sup>®</sup> DHS/DHS-E<sup>™</sup> Part Numbers</b> .....	B-1

---

---

# 1

# Introduction

The information necessary to install, program, operate, and maintain the *STARPLUS*<sup>®</sup> *DHS/DHS-E*<sup>™</sup> systems is addressed in this manual.





---

## Regulatory Information (U.S.A.)

The Federal Communications Commission (FCC) has established rules that allow the direct connection of the *DHS/DHS-E™* systems to the telephone network. Certain actions must be undertaken or understood before the connection of customer provided equipment is completed.

**Table 1-1: FCC Compliance**

<b>Complies with Part 68, FCC Rules.</b>	<i>DHS</i>	<i>DHS-E</i>
FCC Registration Number for PBX or hybrid operation (CO Line accessed by means of dial-access-codes or group/pooled CO line access)	D6XTAI-23086-MF-E	D6XTAI-25245-MF-E
FCC Registration Number for Key System operation (CO Line access by means of individual CO Line button appearance)	D6XTAI-23085-KF-E	D6XTAI-25246-KF-E
Ringer Equivalence Number (REN) or service code	1.0B	1.2B
Type and USOC number of the interface jack to be ordered from the telephone company	RJ21X	RJ21X

### *Telephone Company Notification*

Before connecting the *DHS/DHS-E* system to the telephone network, the local telephone company must be given advance notice of intention to use customer-provided equipment, and must be provided with the following information:

- Telephone numbers to be connected to the system
- DHS/DHS-E system information
- REN
- USOC jack required for direct interconnection with the telephone network (RJ11C)
- FCC Registration Numbers (Refer to [Table 1-1](#))

### *Incidence of Harm*

If the telephone company determines that the customer-provided equipment is faulty and possibly causing harm or interruption to the telephone network, it should be disconnected until repairs can be made. If this is not done, the telephone company may temporarily disconnect service.

---

---

### *Changes in Service*

The local telephone company may make changes in its communications facilities or procedures. If these changes affect the use of the DHS/DHS-E system or compatibility with the network, the telephone company must give written notice to the user to allow uninterrupted service.

### *Maintenance Limitations*

Maintenance on the DHS/DHS-E system must be performed only by the manufacturer or its authorized agent. The user may not make any changes and/or repairs except as specifically noted in this manual. If unauthorized alterations or repairs are made, any remaining warranty and the software license for the system will be voided.

### *Hearing Aid Compatibility*

All DHS/DHS-E digital terminals are Hearing Aid Compatible, as defined in Section 68.316 of Part 68 FCC Rules and Regulations.

### *UL/CSA Safety Compliance*

The DHS/DHS-E system has met all safety requirements and was found in compliance with the Underwriters Laboratories (UL) 1459.

### *Notice of Compliance*

The DHS/DHS-E system complies with rules regarding radiation and radio frequency emissions by Class A computing devices. In accordance with FCC Standard 15 (Subpart J), the following information must be supplied to the end user:



*"This equipment generates and uses RF energy and if not installed and used in accordance with the Instruction Manual, may cause interference to Radio Communications. It has been tested and found to comply with the limits for a Class A computing device, pursuant to Subpart J of Part 15 of the FCC Rules, which are designed to provide reasonable protection against such interference, when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user, at his own expense, will be required to take whatever measures may be required to correct the interference."*

---

---

## Toll Fraud and DISA Disclaimer

“While this device is designed to be reasonably secure against intrusions from fraudulent callers, it is by no means invulnerable to fraud. Therefore, no express or implied warranty is made against such fraud including interconnection to the long distance network.”

“While this device is designed to be reasonably secure against invasion of privacy, it is by no means invulnerable to such invasions. Therefore, no express or implied warranty is made against unlawful or unauthorized utilization which results in the invasion of one’s right of privacy.”

Vodavi has made every reasonable effort to ensure that this product works in most business environments. However, there may be some environments (RFI and EMI) in which this product may not work properly. In such cases, it is the responsibility of the installer to take the necessary actions to correct the situation.



*The **STARPLUS<sup>®</sup> DHS/DHS-E<sup>™</sup>** Systems are Year 2000 compliant. Vodavi displays 00 as the year in SMDR output and on LCD displays.*



*Use of Station Lock Feature 97 will restrict access to 911. Also, use of certain music sources for BGM or MOH may violate copyright laws.*



---

---

# 2

## DHS Description and Installation

The *STARPLUS DHS/DHS-E™* Digital Hybrid System is a full-featured digital key telephone system. The common system architecture supports three digital telephone models, a Direct Station Selector (DSS) <FP3> and an expandable analog adaptor interface. The *DHS* is designed to meet the telecommunications needs of small-to-medium sized business offices.



---

---

## DHS General Description

### *System Technology*

The *DHS* product line incorporates state of the art digital technology for voice switching and call processing utilizing Pulse Code Modulation and Time Division Multiplexing (PCM/TDM). The *DHS* family is engineered to allow migration of the *DHS* digital terminals and terminal accessories throughout the entire product line. ISDN-like, 2B+D technology complements the system architecture and capabilities. On one industry standard twisted pair, key telephones perform all system functions and voice communications. Some additional features of the *DHS* include:

- A non-blocking switch, with no loss or degradation of voice signals.
- Stored-Program Control (SPC), utilizing a 16-bit, 8 MHz microprocessor.
- Memory consists of 512 KB of Read Only Memory (ROM) and 128 KB of Random Access Memory (RAM).

When an analog device interface is required, a 2-Port Central Office (CO) Module may be connected to any one digital station port. The 2B+D technology allows the *DHS* to split one digital key telephone port voice channel (B1) and the second voice channel (B2) to provide two independent SLT-type device interfaces.

The 2-Port CO Module may be expanded with the 2-Port Analog Expansion (in the 2-Port CO Module housing).

The 2-Port CO Module and 2-Port Analog Expansion each require one dedicated digital station port.



*The application of analog devices in the *DHS* has the effect of two-to-one port gain. For every single digital port used to interface a 2-Port CO Module/Expansion, two analog ports are available.*

### *System Components*

#### **KSU Components**

The *DHS* platform is comprised of three key telephone models, an optional Direct Station Selector (DSS) and a modular Key Service Unit (KSU) which houses the following KSU components:

- *3 x 8 Module*
- *Standard MOH/BGM Module*
- *6-Port CO Module*
- *Option Module*



Two 3 x 8 Modules may be added to the initial 3 x 8 module in the Basic KSU. Alternately, a 6-Port CO Module may be substituted for one 3 x 8 module for greater flexibility. The maximum capacity is either 9 CO lines x 24 stations, or 12 CO lines x 16 stations.

**Table 2-1: System Configurations**

<b>Equipment Installed</b>	<b>Maximum Number of Loop Start Lines</b>	<b>Maximum Number of <i>DHS</i> Digital Key Telephones</b>
One 3 x 8 module	3	8
Two 3 x 8 modules	6	16
Three 3 x 8 modules	9	24
One 3 x 8 module and One six-port CO module	9	8
Two 3 x 8 modules and One six-port CO module	12	16

The basic KSU is equipped with a Standard Background Music/Music-On-Hold (BGM/MOH) Module. An external music source may be connected to this interface via a 1/8 in. phono plug for BGM/MOH listening. The Option Module replaces the Standard BGM/MOH Module and provides two DTMF receivers and two Tone Detectors specifically for ECF, DISA, Unsupervised CO Line Conference, and Dial Tone Detection.



*SLT operations do NOT use Option Module resources.*

### *External Components*

- Executive Key Telephone
- Enhanced Key Telephone
- Basic Key Telephone
- 2-Port Analog Adapter
- 2-Port SLT Expansion
- Direct Station Selector <FP3>



*Key telephones are available in two colors: Off White, and Charcoal Gray.*

---

---

## *System Administration*

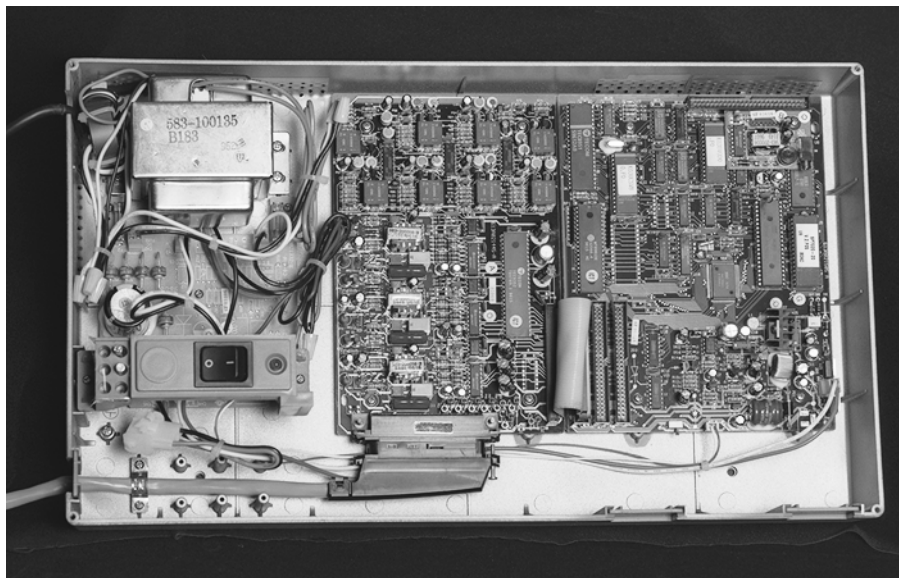
The system default customer data base can be entered and changed, under password control, from any Executive Key Telephone. All Customer information is protected by an internal rechargeable NiCad or NiMh battery. Programmable password protection is allowed for each station, system administrator and external (DISA) callers. An optional PC Programming Software is available to program the *DHS* system. This Software allows the user to program offline and then upload directly to the system. The *DHS* requires the Option Module to use the PC Programming Software.

## *Key Service Unit (KSU)*

The *DHS* Key Service Unit (KSU) is a modular flat-pack design. It is a self-contained cabinet with internal power supply, common control circuits (CPU board) and 3 x 8 module. The power supply AC transformer is hard-wire selected for either 117V AC ( $\pm 10\%$ ). The KSU is designed for wall mount and shipped with a wall mounting template. The compact KSU weighs less than 20 pounds and is UL compliant.

Standard inserts installed over various KSU openings may be removed or repositioned to accommodate exterior connection requirements; three such panels are present. One may be removed to route a serial cable through the KSU outer housing for connection of SMDR equipment. Another may be removed to route a serial cable through the KSU outer housing for connection of a modem or PC (via a straight-through cable). This serial port is used for Caller ID, PC programming and maintenance. Both serial ports are provided when the Option Module is installed.

One KSU opening panel may be removed or repositioned to accommodate cable entry requirements through the outer housing for connection to the MDF.



**Figure 2-1: DHS Unit (cover removed)**

## *Power Supply*

The power supply circuitry of the *DHS* incorporates a linear design transformer with a choice of input voltage taps. The transformer primary windings are shipped wired for 117V AC applications; a factory insulated tap wire may alternatively be connected for 230V AC applications. Since the power supply is linear in design the output voltage varies between 21.6 and 32V DC depending on load and stability of the input voltage. The output voltage is delivered to the CPU board for distribution and rectified there for logic and control voltages.

Two fuses are equipped on the power supply board, one for AC input over-voltage protection and one for DC output over-voltage protection. A Double Pole Double Throw (DPDT) switch is accessible from outside of the KSU when the KSU cover is in place. The DPDT switch will simultaneously switch AC input and DC output circuits ON and OFF.

In the event battery backup operation is desired and equipped via the optional *DHS* Battery Charging Unit (BCU), the KSU switch may be used to switch OFF/ON power from both sources.

The power supply wiring harness is equipped with a mate-n-lock connector on the DC output for connection of the *DHS* BCU. When equipped, the BCU will maintain complete system operation during commercial power outages. A current draw/configuration chart is included in this document for assistance in selecting the appropriate batteries for use in the BCU. Please consult the BCU manual for installation precautions and proper battery installation.

## *Central Processor Unit (CPU)*

The CPU board is standard in the KSU. This board contains all circuitry required to control the fully-equipped *DHS*. Three bus connectors are provided where the station/CO line interface 3 x 8 module and 6-Port CO Module are connected. The Option Module connector and Standard MOH Module connector are also located on the CPU board. All digital voice switching and call process data switching is accomplished on the CPU board.

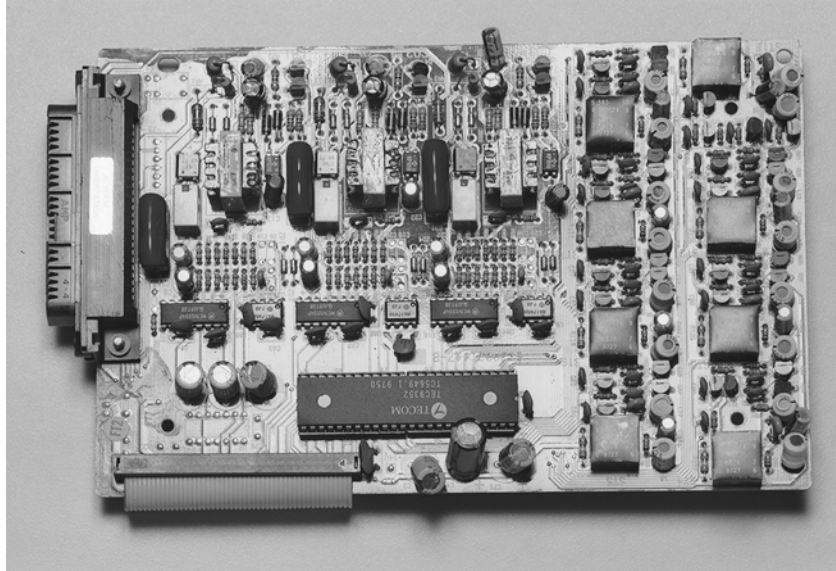
## *3 x 8 Module*

The 3 x 8 module provides interface of three loop-start CO lines and eight *DHS* key telephones.

Each CO line circuit incorporates over-voltage protection, ring detector, loop detector, loop/pulse-dial relay, current sink circuit, coupling/isolation transformer (impedance 600:Ohms), hybrid circuit and combo (CODEC and filter) polarity guard circuit and radio frequency noise filter.

Each digital key telephone port is comprised of a proprietary transceiver designed using ISDN type 2B+D architecture.

Physical connection of stations and CO lines to the 3 x 8 module is made through one male 25-pair, amphenol-type connector to the Main Distribution Frame (MDF). Station power and signaling to the digital key telephones are provided via a single twisted pair from the 3 x 8 module.

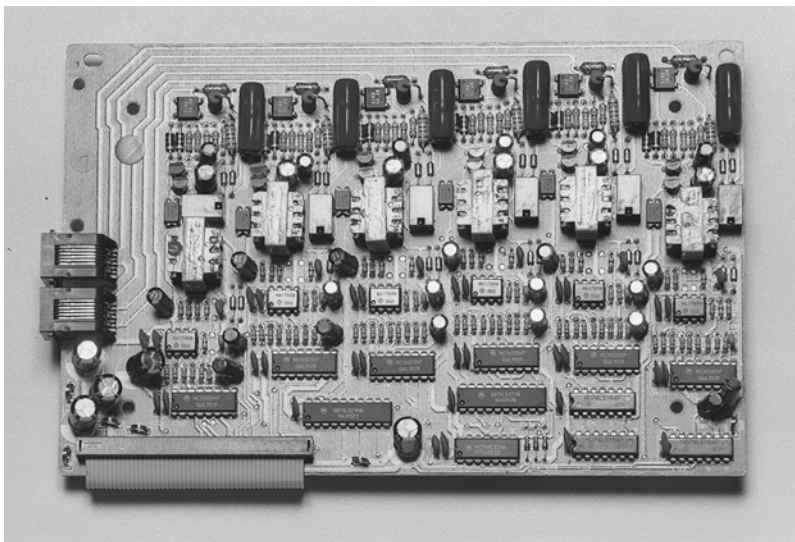


**Figure 2-2: 3 x 8 Module**

### *6-Port CO Module*

The 6-Port CO Module may be installed in place of a 3 x 8 module in the last card position. The 6-Port CO Module interfaces with 6 loop-start CO lines. No digital station interface is provided on this module. The 6-Port CO Module is shipped with four mounting stand-offs used to install the board into the Basic KSU, two 6-conductor modular line cords and two 6-conductor modular blocks. The mounting cords and modular blocks are used to extend the CO line interface circuits to the MDF for connection.

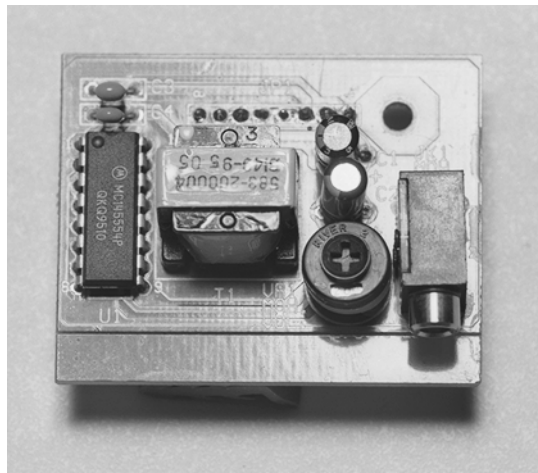
Each CO line circuit consists of an over-voltage protector, ring detector, loop detector, loop/pulse-dial relay, current sink circuit, isolation transformer, hybrid circuit and COMBO (CODEC and filter).



**Figure 2-3: 6-Port CO Module**

### *Standard MOH/BGM Module*

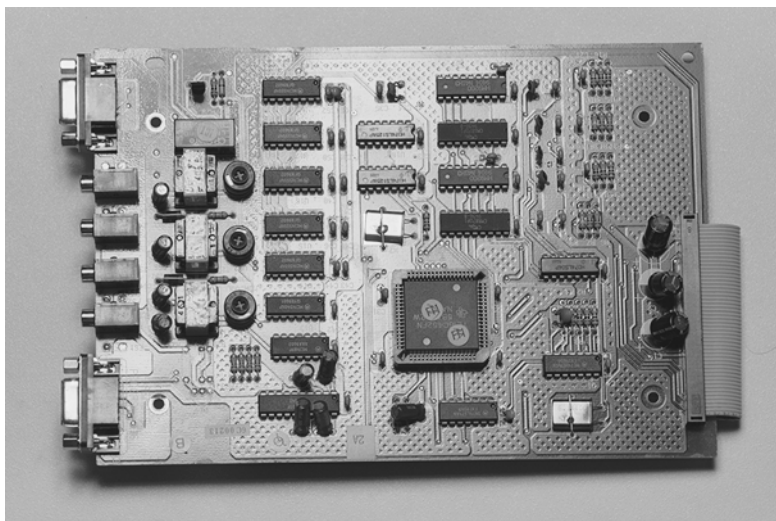
The standard MOH/BGM Module is installed at the factory and used to interface with one external music source via an 1/8 in. phono type connector. This module must be removed if the optional module is installed.



**Figure 2-4: MOH/BGM Module**

### *Option Module*

The Option Module replaces the standard MOH/BGM Module. The Option Module contains two DTMF receivers and two Tone Detectors that enable the following features: Dial Tone Detection, External Call Forwarding, Direct Inward System Access, Automatic Busy Redial and Unsupervised Conference. Interface circuits and hardware connectors are provided for SMDR (Station Message Detail Recording), PC Programming, Caller ID, Loud Bell Control, External Voice Paging and two music sources. Connectors for SMDR and PC Programming are 9-pin RS-232 (serial) connectors. Connectors for Loud Bell Control, External Voice Paging, MOH/BGM and BGM2 are 1/8 in. phono type connectors.



**Figure 2-5: Option Module**

---

---

## Digital Key Telephones

The *DHS* and *DHS-E* support three proprietary digital key telephones (Basic, Enhanced and Executive). All key telephone models operate on one single twisted pair and provide D/A and A/D conversion at the terminal. These key telephones support hot key pad for dialing digits at any time.

### Basic Key Telephone

The basic key telephone (refer to Figure 2-6) is equipped with a speaker for monitoring call progress and receiving call announcements but is not equipped with a microphone for hands-free reply. The basic key telephone has 16 buttons, 8 of which are fixed function buttons to control settings and primary key telephone call processing operations: HOLD, TRANS (Transfer), FEAT (Feature), CLEAR, MUTE, SPKR (Speaker), and Volume UP/DN.

Eight buttons are user-programmable feature buttons, that are equipped with dual color LED with preassigned default settings for quick power up operation. These buttons are arranged in two rows and four columns. Beginning at the top left button they are assigned the following default values; CO line 1, CO line 2, CO line 3, CO line 4, CO line 5, CO line 6, HF/Tone and Message Waiting.



Figure 2-6: Basic Key Telephone

---

---

## Enhanced Key Telephone

The Enhanced Key Telephone is fully equipped for hands-free, speakerphone operation. This key telephone is expanded to 28 buttons. Eight fixed function buttons remain consistent with those of the Basic Key Telephone.

Twenty buttons are user-programmable feature buttons equipped and dual color LED with pre-assigned default settings for quick power up operation. These buttons are arranged in five rows and four columns. Beginning at the top left button they are assigned the following default values; Station 10 - 21, CO line 1-6, HF/Tone and Message Waiting. The Enhanced Key Telephone also is equipped with a 12-key Dial Pad for dialing intercom numbers, system feature codes and telephone network numbers on CO lines.



**Figure 2-7: Enhanced Key Telephone**

Each telephone is equipped with an Additional Device Port (ADP) located on the underside of the phone for user-friendly connection of analog devices (answering machines, faxes, modems, cordless telephones, etc.). An analog adapter is required for this port to be equipped for use as an extension of the system.

---

## Executive Key Telephone

The Executive Key Telephone model has a 2 x 16, 32-character Super Twist LCD display, with three interactive Soft Buttons to enhance system features operation.

The Super Twist LCD eliminates the need for contrast adjustment and enhances angled viewing position clarity of displayed data. A visual reference to call progress and call duration, as well as time and date information, is displayed. The display also enables the Executive Key Telephone user to send and receive visual advisory and call-back messages.

The Executive model telephone is fully equipped for hands-free, speakerphone operation, and enables hands-free outgoing and incoming calls. The same 20 Programmable Feature Buttons are available on the Executive model, as on the Enhanced model. Eight fixed function buttons remain consistent with those of the Basic and Enhanced Key Telephone.



**Figure 2-8: Executive Key Telephone**

Each telephone is equipped with anADP located on the underside of the phone for user-friendly connection of analog devices (answering machines, faxes, modems, cordless phones, etc.). An analog adapter is required for this port to be equipped for use as an extension of the system.



---

---

### *Direct Station Selector (DSS) Console <FP3>*

Previously only available on the DHS-E, the Direct Station Selector (DSS) Console is now also available on the DHS. One DSS Console may be assigned to a station. Each DSS Console uses one Digital Station Port. Up to 12 DSS Consoles can be installed on a system.

The DSS Console buttons are programmed by the Station User using the FEAT + # + 5 command, then pressing the button on the DSS to be programmed. All system feature codes may be stored on the Programmable Feature Buttons for one-button operation. Certain programmed feature buttons will light when activated (DND, Call Forward, DSS/BLF, etc.), while others such as Call Pick-Up, BGM and Last Number Redial do not.

Features are separated into three distinct categories for programming on a button: CO line, station, or feature.



**Figure 2-9: DSS Console**

## *2-Port Analog Adapter*

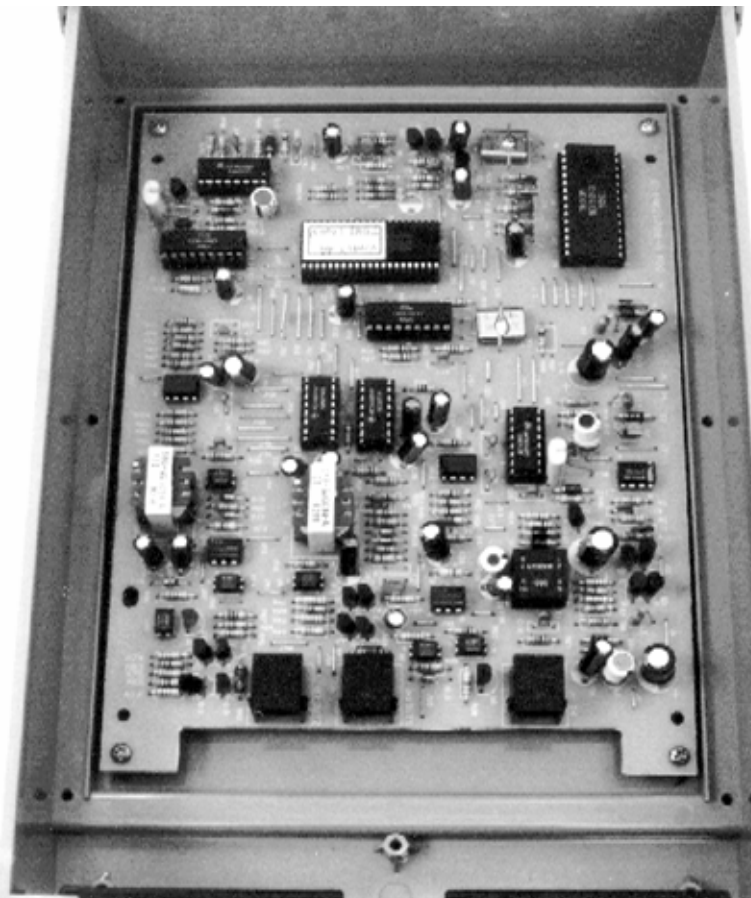
A 2-Port Analog Adapter is optionally available which will support most auxiliary equipment within a business environment such as fax machines, answering devices and Single Line Telephones (SLT). Each adapter requires an unused digital station port and will yield two analog device interfaces.

The 2-Port Analog Adapter is a wall mount apparatus that is powered from the KSU. The adapter receives both voice channels and data control from the KSU, over one pair of wires. The 2-Port Analog Adapter generates -30V DC and 20-25Hz, 50V square wave ringing for operation of SLTs, fax machines, answering devices, and most modems. All terminations are by RJ-11 connection.

The analog Adapter utilizes the B1 channel for voice tip/ring connection to one analog station, and the B2 channel for the other. D channel provides port control to and from the KSU. The adapter provides two DTMF receivers (one for each analog port). Third party analog devices connected to the 2-Port Analog Adapter must generate DTMF signaling (Pulse/rotary dial telephones/equipment are not supported). The 2-Port Analog Adapter provides adequate housing space for one 2-Port Analog Expansion.



*Loop disconnect and message waiting lamps are not supported by the analog adapter.*



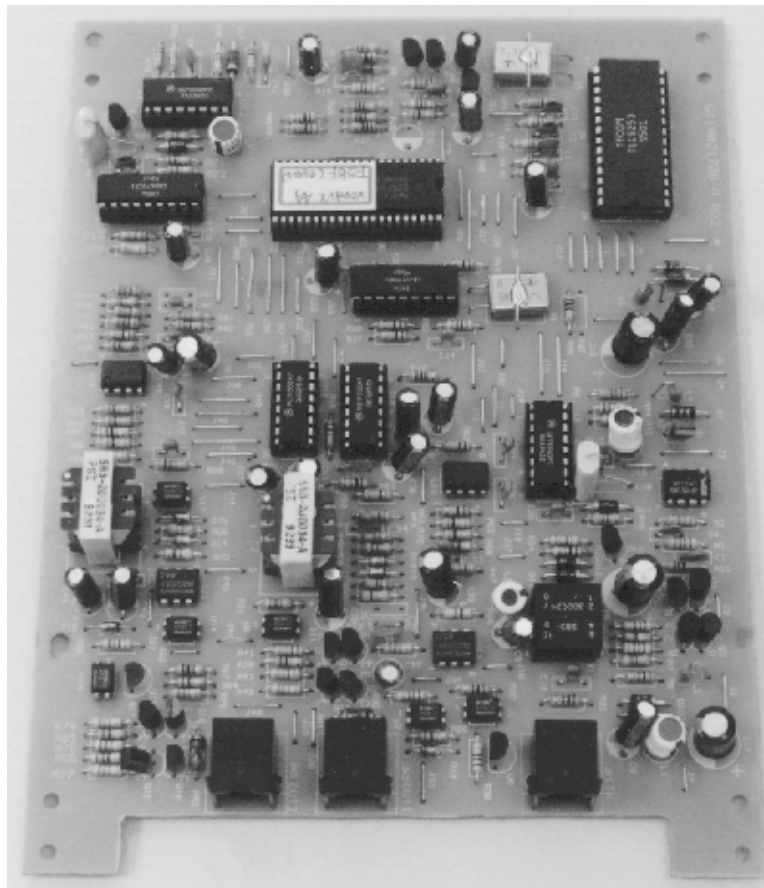
**Figure 2-10: 2-Port Analog Adapter**

## *Two-Port Analog Expander*

A 2-Port Analog Expander module is optionally available and is designed to be installed inside the 2-Port Analog Adapter housing. The 2-Port Analog Expander provides the same interface capabilities of the 2-Port Analog Adapter and is in fact comprised of the same circuit board used inside the 2-Port Analog Adapter. Loop disconnect and message waiting lamps are not supported by the analog adapter.



*The 2-Port Analog Expander requires its own, dedicated digital **DHS** port for operation.*



**Figure 2-11: 2-Port Analog Expander**

---

## DHS Technical Specification Tables

**Table 2-2: Digital Hybrid System Capacities**

<b>Component</b>	<b>Description</b>
System Programming Memory Protection	300 Hours on a fully-charged battery (internal Nicad/Nimh battery requires 14 continuous-powered hours of system operation to become fully charged.)
Ports:	
CO/PBX/Centrex Lines	12 (Note: 16 stations max. with this configuration.)
Digital Stations	24 (Note: 9 CO lines max. with this configuration.)
Standard SLTs	46 (Note: one digital port must be reserved for digital station operation. One digital station port is used for every 2 SLT ports required.)
DSS Console	12 (Note: one for each digital station.)
DTMF Receivers:	
2-Port CO Module	2 (One for each SLT port)
2-Port Analog Expansion	2 (One for each SLT port)
Option Module	2 (Shared for advanced call processing system features; DISA, ECF)
DTMF Senders	Unlimited. (DTMF signal generation is derived from the core system tone resource. Tone combinations are available as needed.)
Tone Detectors (used to monitor call progress tones: Busy Tone, Ring-back Tone, etc.)	2 (Shared for advanced call processing system features; DISA, ECF, ABR. etc.) Located on the Option Module
Contacts	1 LBC contact is available via the Option Module.
Conference Circuits	Four-party conference circuits (8 per system).
DISA Circuits	Any number of CO lines may be programmed for DISA operation.

**Table 2-2: Digital Hybrid System Capacities**

System Attendants	1 + 1 Alternate position for overflow call handling.
Hunt Groups	8
Members per Group	24
Group Types	Pilot Hunt Group (HG), All Ring Group, or Voice Mail (VM) Group
Voice Mail Groups:	1 (Selected as VM type from HG)
Members (ports)	24
Integration Method:	In-band
VM Message Waiting	[#] + [96] + station number to turn VM button LED on. [#] + [*] + [96] + station number to turn VM button LED off.
VM Control codes:	
Disconnect Digit(s)	8 digits max.
Prefix for intercom calls	4 digits max.
Prefix for transferred calls	4 digits max.
Record Digits for Voice Recorder function	4 max.
Suffix for intercom calls	2 max.
Suffix for transferred call	2 max.
CO Line Loop Current Sensing	Interrupt programmable from 50 to 2500 ms
Paging	8 Internal Page Extension Groups 1 External Page Port (via Option Module) 1 Internal All Call 1 System (Internal/External) All Call
System Speed Dialing	80 Total, 16 digits per bin
Station Speed Dialing (DKT and SLT)	20 Total per station, 16 digits per bin
Last Number Redial	16 Digits per station
Save Number Redial	16 Digits per station
User Saved Number Redial	20 Digits per station

**Table 2-2: Digital Hybrid System Capacities**

Callback Request Per Station	1
Camp On By A Busy Station	1
Stations Camped On To Station	1
Stations Camped On To Busy Line	1
Message - Executive Notification	6 Preprogrammed; 1 Personal per station
Message - Executive Preprogrammed	6 Preprogrammed; 1 Personal per station
Message Waiting	32 Simultaneous
Name in Display	1 Per station, 7 characters max.
Class Of Service (COS)	8 (0-7) per Day, 8 (0-7) per Night
Toll Restriction To/From Tables	100 Entries, 10 digits per entry
Forced Verified Account Codes	100 Bins, 8 digits max.
Unverified Account Codes	8 Digits max.
Call Pick Up Groups	8 Extension Groups
Station Lock Password	4 Digits max. per station
System Programming Password	6 Digits (000000 at default)
System Reminder Alarm	8 Time settings
Station Alarm	1 Per station
Ring Schemes	3
Distinctive Ring Tones	
Station	4 (1-5)
CO Line	4 (0-4)
External Call Forward	1 incoming line, 1 outgoing line

**Table 2-3: Electrical Specifications**

<b>Component</b>	<b>Description</b>
AC Power Source	Dedicated 117/230V AC $\pm$ 15% (47-63 Hz single phase)
Power consumption	1.5A max. at 120V AC (180 W)
Power Supply fuse: AC input DC output	2A 250V 1A 125V
Idle Channel Noise	-74 dB
Cross Talk Attenuation	75 dB (at 1 kHz)
Ringing Sensitivity	40V RMS 25 Hz
Ringer Equivalence Number	1.0B
CO Line Signaling	DTMF amplitude (-5, -7 dB) $\pm$ 2 dB, at approx. 2 Vpp Pulse Dialing ratio 60/40 at 10 Pps
Music Source/Background Music	0 dBm at 600 $\Omega$ input impedance 1/8 in. phono jack
Contact rating (Option Module LBC)	1A at 24V DC 1/8 in. phono jack
External Page Port	0 dBm at 600 $\Omega$ 1/8 in. phono jack
Serial Ports	Nine-pin female RS-232C

**Table 2-4: Environmental Specifications**

<b>Requirements</b>	<b>In Operation</b>	<b>In Storage</b>
Temperature KSU	32 to 104° F 0 to 40° C	-40 to 185° F -40 to 85° C
Recommended Operating Temperature	70 to 78° F	
Temperature Station Instruments	32 to 113° F 0 to 45° C	-40 to 185° F -40 to 85° C
Relative Humidity (non-condensing)	5 to 90%	5 to 90%
Heat Dissipation (BTU)	300	
Altitude	Up to 10,000 ft. (3,048 m)	Up to 40,000 ft. (12,192 m)



**Table 2-5: Unit Specifications**

Part #	Description	Dimensions			Weight
		L	W	H	
SP7000-00	Basic KSU ( <i>DHS</i> )	L W H	18.4 in. 10.8 in. 4.2 in.	460 mm 270 mm 105 mm	4.0 Kg 8.8 lb
SP7100-00	3 x 8 Module	L W H	8.6 in. 5.2 in. 0.88 in.	215 mm 130 mm 22 mm	0.4 Kg 0.88 lb
SP7100-10	6-Port CO Module	L W H	8.6 in. 5.2 in. 0.88 in.	215 mm 130 mm 22 mm	0.3 Kg 0.66 lb
SP7110-00	Option Module	L W H	8.48 in. 5.6 in. 0.88 in.	212 mm 140 mm 22 mm	0.4 Kg 0.88 lb
SP7310-XX*	DSS Console	L W H	88.8 in. 6.62 in. 1.75 in.	234 mm 188 mm 64.5 mm	1.2 Kg 2.64 lb
SP7311-XX	Basic Key Telephone	L W H	9.36 in. 7.52 in. 2.58 in.	234 mm 188 mm 64.5 mm	1.2 Kg 2.64 lb
SP7312-XX	Enhanced Key Telephone	L W H	9.36 in. 7.52 in. 2.58 in.	234 mm 188 mm 64.5 mm	1.2 Kg 2.64 lb
SP7314-XX	Executive Key Telephone	L W H	9.36 in. 7.52 in. 2.58 in.	234 mm 188 mm 64.5 mm	1.2 Kg 2.64 lb
SP7420-00	2-Port SLA Module	L W H	12.82 in. 7.38 in. 2.6 in.	320.5 mm 184.5 mm 65 mm	0.4 Kg 0.88 lb
SP7440-00	2-Port Analog Expansion	L W H	7.92 in. 5.96 in. 0.88 in.	198 mm 149 mm 22 mm	0.7 Kg 1.54 lb
SP7465-00	Standard BGM/ MOH	L W H	2.00 in. 1.65 in. 1.25 in.	50.8 mm 42 mm 64.5 mm	0.023 Kg 0.05 lb
SP7081-10	Caller ID Cable	L W H			

\* XX Denotes color option: 71 = Charcoal, 08 = Off White

**Table 2-6: Maximum Cable Length**

<b>Digital Key Telephone</b> (Distance measures in linear ft. of cable from KSU to DKT.)	26 AWG - (850 ft) 255 m 24 AWG - (1416 ft) 425 m 22 AWG - (1983 ft) 700 m
<b>Standard SLT</b> (Distance measures in linear ft. of cable from KSU to SLT. 2-Port CO Module may be placed anywhere in between.)	26 AWG - (650 ft) 195 m 24 AWG - (1133 ft) 340 m 22 AWG - (1586 ft) 476 m

**Table 2-7: Dialing Specifications**

<b>DTMF Dialing mode:</b> <b>Frequency deviation</b> <b>Rise time</b> <b>Duration of DTMF signal</b> <b>Inter-digit time</b> <b>VM Port DTMF duration</b> <b>VM Port Inter-digit time</b>	$\pm 1\%$ 3ms programmable 50-150ms (70ms default) programmable 50-150ms (70ms default) programmable 60-150ms (120ms default) programmable 60-150ms (120ms default)
<b>Pulse Dialing mode:</b> <b>Pulse dial rate</b> <b>Pulse Make/Break ratio</b>	10 pulses per second 60/40

**Table 2-8: FCC Registration Numbers**

For systems configured for Key System operation (each CO line appears on its own dedicated button).	D6XTAI-23085-KF-E
For systems configured for hybrid operation (CO lines may be accessed by dial codes and Pool/Loop buttons).	D6XTAI-23086-MF-E

**Table 2-9: Audible Signals**

<b>Signal</b>	<b>Frequency</b>	<b>Cadence</b>
CO Line Ringing: Scheme 0 Scheme 1 Scheme 2 Distinctive 1 Distinctive 2 Distinctive 3 Distinctive 4 SLT	N/A N/A N/A SLT bell	300 ms On, 400 ms Off, 300 ms On, 4 seconds Off 1 second On, 3 seconds Off 1 second On, 3 seconds Off Follows ring cadence of Ring Scheme selected Follows ring cadence of Ring Scheme selected Follows ring cadence of Ring Scheme selected Follows ring cadence of Ring Scheme selected Follows ring cadence of Ring Scheme selected
Intercom Ringing: Scheme 0 Scheme 1 Scheme 2 Distinctive 1 Distinctive 2 Distinctive 3 Distinctive 4 SLT	N/A N/A N/A SLT bell	1 second On, 3 seconds Off 1 second On, 3 seconds Off 300 ms On, 400 ms Off, 300 ms On, 4 seconds Off Follows ring cadence of Ring Scheme selected Follows ring cadence of Ring Scheme selected Follows ring cadence of Ring Scheme selected Follows ring cadence of Ring Scheme selected Follows ring cadence of Ring Scheme selected
Message Wait Callback		Follows ring cadence of Ring Scheme selected

**Table 2-10: Mean Time Between Failure Analysis**

<b>Component</b>	<b>MTBF (hr)</b>
Case Assembly	100.0
Power Supply Unit	193.0
CPU Module	3095.0
Standard Music On Hold Module	325.7
3 x 8 Module	5744.0
6-Port CO Line Module	7201.2
Option Module	2866.0
Basic Key Telephone	2988.3
Enhanced Key Telephone	4205.3
Executive Key Telephone	4275.3
2-Port CO Module and 2-Port Analog Expansion	5000.9
Method: Use the figures above for each unit installed (or to be installed) and calculate the total for this system configuration. Use the total from Step 1 in place of the variable x in the formula at the right to calculate MTBF for this system configuration.	$(1 \div x)(10^9) = \text{MTBF hr}$

---

---

## Preparation for DHS Installation

### *Installation Overview*

1. Plan the installation, including the KSU and Main Distribution Frame (MDF) location, station locations, cable runs, and optional equipment.
2. Mount a backboard in the designated MDF location.
3. Mount the KSU on the MDF backboard. Use the provided mounting template to aid in spacing the mounting screws.
4. Install optional 3 x 8 Modules inside the KSU as required.
5. Install the Option Module if required.
6. Mount the MDF backboard and attach the punch-down terminal block(s) on the backboard.
7. Run cables for the key telephone and single-line telephone locations from the MDF to each location. No cable should loop from one telephone location to another.
8. Run wiring to any optional equipment, such as external paging equipment, loud bell signaling devices, music sources, etc.
9. Route telephone and CO line port interface connections through the appropriate KSU opening, and terminate all industry standard wiring on punch-down terminal block(s) on the MDF.
10. Route auxiliary device cabling through the appropriate KSU opening and terminate as required (music source, printer/computer for SMDR, external paging equipment, etc.).
11. Terminate station cables on punch-down terminal block(s) on the MDF.
12. Terminate station cables on modular jack assemblies at the station locations.
13. Cross-connect the CO lines and station ports to station cables on the corresponding punch-down terminal block.
14. Install the station instruments and any optional station equipment, such as headsets or SLTs.
15. Set the RAM memory initialization switch from its factory set OFF position to the ON position (refer to [Figure 2-12: DHS Components](#)).



*If the RAM Initialization switch was not in the OFF position prior to this installation, it must be moved to the OFF position and allowed to stay in the OFF position for 2 minutes while the system is NOT powered. This critical step is detailed in "Power Up Sequence" near the end of this chapter.*

16. Plug the AC power cord into the dedicated AC outlet and power up by operating the AC power switch to the ON position.
17. Observe the power/CPU heartbeat LED for flashing status after 4-6 sec.

---

---

## General Site Considerations

The first step of *DHS* installation, is to locate an acceptable site for the common equipment (KSUs, boards, etc.). When locating a mounting site for the KSUs, the following points must be considered:

- KSUs are designed for wall mounting and should not be mounted directly to a masonry or plasterboard wall. It is recommended that 1/2 in. plywood backboard be firmly mounted to the wall, and the KSU and MDF be mounted to the backboard.
- The location must have access to a *dedicated* 117V AC ( $\pm 10\%$ ), 60 Hz, single-phase circuit with a circuit breaker or fuse rated at 15 amps. A 3-wire parallel blade grounded outlet should be within approximately 6 feet of the lower left rear of the KSU mounting.
- The location must have access to a good earth ground, such as a metallic cold water pipe without non-metallic joints. The ground source should be located as close as possible to the system.
- The system should be located in an area that is well ventilated with a recommended temperature range of 68-78° F and a relative humidity range of 5-60% (non condensing).
- The system should be located within 25 ft. of the telephone company's termination point. Also, the location should be within the prescribed station loop lengths for all keysets and terminals. If existing cabling is used, its location and conduits should be considered. Station wiring should be in the building. Station ports are not designed for installation outside of the building.
- Protection from flooding, flammable materials, excessive dust and vibration.
- The site should be away from radio transmitting equipment, arc-welding devices, copying machines and other electrical equipment capable of generating electrical interferences.
- Operation of this equipment in a residential area is likely to cause interference. In which case the user, at his own expense, is required to take any necessary measures to correct the interference.

## Necessary Tools and Supplies

To make installation easier, consult the following pages when preparing to install the system.

### Tools

The following tools are recommended to install your *DHS* system. Others may be needed for certain troubleshooting procedures.

- Use unshielded, twisted multi-pair (three-pair minimum recommended) cable to run from the MDF to all station instruments (key telephone and single-line DTMF telephones). Digital key telephones only need one twisted pair to operate.



*Use shielded cable if RFI/EFI is expected.*

- Six conductor modular jack assemblies for all station instruments (recommended).
- Standard punch-down terminal block(s), 66M1-50 type, as required.
- Industry-standard, 25-pair cable(s) with a 50-pin male amphenol/AMP type connector for connection from each equipped 3 x 8 module to the MDF.
- AC voltage surge/spike protector.
- Standard telephone hand tools and mounting hardware for the KSU, MDF backboard, punch-down terminal block(s), modular jack assemblies for CO lines, etc.

Some additional tools suggested to have on-hand when installing the *DHS* system include:

- |   |  |  |
|---|--|--|
| □ 1 box 4 pair Cat3 or Cat5 twisted pair                | □ Drywall screws                           | □ Multi-meter (fluke)  |
| □ 25 pair Amp cables (male-female)                      | □ Electrical tape                          | □ Permanent marker (0.8 mm, 0.5 mm for certain applications)                           |
| □ 25 pair Cat3 cable                                    | □ Extension cord (three-prong with ground) | □ Phillips head screwdrivers:<br>#1 x 4<br>#2 x 4<br>#2 x 6                            |
| □ 89B-Brackets  | □ Fiber rod for fishing walls              | □ Phone jacks  |
| □ B splice connectors or Scotchlok™ splicing connectors | □ Fish tape                                | □ Punch Down Tool (110 and 66 Block Blades)  |
| □ Bridge clips  | □ Harmonica adapter                        | □ RJ11 plugs   |
| □ Butt set (T.S. if possible)                           | □ In-line adapter                          | □ RJ45 plugs   |
| □ Chain for fishing walls                               | □ Ladder                                   | □ Standard screwdrivers:<br>1/8 x 4 in.<br>1/4 x 4 in.<br>3/16 x 6 in.<br>5/32 x 4 in. |
| □ Computer with RS232                                   | □ Level                                    | □ Static/Ground Strap  |
| □ Cordless drill  | □ Linesmen scissors                        | □ Toner  |
| □ Diagonal wire cutters                                 | □ Long nose pliers                         | □ Wand (Induction Amp)   |
| □ Digit grabber   | □ M1-66 split blocks                       | □ Wire spools  |
| □ Drill   | □ Modular crimping tool (RJ-11 and RJ-45)  | □ Yellow 77 (lubricant for wire)   |

---

---

## Verify On-Site Equipment

Once the equipment installation site is identified and a dedicated AC outlet, earth ground, adequate lighting and ventilation are available, verify that all equipment required is on-site and was not damaged during shipping:

- ❑ Unpacking the KSU - The Key Service Unit is shipped in its own protective carton and contains the following:
  - ❑ Basic KSU
  - ❑ One mounting template
  - ❑ One System Installation & Maintenance Manual

Open the carton and verify that all items are complete and undamaged. Remove all packing material and store for future use in the event that return shipment is required. This should be performed at the installer's office with a 48-hour burn-in period prior to installation.

- ❑ Check that the type and quantity of boards received is correct. DO NOT unpack the individual boards at this time.
- ❑ Verify optional equipment is received and is in good condition.
- ❑ Verify that a Power Line Surge Protector is on-site.



*If any equipment is damaged or missing, notify the appropriate personnel to correct the situation.*

---

## DHS Installation

### 1. Backboard MDF Installation

A wooden backboard is recommended for all installations and must be installed when the location has masonry or plasterboard walls. A 1/2 in. plywood material is sufficient for most installations.

1. Mount the backboard at a convenient height, about 3 ft. above the floor. It can be bolted in various places to distribute the weight of the system.
2. Space should be available on the bottom side of the backboard for the MDF cabling and for optional equipment such as a music source and battery backup.
3. It is recommended that the location of each major item be roughly sketched on the backboard as an installation layout.
4. Locate the Telco-provided CO/Centrex lines at the demarc and extend them to the MDF location.



## 2. KSU Grounding

To ensure that the system will operate properly, a good earth ground is recommended. The Telco protector ground terminal or a metallic COLD water pipe will usually provide a reliable ground path. If cold water pipe is used, carefully check that the pipe does not contain insulated joints that could isolate the ground. In the absence of the cold water pipe, a ground rod or other source may be used. A No. 8 AWG copper wire should be used between the ground source and the KSU.



*The ground wire should be kept as short as possible and can be connected to the ground lug located on the bottom of the KSU. Check your local grounding regulations before installing the ground wire.*

### ***Voltage Surge/Spike Protection***

To reduce the effects of AC voltage surges and spikes that may cause system malfunctions, false logic, and/or damage to the electronic components, it is recommended that a separately sourced surge/spike protector be installed. Check the manufacturer's specifications to ensure that the device meets the following requirements:

- The power cord should not be used with a 3-wire to 2-wire plug adapter.
- A power line surge protector should be used to protect the power supply from electrical surges. The surge protector should be installed in accordance with the manufacturer's instructions and applicable local electrical codes.
- Clamp voltage transients at 300V within 5 nsec. when exposed to wave-forms as described in the ANSI/IEEE Standard C62.41-1980 (IEEE 587).
- Reduce RFI/EMI noise by at least 20 dB at frequencies between 5 kHz and 30 MHz.

## 3. Battery Backup - System

External batteries may be connected to the KSU via the optional Starplus VC61101 Battery Charging Unit (BCU). This unit may be equipped with batteries sized to meet the particular customer requirements. The approximate time, in back-up hours, is located in Table 2-11. In the event of a commercial power outage, the BCU will provide the necessary system voltage (24V) to allow full feature key telephone operation until AC power is restored or the battery voltage reaches minimum voltage thresholds and is automatically disconnected to avoid battery damage. This threshold is approximately 21 to 21.5V. The amount of system battery operation time is dependent on several factors:

- Number and type of key telephones installed
- System traffic load
- Age of external batteries
- Equipment Room Temperature
- Amp/Hour rating of external batteries
- Recovery time since last AC power interruption

The Starplus VC61106 BCU is designed for use with the DHS system. Follow the instructions supplied with the BCU to install batteries in that unit. Consult Table 2-11 for system operating current draw to select the right battery size for the desired back up duration.

**Table 2-11: Battery Sizing Chart**

Configuration	Battery Power (Hr)		
	12 AH	20 AH	40 AH
3 x 8	3.5	4.5	8
6 x 16	2	3.5	7
9 x 24	1.5	2.5	4

***Cautionary Steps***

To reduce the risk of fire or injury to persons, read and follow these tips:

- ❑ Use only the following type and size battery(ies) listed here as the maximum battery type and size: 24vdc, 40 AH.
- ❑ Do not dispose of any battery(ies) in a fire, the cell may explode. Check with local codes for possible special disposal instructions.
- ❑ Do not open or mutilate the battery(ies). Released electrolyte is corrosive and may cause damage to the eyes or skin. It may be toxic if swallowed.
- ❑ Exercise care in handling batteries in order not to short the battery with conducting materials such as rings, bracelets, and keys. The battery or conductor may overheat and cause burns.
- ❑ Charge the battery(ies) provided with or identified for use with this product only in accordance with the instructions and limitations specified in this manual.
- ❑ Observe proper polarity orientation between the battery(ies) and battery charger.
- ❑ Do not mix old and new batteries in this product (applies to products employing more than one user replaceable secondary battery).

Do not mix batteries of different sizes or from different manufacturers in this product (applies to products employing more than one user-replaceable, secondary battery).

**4. KSU Installation**

The KSU is designed for wall mounting only. The KSU should NOT be mounted directly on a masonry surface. If the KSU is to be mounted on a masonry surface, a wooden backboard of sufficient size should be attached to the wall and the KSU mounted on the backboard.

1. Using the mounting template as a guide, mark the 2 mounting screws locations on the MDF backboard.
2. Pre-drill 2 screw holes and install 2 pan-head No. 10 screws into the backboard. The screw heads should protrude about 1/4-in. from the backboard plywood surface.
3. Lift the KSU over the 2 screws allowing the screws to extend into the KSU slotted mounting holes. As the KSU is allowed to rest in place on the mounting screws it will slip over the screw shanks until the top of the slot is reached. Properly installed, the

---

KSU power transformer (where the KSU AC power cord is located) is positioned in the upper left corner. The power switch and Power/Heartbeat LED are positioned at the left side of the KSU toward the bottom.



*It is very important that the KSU be correctly mounted to allow proper power supply heat dissipation.*

## 5. Installing KSU Components

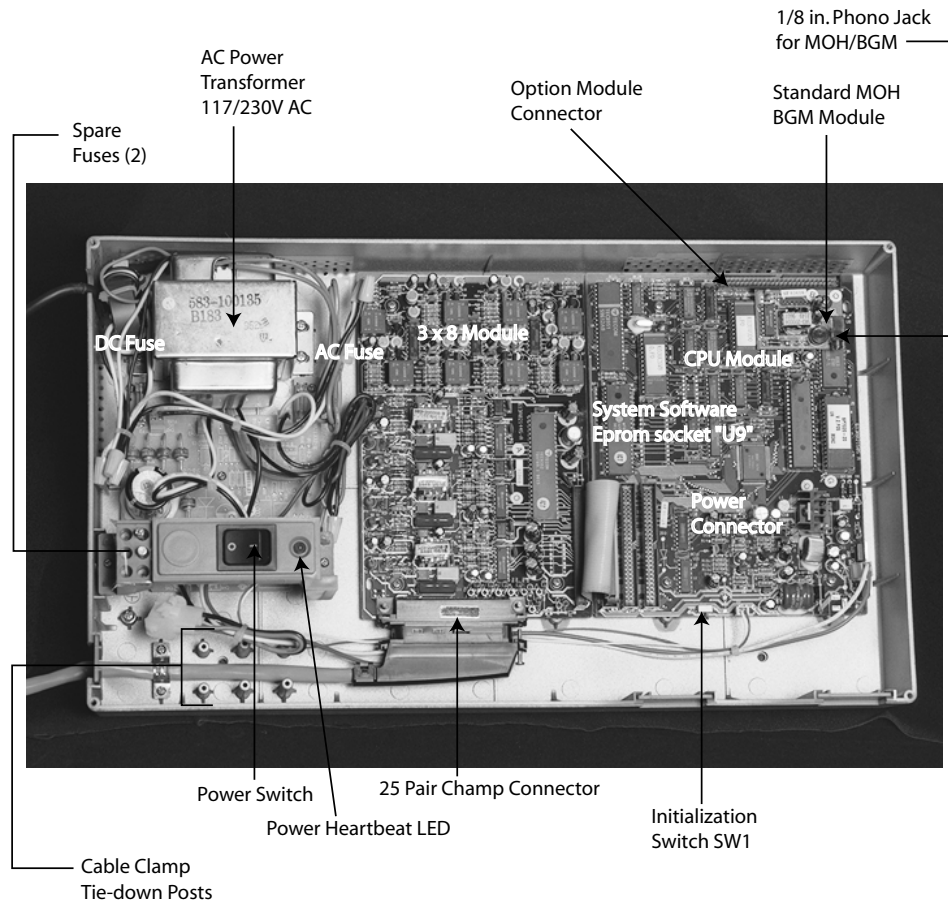
- [3 x 8 Module](#)
- [6-Port CO Module](#)
- [Option Module](#)
- [Standard MOH/BGM Module](#)

### **3 x 8 Module**

The 3 x 8 module requires one 25-pair amphenol type (male) ended station cable to extend the interface ports to the MDF. The station cable is plugged into the female amphenol connector at the base (orientation assumes a properly mounted KSU) of the 3 x 8 module.



*System power should be OFF before plugging in the station cable or while working on the station punch-down block. (Although each port is over-current protected, unnecessary shorting should be avoided).*



**Figure 2-12: DHS Components**

The cable is then routed out of the KSU through an opening at the lower left of the KSU housing. A cable restraint clamp is provided and may be used to secure cables exiting the KSU. The 25-pair cable is then terminated on a punch-down terminal block on the MDF. Refer to [Figure 2-19: Wiring Designations for 3 x 8 Modules](#).

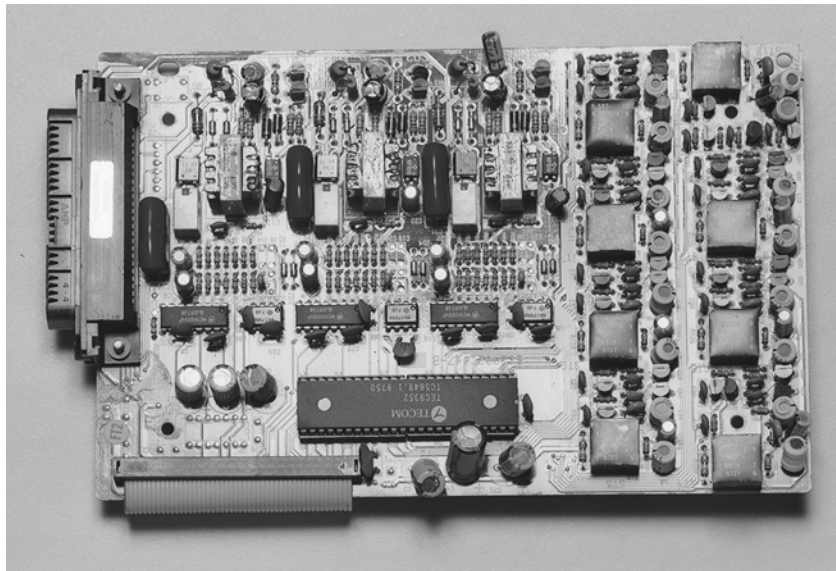
The 3 x 8 module is installed to expand system capacity and is housed in the KSU in stacking fashion over the initial 3 x 8 module. Three 3 x 8 modules maximum can be installed in the KSU. The 3 x 8 module is shipped with four stand-off mounting posts. Follow these steps when installing a 3 x 8 module:

1. Be sure that KSU power is turned OFF.
2. Remove the KSU cover.
3. Connect grounded wrist strap to a suitable earth ground.
4. Locate the screws used to secure the 3 x 8 module or 6-Port CO Module.



*The 6-Port CO Module must be installed in the last available expansion bus connector on the CPU Module. That is, if a 6-Port CO Module is installed on (JP3) a 3 x 8 module will not function if installed on (JP4). So, if a 3 x 8 module is added after a 6-Port CO Module was previously added, the 6-Port CO Module must be removed from (JP3), the new 3 x 8 module installed to (JP3) and the 6-Port CO Module reinstalled onto (JP4).*

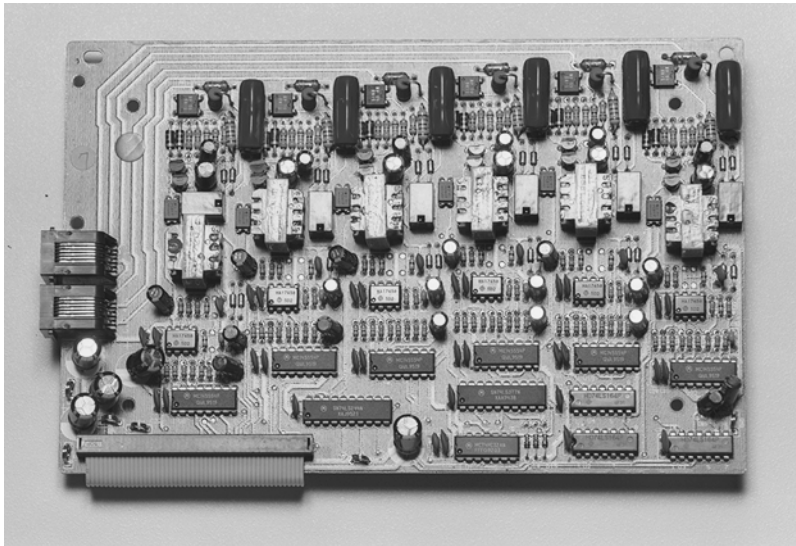
5. Remove one of the module-securing screws only so the existing board stays in place, and retain the screw for later use.
6. Insert one of the stand-off posts into the screw position where the screw from Step 5 was removed.
7. Tighten securely by hand, then snug tight using a small hand tool. It is very important not to over-tighten any screw or stand-off post as damage to the board may occur.
8. Repeat Steps 5 through 7, until all module screws are replaced with stand-off posts.
9. Position the new 3 x 8 module over the stand-off posts installed and use the screws removed in the previous steps to secure it in place on the stand-off posts.
10. Once mounted, carefully insert the bus ribbon cable into the next available bus connector on the CPU board.
11. Connect the amphenol-ended cable to the connector on the 3 x 8 module.
12. Secure cable in place with a clamp or cable tie.
13. Replace KSU cover and secure with cover screws, and restore KSU power when all wiring is complete. Or continue with the installation process.



**Figure 2-13: 3 x 8 Module**

### ***6-Port CO Module***

The 6-Port CO Module is installed to increase system capacity of CO lines. The 6-Port CO Module is shipped with two 6-conductor cords, two surface-mount modular jacks and four stand-off posts. Regardless of how many 3 x 8 modules are installed, only one 6-Port CO Module may be installed. The 6-Port CO Module must be the last module installed. For example, if a 6-Port CO Module is first installed as the first Expansion Module (JP3), and a 3 x 8 module is then installed, the 6-Port CO Module must be moved to the last expansion position (JP4).



**Figure 2-14: 6-Port CO Module**

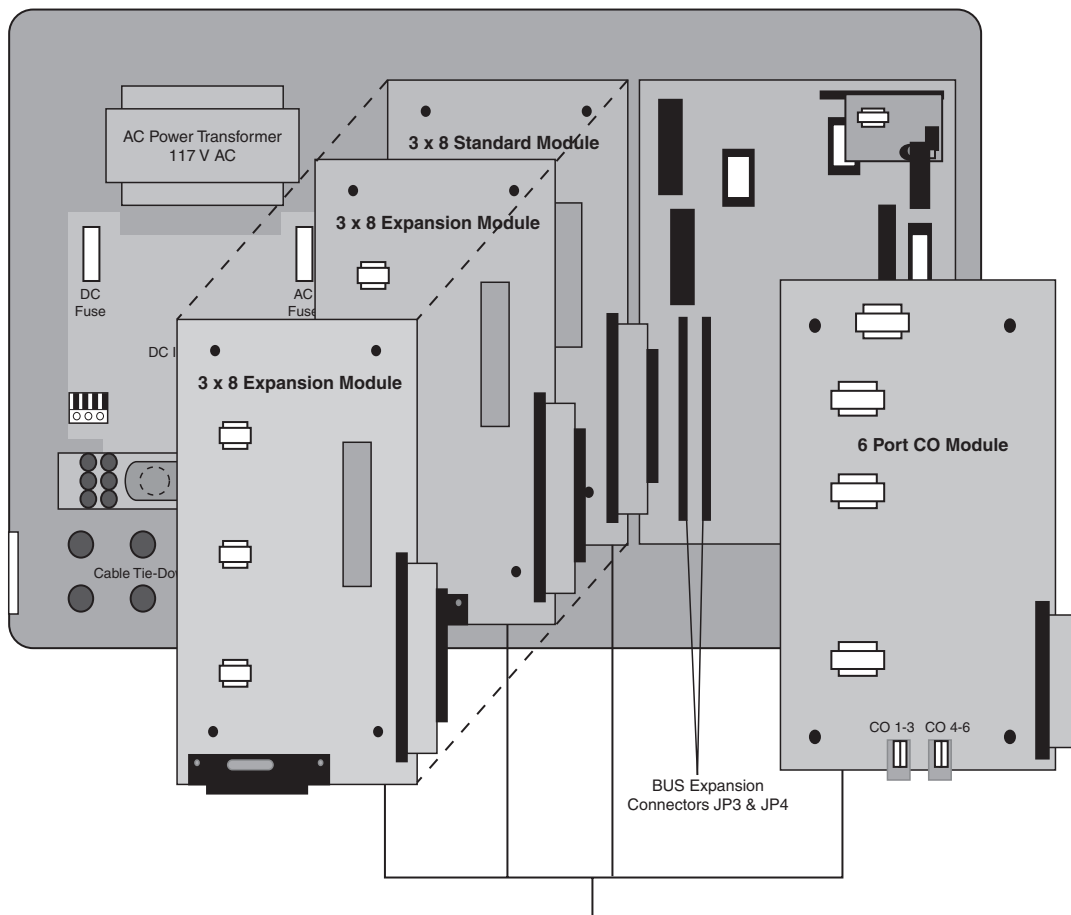
Follow these steps when installing the 6-Port CO Module:

1. Be sure that KSU power is turned OFF, and the KSU cover is removed.
2. Connect grounded wrist strap to a suitable earth ground.
3. Locate the screws that secure the 3 x 8 module already in place, and remove one of the module securing screws only so the existing board stays in place. Retain the removed screw.
4. Insert one of the supplied stand-off posts into the screw position where the screw from Step 3 was removed.
5. Tighten securely by hand, finish tightening using a small hand tool. It is very important not to over-tighten any screw or stand-off post as damage to the board may occur.
6. Repeat Steps 3 through 5 until all module screws are replaced with stand-off posts.
7. Position the 6-Port CO Module over the stand-off posts installed and use the screws removed in that process to secure it in place on the stand-off posts.
8. Once mounted, carefully insert the bus ribbon cable into the next available expansion bus connector on the CPU Module. When the Option Module is installed, it is necessary to remove the Option Module screws and lift the Option Module away from the CPU Module for clear access to the CPU module bus connectors (JP3 and JP4).

9. Connect two 6-Conductor Line Cords into Jacks on 6-Port CO Module, and feed the Cables through the opening in the lower left of the cabinet.
10. Mark CO Line Cords.
11. Replace the KSU cover and secure it with cover screws.
12. Restore KSU power when all wiring is complete, or continue with the installation process.



*The 6-Port CO Module must be installed in the last available expansion BUS connector on the CPU Module. That is, if a 6-Port CO Module is installed on (JP3) a 3 x 8 module will not function if installed on (JP4). So, if a 3 x 8 module is added after a 6-Port CO Module was previously added, the 6-Port CO Module must be removed from (JP3), the new 3 x 8 module installed to (JP3) and the 6-Port CO Module reinstalled onto (JP4).*



Three configurations are available in the DHS:  
 \* 1 3 x 8 Module, and 1 6-Port CO Module,  
 \* 2 3 x 8 Modules, and 1 6-Port CO Module, or  
 \* 3 3 x 8 Modules

**Figure 2-15: KSU Expansion Module Installation**

### ***Option Module***

The Option Module provides advanced call processing features like External Call Forward, Automatic Busy Redial, etc. (Generally, features that require enhanced call monitoring via Tone Detectors and DTMF receivers). The Option Module is equipped with two DTMF receivers and two Tone Detectors. In addition, the Option Module provides two music source inputs (one that replaces the Standard MOH/BGM Module), one External Page Zone port and one Loud Bell Control contact.

Follow these steps when installing the Option Module:

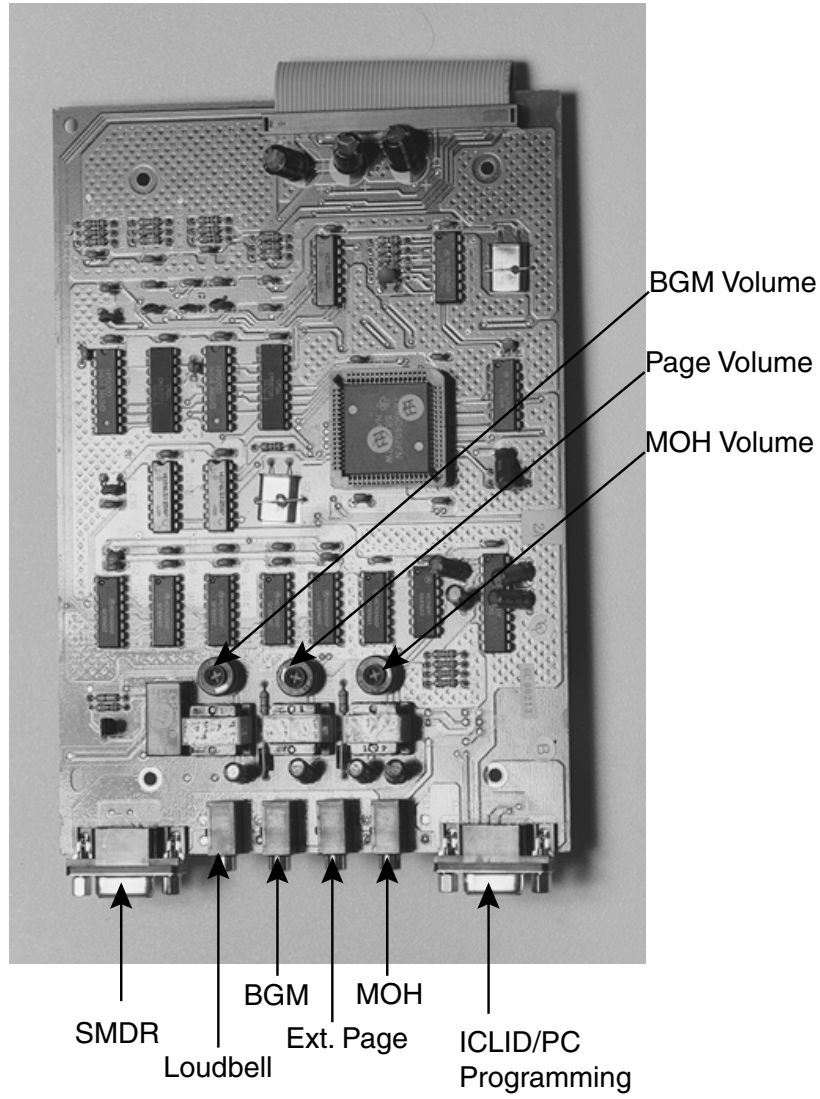
1. Be sure that KSU power is turned OFF, and cover is removed.
2. Connect grounded wrist strap to a suitable earth ground.
3. Locate the Standard MOH/BGM Module already in place. Notice that there is one screw that secures the Standard MOH/BGM Module to the CPU Module.
4. Remove the MOH/BGM Module screw and MOH/BGM Module. Then remove the short stand-off post used to mount the Standard MOH/BGM Module. Retain these pieces in the event that the Option Module is to be eliminated and standard MOH/BGM operation is again desired.
5. Install one of the stand-off posts supplied with the Option Module into the position previously occupied by the short stand-off post. Use Step 8 as a guide for tightening the stand-off post. Locate the remaining three screws used to secure the CPU Module.
6. Remove one of the module securing screws at a time, so that the CPU Module stays in place, and retain the removed screw.
7. Insert one of the Option Module stand-off posts into the screw position where the screw from Step 6 was removed.
8. Tighten securely by hand, then snug tight using a small hand tool. It is very important not to over-tighten any screw or stand-off post as damage to the module may occur.
9. Repeat Steps 6 through 8 until all module screws are replaced with stand-off posts.
10. Position the Option Module over the stand-off posts installed such that the ribbon cable and connector are oriented at the top right of the module (Assuming correct KSU installation).
11. Locate the Option Module connector located on the CPU Module labeled "JP1" and carefully attach the Option Module ribbon cable to JP1 assuring that all connector pins are properly aligned.



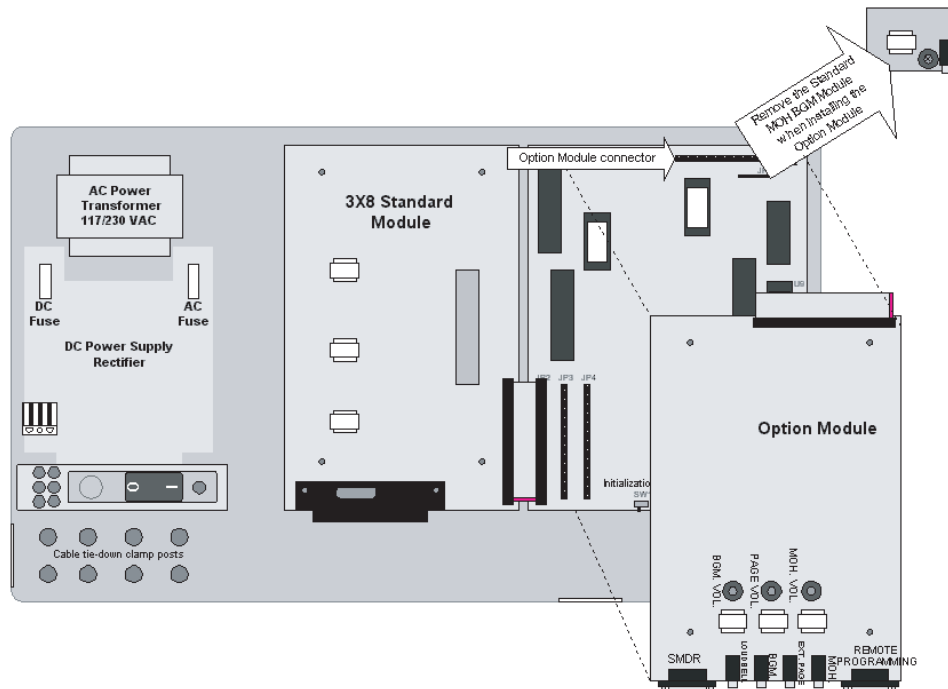
*It is very important that all pins make contact to the connector and that no pins become bent in this process*

12. Use the screws retained in Step 6 to secure the Option Module to the stand-off posts installed.
13. Replace KSU cover and secure with cover screws.
14. Restore KSU power when all wiring is complete, or continue with the installation process.





**Figure 2-16: Option Module**

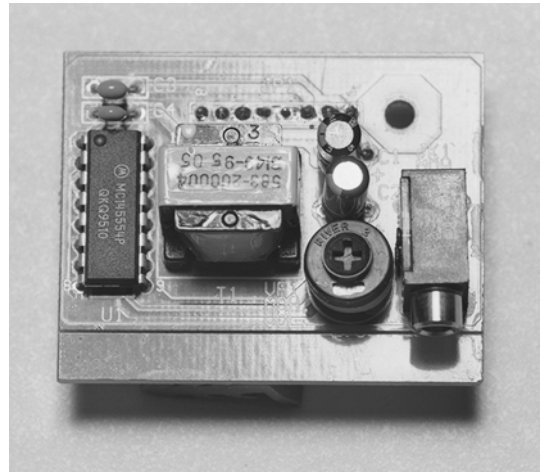


**Figure 2-17: KSU Option Module Installation**

### ***Standard MOH/BGM Module***

The Standard MOH/BGM Module is shipped installed in the KSU. In the event that the Option Module was installed and the Standard MOH/BGM Module is to be re-installed, follow these steps:

1. Make sure KSU power is OFF, and the cover is removed.
2. Connect grounded wrist strap to a suitable earth ground.
3. Locate the four screws used to secure the Option Module to the Option Module stand-off posts. Remove each screw carefully to assure that no damage to the Option Module results when the last screw is removed. Retain these screws.
4. Lift the Option Module away from the CPU Module, and unplug the Option Module ribbon cable from the Option Module connector (JP1) of the CPU Module.
5. Locate the four Option Module stand-off posts. Remove the upper-right stand-off post and replace it with the Standard MOH/BGM Module stand-off.
6. Remove each of the other stand-off posts one at a time and replace with the screws removed in Step 3.
7. Carefully push the Standard MOH/BGM Module connector onto the MOH/BGM connector (JP5) on the CPU Module.
8. Use one of the screws removed in Step 3 to secure the Standard MOH/BGM Module in place.
9. Replace KSU cover and secure with cover screws, and restore KSU power. Or continue with the installation process.



**Figure 2-18: Standard MOH/BGM Module**

## 6. Terminating Connections

### *3 x 8 Module(s)*

1. The CO line connections (as well as station connections) are made to the 3 x 8 Standard Module and Expansion Module(s) via the 25-pair connector located along the bottom edge of the installed module. Refer to [Figure 2-19: Wiring Designations for 3 x 8 Modules](#).
2. Once the 25-pair cable is terminated on an industry standard 66M1-50 block, cross-connect (jumper wire) should be used to extend the CO line pair from the terminal block to the Telco Demarcation block.

**66M1-50 wiring designations for 3X8 Modules**

CA Pair	Pair Color	Designation	Standard 3X8 Module	1 <sup>st</sup> 3X8 Expansion Module	2 <sup>nd</sup> 3X8 Expansion Module
26/1	White/Blue	n/c			
27/2	White/Orange	CO Line Port 3	CO 3	CO 6	CO 9
28/3	White/Green	CO Line Port 2	CO 2	CO 5	CO 8
29/4	White/Brown	CO Line Port 1	CO 1	CO 4	CO 7
30/5	White/Slate	n/c	Do not use these pairs for any reason. Electrical damage may occur.	Not applicable when the 6-Port CO Module is installed in this position.	Not applicable when the 6-Port CO Module is installed in either Expansion Module position.
31/6	Red/Blue	n/c			
32/7	Red/Orange	n/c			
33/8	Red/Green	n/c			
34/9	Red/Brown	n/c			
35/10	Red/Slate	n/c			
36/11	Black/Blue	n/c			
37/12	Black/Orange	n/c			
38/13	Black/Green	n/c			
39/14	Black/Brown	n/c			
40/15	Black/Slate	n/c			
41/16	Yellow/Blue	n/c			
42/17	Yellow/Orange	n/c			
43/18	Yellow/Green	Station Port 1	STA 10	STA 18	STA 26
44/19	Yellow/Brown	Station Port 2	STA 11	STA 19	STA 27
45/20	Yellow/Slate	Station Port 3	STA 12	STA 20	STA 28
46/21	Violet/Blue	Station Port 4	STA 13	STA 21	STA 29
47/22	Violet/Orange	Station Port 5	STA 14	STA 22	STA 30
48/23	Violet/Green	Station Port 6	STA 15	STA 23	STA 31
49/24	Violet/Brown	Station Port 7	STA 16	STA 24	STA 32
50/25	Violet/Slate	Station Port 8	STA 17	STA 25	STA 33

**Figure 2-19: Wiring Designations for 3 x 8 Modules**

**6-Port CO Module**

1. CO line interface to the 6-Port CO Module is made through two RJ25 type modular connectors on the 6-Port CO Module located along the bottom edge of the installed module. CO line ports (1-3) of the 6-Port CO Module are connected through RJ25 connector CO 1-3 (positioned toward the left/center of the installed module) and CO line ports (4-6) of the 6-Port CO Module are connected through RJ25 connector CO 4-6 (positioned toward the right/center of the installed module).
2. The 6-Port CO Module is shipped with two 3-pair line cords and two 3-pair terminal blocks for connection on the MDF. Once terminated, the individual pairs of the 3-pair terminal blocks are extended to the Telco Demarcation block. Plan to use at least one pair of bridging clips for each CO line connected so that service of any one specific CO line is simplified.

**Table 2-12: CO Lines Connections, 6-Port CO Module**

6-Port CO Module Jack	Module Jack Pin	Cable Pair (if applicable)	Jack Wire Color	Designation
CO (1-3)	4	White/Blue	Green	CO line port 1 Tip
	3	Blue/White	Red	CO line port 1 Ring
	2	White/Orange	Black	CO line port 2 Tip
	5	Orange/White	Yellow	CO line port 2 Ring
	1	White/Green	White	CO line port 3 Tip
	6	Green/White	Blue	CO line port 3 Ring
CO (4-6)	4	White/Blue	Green	CO line port 4 Tip
	3	Blue/White	Red	CO line port 4 Ring
	2	White/Orange	Black	CO line port 5 Tip
	5	Orange/White	Yellow	CO line port 5 Ring
	1	White/Green	White	CO line port 6 Tip
	6	Green/White	Blue	CO line port 6 Ring

**Conditions**

- It is the installer's responsibility to assure that CO line connections are made in such a way that proper CO Hunting will sequence from the first CO line button to the last, in order on key telephones.
- Typically, the Telco service provider provides lightning protection on the premise at the service entrance.
- Test each CO Line at the MDF for dial tone, correct ringing sequence, Telco number assignment and polarity.



*If incoming CO lines hunt from a main telephone number and are also used for outgoing (both-way CO line) service, always prioritize the incoming line order so that the last choice incoming trunks appear on the higher number CO line positions. This is because the system automatically selects idle trunks for outgoing calls, by searching from CO line 12, to CO line 11, and so on to CO line 1. This technique may avoid a head-on or glare condition where a user trying to place an outgoing call inadvertently answers a ringing line.*

## 7. Station Cabling

Floor plans should be developed to aid in proper station cabling in a star (home run) configuration from the KSU. The cables are run from the station locations to the STN block at the MDF.

Both ends of each cable should be labeled with the station's circuit number. The circuit number designates the station port position in the KSU.

When the system is initialized, the intercom numbers are assigned in order from Port- 1 (intercom number 10) to Port-24 (intercom number 33) as each Module is installed. Refer to [Figure 2-19: Wiring Designations for 3 x 8 Modules](#).

### *Running Cable*

From the MDF location, run unshielded, 3-pair (6-conductor) twisted cable to all key telephone locations and DTMF single-line telephone locations.



*Use shielded cable if RFI/EFI is expected.*

Follow these guidelines:

- Install proper type cable for the application according to the National Electrical Code and local building codes.
- Avoid cable runs parallel to fluorescent light fixtures or AC lines not in conduit. If these obstacles are unavoidable, run the cables across them at right angles.
- Do not run station cables inside electrical conduit already occupied by AC wiring. (To do so is a violation of the National Electrical Code).
- Do not run station cables near equipment with electric motors or through strong magnetic fields, such as those generated by large copy machines, arc welding equipment, heavy motors, etc.
- Do not place station cables where they can be stepped on or where they can be rolled over by office furniture.
- If using multi-pair (25-pair) cable runs to multiple station locations do not include AC ringing single-line sets, AC-ringing auxiliary equipment, or CO lines in a cable being used for key telephones. Key telephones should always be isolated in separate dedicated cable runs.
- Do not exceed the measurements for the station cable lengths (using 26AWG wire) listed in [Table 2-6: Maximum Cable Length](#).



*It is recommended that a minimum of 3-pair cable and a minimum of 4-conductor modular jacks be used for all station connections.*

### *Terminating Cables at Station Locations*

At each station location, terminate station cables on 4-conductor modular jack assemblies. Although only one pair is required for key telephone operation, the second pair is wired through to the ADP jack for a variety of applications at the desktop. For exception, refer to [Table 2-13](#).

**Table 2-13: Station Location Cable Terminations**

Cable Conductor	Jack Wire Color	Designation
White/Blue	Green	Telephone voice and data XT lead
Blue/White	Red	Telephone voice and data XR lead
White/Orange	Black	ADP Jack Tip lead
Orange/White	Yellow	ADP Jack Ring lead

Do not mount the modular jack assemblies on the wall at this time. They will be wall mounted later when the station instruments are installed.



*Since the digital station equipment is not polarity sensitive, reversing the digital telephone pair has no effect on operation. The Station Interface circuits are current-limited and are not fused.*

## **8. Key Telephones Installation**

Key telephones may be mounted with three different orientations: Low Profile Desk Mount, High Profile Desk Mount or Wall Mounted. Packaged inside each key telephone carton are the following components:

- Key telephone
- Key telephone handset
- 7-ft. line cord
- 4-in. line cord (for wall mounting)
- 12-ft. handset cord
- Small base-wedge mount assembly
- Large base-wedge mount assembly

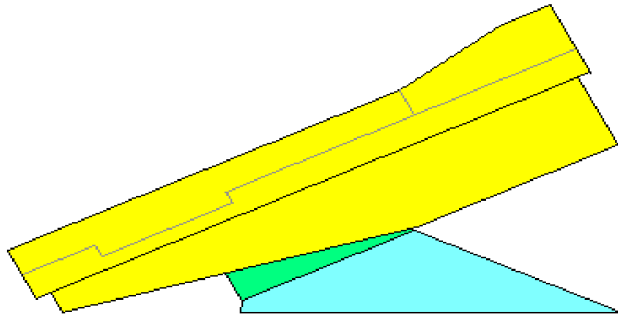


*The two wedge mount assemblies (large and small) are affixed at the factory. This configuration is used for High Profile Desk Mounting.*

Remove the components from the carton and determine which mounting components are required. Most telephones are installed with both mounting wedges.

***High Profile Mount***

For the High Profile Mounted position, reference the illustration below and attach the Base Mount wedges.

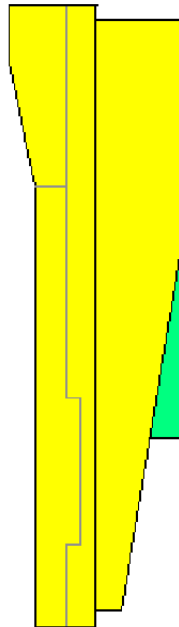


**Figure 2-20: High Profile Mount**

1. The small wedge is always used for the various telephone mounting positions.
2. The small wedge has locking tabs at one end and hooks at the other end used in a hinging fashion.

***Wall Mount***

When the telephone is to be Wall Mounted:



**Figure 2-21: Wall Mount**

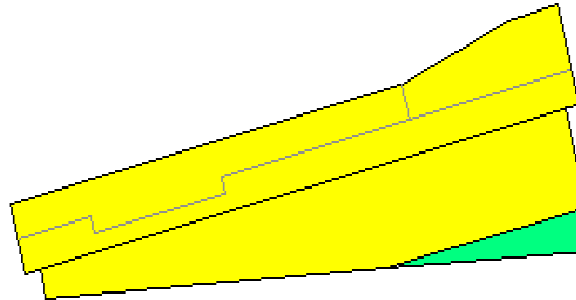
1. Remove the two small screws that secure the small and large wedges together.
2. Store the larger wedge for possible use later (the large wedge is not used when wall mounting the key telephone).



3. Position the smaller wedge as in the illustration at the right for wall mounting. Once in position, the smaller wedge and key telephone bottom housing provide for standard 630 type wall mount wall jacks.

### ***Low Profile Mount***

When the key telephone is to be desk mounted in the Low Profile position:



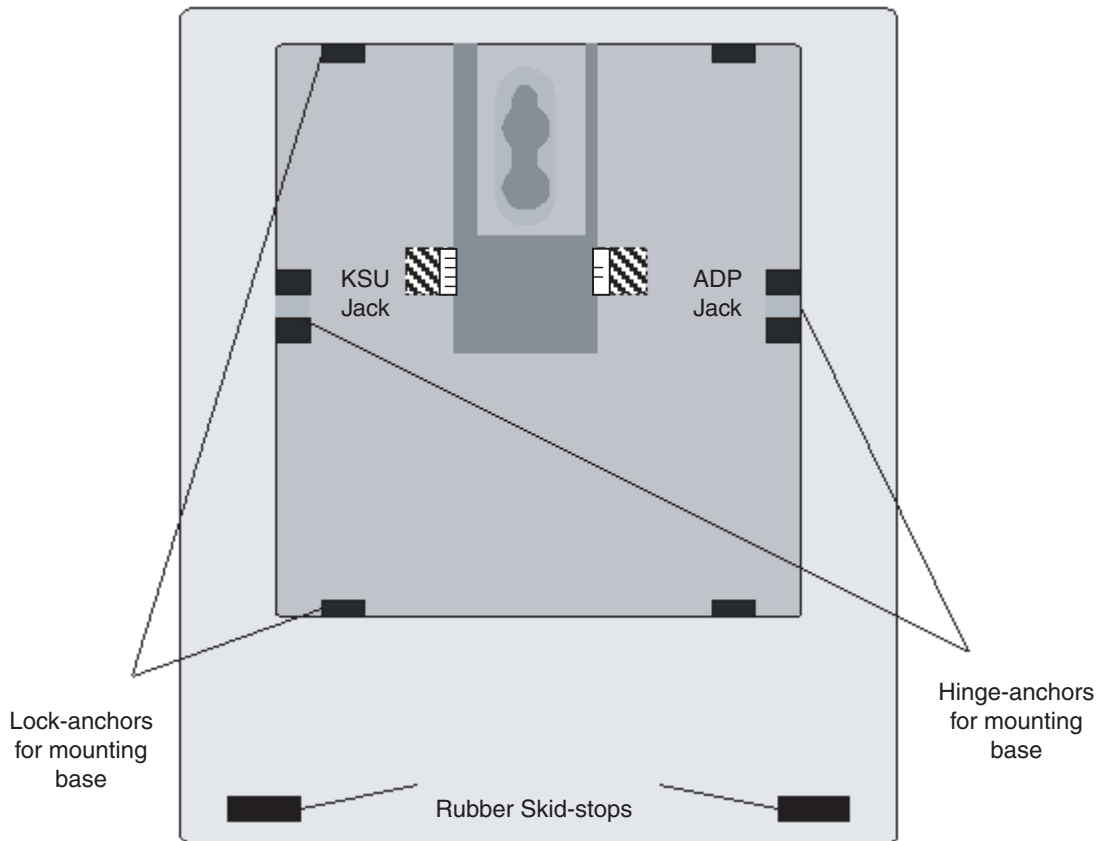
**Figure 2-22: Low Profile Mount**

1. Remove the two small screws that secure the small and large wedges together.
2. Store the larger wedge for possible use later (the large wedge is not used when mounting the key telephone in the Low Profile position).
3. Position the smaller wedge as illustrated below.

When using the Low Profile mounting position, it is important that the line cord be channeled through the slots in the telephone bottom housing, such that the smaller wedge locks them in place when in position.

### ***Key Telephone Modular Jacks***

Each key telephone has two modular jack connectors on the underside of the instrument. Both are located in a recessed connector cavity. When the telephone is held so that the rubber anti-skid feet are downward (no mounting wedge installed), the modular jacks face one another in the cavity. The modular jack at the left side of the cavity is the ADP connector and may be connected to an analog device at the desktop. *The ADP jack is only active when connected for operation at the MDF.* The modular jack at the right side of the cavity is the KSU jack and should be connected to the wall jack and station cabling for connection to the system KSU (refer to [Figure 2-23: Key Telephone Modular Jack Locations](#)).



**Figure 2-23: Key Telephone Modular Jack Locations**

- ❑ ADP Jack - When wired at the MDF, the second pair of the telephone line cord/cable will activate this jack for any analog device function. This jack and wiring are completely independent of the key telephone operation and may be used for system resources. This is not FCC listed.
- ❑ KSU Jack - Connect the station cable line cord here. Two pairs are provided. The first pair is all that is required for telephone voice and data. The second pair is looped to the ADP jack for use of analog devices at the desktop.

## 8. Installing a DSS Unit

To install a DSS to the System:

1. Connect the DSS to a KSU Station port. The DSS takes the place of a Station in the system configuration.
2. Press [FEAT],#,\*, then enter the correct password and press Show from a Display Keypad to enter the Programming Mode.
3. Press Next using the soft buttons below the display screen until Station displays.
4. Press Show, and enter the DSS Station Number to be programmed.

5. Press Show.
6. Then press Next until DSS Owner displays, as shown:

DSS Owner:		
bksp	next	chg

7. Press Chg, and enter the correct Station Number that will be used with the DSS.
8. Press the Soft Button labeled Save to record the selection.
9. Press Clear to exit the Programming Mode.

### 9. SMDR/SMDA Output Device

The output device or the Station Message Detail Recording (SMDR) must meet the requirements and match the RS232C pin-out described below. The Option Module is required for SMDR operation.

- The SMDR port baud rate is programmable from 110 to 19,200 BPS.
- The Data Format is: 8 data bits, 1 stop bit, No parity bit.
- Connection of the SMDR serial port to a computer for call accounting is often relatively simple, since a straight-through cable will typically mate the devices.
- The SMDR serial port output is one way to the printer or other call accounting device.



*The KSU end is considered DCE and printer or call accounting device is DTE.*

#### ***KSU Connection***

To connect an output device to the KSU:

1. Match the baud rates on the output device and the system.
2. Turn ON the AC power to both the device and the system before connecting the RS232C cable to Port-2 on the KSU. This prevents any electrical surges from being transmitted by the interface.



*The RS232C cable connecting the SMDR device to the KSU must not exceed 50 ft. in length.*

3. Carefully connect the RS232C DB-9 male end of the interface cable from the device to the SMDR RS232C DB-9 female connector located at the bottom edge toward the left of the Option Module.

**Table 2-14: RS-232C DB-9 Connector**

DCE	Male DB-9	Designation
K S U	1	DCD
	2	RX
	3	TX
	4	DTR
	5	GND
	6	DSR
	7	RTS
	8	CTS
	9	RI



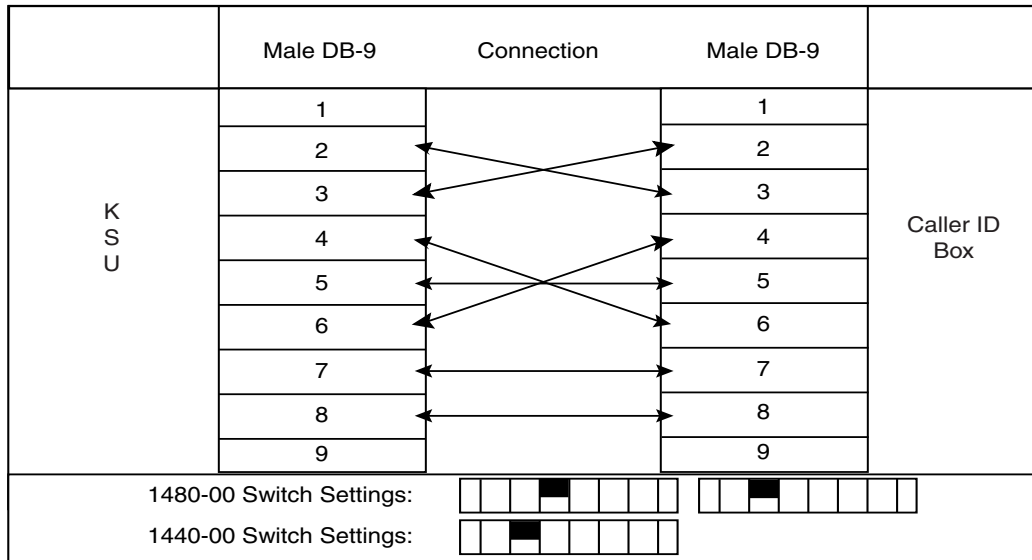
*Consult your peripheral device documentation for additional information.*

## 10. Connecting and Programming Caller ID

The purpose of this service is to provide calling party identification to the dialed party. This information can be the calling party's phone number, name, or a combination of this information. The information is delivered in between the first and second ring. The system can use this information to: Provide LCD information to stations receiving calls, maintain a list of unanswered calls for call back via the caller ID information.

When Incoming Caller ID is to be used with the *DHS* it is necessary to use the caller ID box. The caller ID box must be connected to the *DHS* system ICLID/PC Programming port using the Caller ID Cable. The caller ID box collects data at each CO line to be used for Incoming Caller ID and passes the data to the *DHS* system for processing. Each *DHS* CO line port must be programmed for the associated caller ID box port in customer database programming.

The caller ID box module is connected to the *DHS* system via the ICLID/PC programming port on the Option Module. Consequently, the PC programming port cannot then be used for PC-based programming and Incoming Caller ID data collection simultaneously. When all hardware connections are complete, adjust the caller ID box option switches for 1200 BPS operation. Program the *DHS* system PC Programming port for 1200 BPS operation. A proprietary cable can be ordered (refer to [Table 2-5](#)), or you can use a standard null modem.



**Figure 2-24: Caller ID Connection**

### *Programming Caller ID*

Perform the following steps to program the 1480-00 Caller ID data collection module for the *DHS* system. From any executive station:

1. [FEAT] + [#] + [\*] + [000000] (default password)
2. Press [SHOW]
3. Press [NEXT]
4. Press [NEXT]
5. Press [SHOW] at CO Line
6. Enter the 2-digit Line number 01
7. Press [SHOW]
8. Press [NEXT] until ICLID PORT# displays
9. Press [CHG]
10. Enter the line number
11. Press [SAVE]
12. Press [NEXT] to enter another line #
- OR
13. Press [CLEAR] to exit programming.

At any executive station:

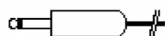
1. [FEAT] + [#] + [\*] + [000000] (default password)
2. Press [SHOW]
3. Press [NEXT] until CALL HANDLING displays
4. Press [SHOW]
5. Press [NEXT] until WAIT ICLID displays
6. Press [CHG] until 7
7. Press [CLEAR] to exit programming.

At any executive station:

1. [FEAT] + [#] + [\*] + [000000] (default password)
2. Press [SHOW]
3. Press [NEXT] until RESOURCE displays
4. Press [SHOW]
5. Press [NEXT] until RMT X RATE displays
6. Press [CHG] until 1200
7. Press [CLEAR] to exit programming.

### 11. External Paging Equipment (Optional)

The system provides a one way paging output at the KSU from the Option Module when installed. An 1/8 in. phono jack (refer to [Figure 2-25](#)) labeled J3 EXT PAGE is provided for connection to an external paging amplifier. The input specifications for the external paging equipment should accept a 600 ohm and 0 dBm interface.

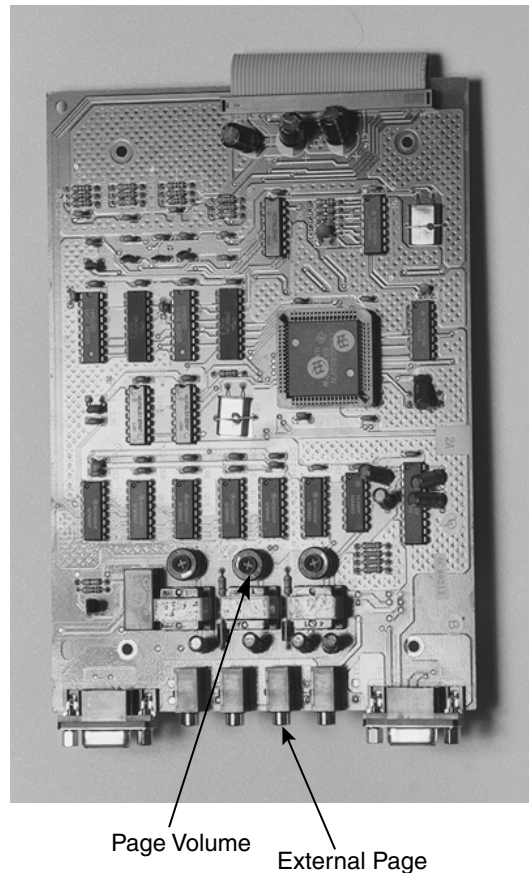


**Figure 2-25: 1/8 in. Phono Jack**

#### *Installation*

Install the external paging equipment as follows:

1. Cut a length of shielded cable to run from the amplifier to the KSU.
2. Attach a 1/8 in. male phono plug to one end of the cable.
3. Connect the other end of the cable to the high impedance input according to the manufacturer's instructions.
4. Connect the paging speaker(s) to the amplifier using speaker cable.
5. Plug in the amplifier's AC power cord. (*DO NOT use the same AC outlet being used for the KSU.*)
6. Insert the 1/8 in. phono plug into the jack labeled EXT. PAGE located on the bottom edge of the installed Option Module. The Ext. Page phono jack on the Option Module is the center-right phono plug (refer to [Figure 2-26: External Paging Equipment Installation](#)).
7. Set the paging amplifier's volume control to the lowest setting and turn ON the external amplifier.
8. From a station location, make a page by lifting the handset, and dialing [F] + [501], the external page feature code.
9. Adjust the amplifier to the desired level while announcing the page.
10. PAGE VOL may be adjusted to lower the output signal in the event it is too strong for the connected amplifier input (over-driving input).



**Figure 2-26: External Paging Equipment Installation**

***Conditions***

- If the one-way paging equipment requires DTMF signaling from the key telephone, then an unused CO Line should be dedicated for proper page interface.
- For Talk-back Paging or Multi-zone External Paging, the manufacturer recommends using a vacant CO line port for best operation.
- A 600 ohm interface is provided on every CO line; therefore, any available CO line may be used for paging.
- Since all CO line dialing is subject to toll restriction, a CO line port will not connect the station's audio until at least one DTMF digit is dialed.
- It may be necessary to assign the CO line being used for paging as a PBX type trunk with one-digit or two-digit access. Therefore, normally toll restricted extensions may still make external pages, without being restricted.

## 12. External Music Source

The Basic KSU is shipped with the Standard MOH/BGM Module. This module is located on a stand-off post toward the upper right corner of the CPU Module when viewing the installed KSU. The module provides a 1/8 in. phono jack (refer to [Figure 2-25: 1/8 in. Phono Jack](#)) labeled JK1 MOH JACK for direct connection to an external music source. The system music input impedance is 2 ohms. A trim Potentiometer (POT) is also provided on the Standard MOH Module for signal attenuation.

### *Music Level Adjustment*

1. Set the trim POT (labeled VR1 MOH VOL) at about mid-point.
2. Access an idle CO line, and dial into the system on another CO line.
3. When the system begins to ring, press [HOLD] to place the first call on hold.
4. Answer the ringing CO line. You should hear the MOH from the previous (now holding) CO line.
5. Adjust the music level at the source. That is, use the volume control of the music source to adjust the MOH level to a desirable level.
6. If the music begins to sound distorted do not increase the source level any further. Rather, adjust the source level down slightly and use the trim POT for further adjustment.
7. If a comfortable desired music level cannot be obtained using these techniques, it is likely that the music source is not properly matched to the MOH input circuitry.



*In some circumstances, there may be broadcast restrictions associated with music. Check with the original distributor and/or the radio station for copyright and broadcast restrictions concerning Background Music and Music-on-Hold.*

### *External Music—Option Module*

The Option Module may be installed for several feature upgrades. One of these upgrades is the addition of a second music source. When installed, the Option Module provides an MOH 1/8 in. phono jack (refer to [Figure 2-25: 1/8 in. Phono Jack](#)) labeled J2 MOH (located at the bottom-edge of the Option Module toward the right) that replaces the music circuit of the Standard MOH/BGM Module and an 1/8 in. phono jack labeled J4 BGM that adds a second BGM channel. J4 is located at the bottom edge of the Option Module center left.

To install the external music source:

1. Attach an 1/8 in., two-conductor, phono plug to one end of a length (5 ft. min.) of shielded cable.
2. Connect the other end of the cable to the speaker output terminals of the music source.  
OR
3. If the music source has an earphone jack, attach another 1/8 in. phono plug (or other specified connector) to the other end of the cable, and plug it into the earphone jack on the music source.
4. Plug in the AC power cord for the music source. If possible, use a separate AC outlet than the one being used for the KSU. Turn ON the AC power to the music source.
5. Insert the 1/8 in. phono plug into the appropriate music source jack inside of the KSU.
6. Since the MOH music source serves to provide MOH/BGM, it is best to adjust the input level such that MOH is at a comfortable level.



To set a desirable MOH level:

1. Set the trim POT (labeled VR1 MOH VOL) at about mid-point.
2. Access an idle CO line, and dial into the system on another CO line.
3. When the system begins to ring, press [HOLD] to place the first call on hold.
4. Answer the ringing CO line. You should hear the MOH from the previous (now holding) CO line.
5. Adjust the music level at the source. That is, use the volume control of the music source to adjust the MOH level to a desirable level.
6. If the music begins to sound distorted do not increase the source level any further. Rather, adjust the source level down slightly and use the trim POT (labeled VR1 MOH VOL) for further adjustment.
7. If a comfortable music level cannot be obtained using these techniques, it is likely that the music source is not properly matched to the MOH input circuitry. You may need a 600 ohm matching transformer to properly interface the music source.
8. The BGM music level can be attenuated using the trim POT VR3 BGM VOL.

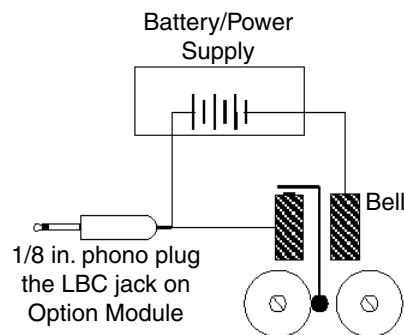


*The music source must be placed 5 to 10 ft. away from the KSU, to avoid any interference.*

### 13. Loud Bell Control

When the Option Module is installed, the system provides a dry contact closure to signal externally powered alerting devices for any incoming CO Line call. Transferred CO Lines that recall system wide will also activate the LBC, in the same cadence as for an incoming CO Line ring.

#### *Installation*



**Figure 2-27: Loud Bell Control Installation**

1. Determine which CO lines should operate the Loud Bell Control (LBC) relay. Program each of these lines separately for LOUD BELL = Y.
2. Cut a length of cable to run from the MDF to the Option Module.
3. Attach a male 1/8 in. phono plug to one end of the cable.
4. Insert the 1/8 in. phono plug into the LOUDBELL jack (left-most 1/8 in. jack along the bottom edge of the Option Module).

5. Terminate the other end of the cable on an industry standard 66M1-50 block for interconnection to the loud bell and power source.
6. Terminate the Loud Bell and power supply leads on an industry standard 66M1-50 block.
7. Using cross-connect (jumper) wire connect each of the three LBC components (contact, bell and power source) in series fashion.



*The LBC output on the KSU provides only interrupted dry contact closure during the ringing period of incoming CO Lines.*



*Relay contact on DHS are rated at 24V DC 1.0 amp. Do not apply AC voltage to these contacts.*

#### 14. 2-Port Analog Adapter

The 2-Port Analog Adapter is used to connect analog SLTs and other analog devices to the system. The analog device must provide DTMF (touch tone) signals in order to make intercom calls, access outside lines and to activate system features. Some examples of analog devices are: telephone answering device (TAD), facsimile machine (FAX) or modem.



*The 2-Port Analog Adapter is not an OPX device as determined by FCC Rules. Additional equipment is required to support OPX lines. The Analog Adapter will not support Message Waiting Indication for SLT devices. The Analog Adapter will supply Stutter Dial Tone to the user.*

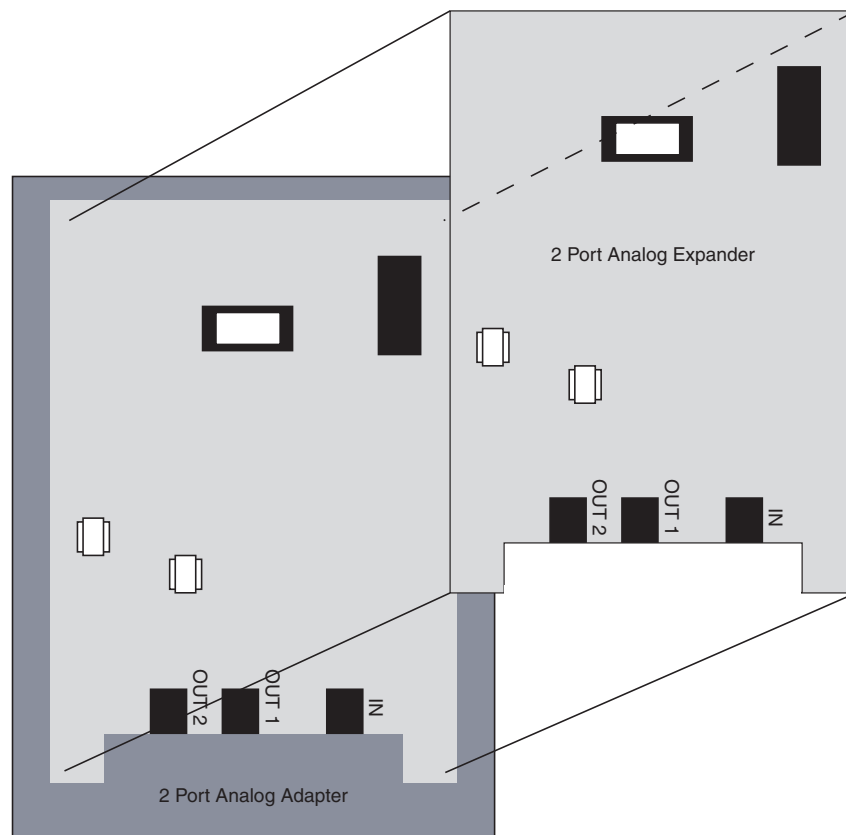
The 2-Port Analog Adapter is designed for installation at the MDF but may be positioned anywhere along the cable path between the KSU and the SLT (or other analog device).



*Do not exceed the maximum cable length from KSU to SLT regardless of where the 2-Port CO Module is installed.*

1. The 2-Port Analog Adapter is contained in a wall mount enclosure with pre-drilled flanges for simple mounting. Properly mounted, the hinged cover will open upward and lock into position for servicing.
2. Inside the enclosure, the 2-Port Analog Adapter Printed Circuit Board (PCB) is seen with three RJ-11 modular jacks along the bottom edge of the PCB. One oriented toward the right side of the 2-Port Analog Adapter PCB is labeled IN. The other two jacks are labeled OUT1 and OUT2.
3. Extend each of these jacks to the MDF using modular cords and terminal blocks.
4. Once on the MDF, connect the IN jack to the desired digital station port to be used for analog device interface. This connection requires that the green and red wires (White/Blue pair) be used.
5. The modular jack OUT1 is now operational as an analog device port with the same station number that would have been used by a digital key telephone connected to this port.
6. The modular jack OUT2 is also now operational as an analog device port with a station number assigned from the upper range (B2 voice channel). The number assigned is from (58-81). Determining the number is done by association; if the B1 voice channel station number connected to the 2-Port Analog Adapter is 11, then the

B2 voice channel station number is 59 (the adapter's channel station number plus the difference of 48). Use this relationship in numbering to determine the B2 channel station number, or simply dial an Executive Key Telephone from the B2 station port and read the display.



**Figure 2-28: 2-Port Analog Adapter**

## 15. 2-Port Analog Expander

The 2-Port Analog Expander is a single PCB identical to the PCB of the 2-Port Analog Adapter. One 2-Port Analog Expansion may be housed in the 2-Port Analog Adapter enclosure. The expansion is shipped with screws used to secure it to the existing 2-Port Analog Adapter PCB stand-offs. Since the PCB and circuit function are identical to the 2-Port Analog Adapter, follow the installation wiring instructions provided for the 2-Port Analog Adapter (Refer to [14. 2-Port Analog Adapter](#)).

### **Installation**

1. Position the 2-Port Analog Expander over the stand-off posts that are factory installed on the 2-Port Analog Adapter PCB.
2. Using the screws supplied with the 2-Port Analog Expander, secure the 2-Port Analog Expander PCB to the stand-off posts (refer to Figure 2-28).



*Only one 2-Port Analog Expander can be installed in a 2-Port Analog Adapter housing.*

---

## 16. Headset Installation

The system supports integrated headset operation. Customers may take advantage of this standard system feature at any key telephone. Most headsets will operate without extra equipment or need for additional steps in user operation.

### *Installation*

1. A headset adapter that uses a toggle switch to select between Headset and Handset use is desirable. The headset adapter is plugged directly into the Handset jack.
2. The telephone handset is then plugged into the headset adapter.

Non-amplified headsets receive operating voltage from the headset circuitry built into the phone (*refer to the headset manufacturer's instructions for information regarding compatibility, power source, power adapter or batteries, and special options*).



*On amplified headsets with self-powered (battery) headset adapters, the key telephone MUTE operation may not mute the headset. This is because the key telephone MUTE function removes system battery from the microphone at the handset jack. External power supplied to the headset will maintain its microphone voltage and allow the user to override the key telephone MUTE operation. In this case, the headset adapter MUTE function must be used (*refer to the headset manufacturer's instructions for more details*).*

---

## System Check-Out

After completing installation on the **DHS** system, it must be initialized so that default data can be loaded. Prior to actual power up and initialization, the **DHS** should be checked-over to avoid startup delays or improper loading:

1. Make sure that the KSU is properly grounded.
2. Verify that all PCBs are firmly seated onto their connectors.
3. Inspect the MDF for shorted wiring and improper polarity that would affect the Digital Key Terminals or DSS consoles.
4. Make sure that the plug-ended MDF cables connected to the KSU are secure and are plugged into the correct position.

### *Power Up Sequence*

The power up sequence involves the proper application of AC power to the system. A successful power up is assured if the installation procedure has been followed:

1. Plug the AC power cord of the KSU into the dedicated 117V AC outlet.
2. Locate the database INITIALIZATION switch SW1 on the CPU Module. It is located at the bottom edge of the CPU Module oriented in the center. It is also labeled ON and OFF.

This switch controls connection of the dynamic RAM battery circuit. When switched OFF, customer volatile database programming is not protected by the memory battery in the event power is lost. In normal operation this switch will be ON at all times.

3. To load default at this time, turn KSU power OFF.
4. Operate the INITIALIZATION (SW1) to the OFF (left) position.
5. Allow the system and switch to remain in this state for approximately two minutes.

6. Operate the INITIALIZATION (SW1) to the ON (right) position.
  7. Restore system power.
  8. Observe the CPU/Power LED. After approximately 4 - 6 sec., the LED should begin to flash.
  9. If the LED remains unlit or lit without flashing, repeat the above steps from Step 3.
- Once the power up sequence is complete, DEFAULT DATA is loaded and the system should be fully operational.



Refer to [Chapter 7, Maintenance/Troubleshooting](#), for further assistance if power up cannot be activated.

---

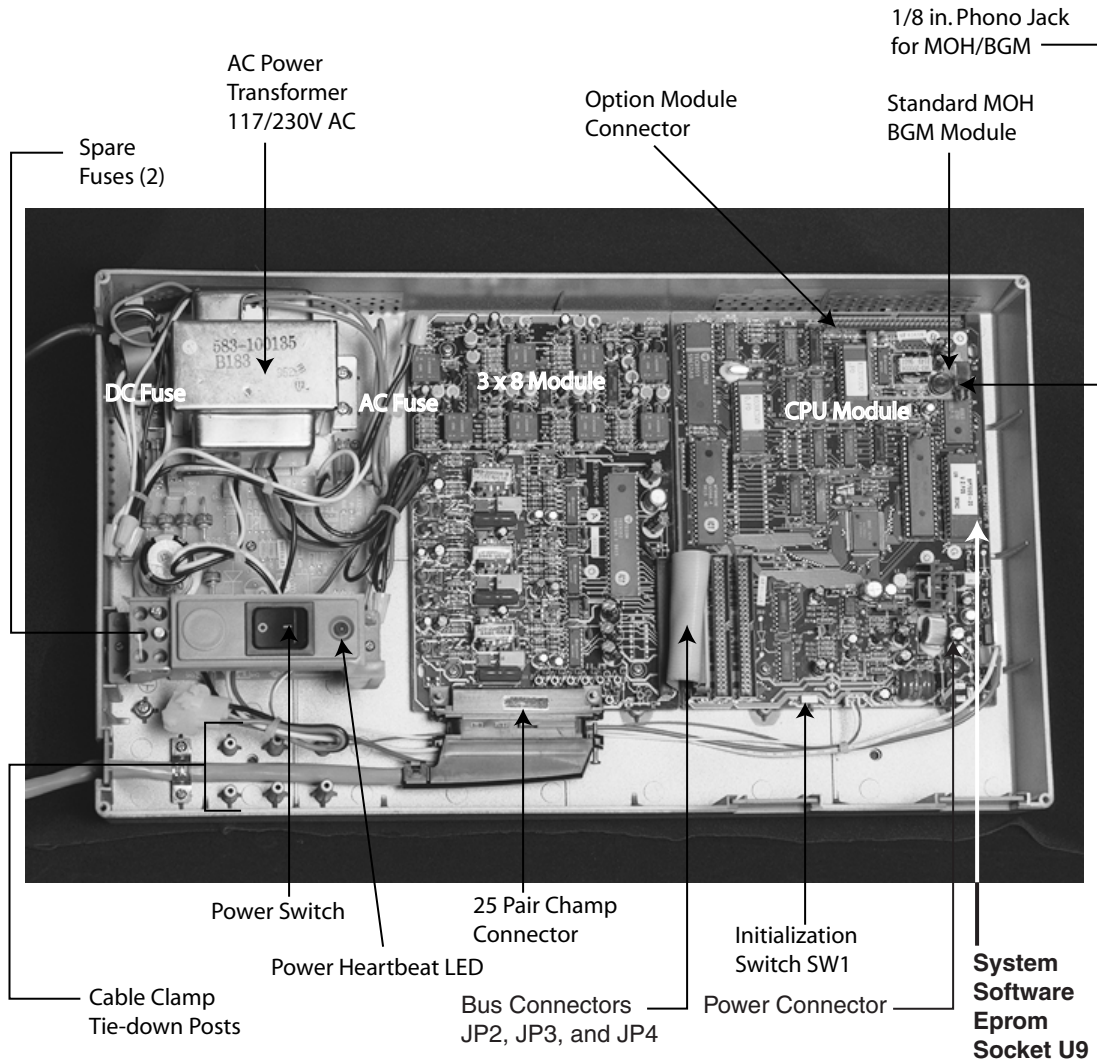
## Feature Upgrade Procedure

Use the following procedure to upgrade the **DHS** system Feature Package software. Once the upgrade is complete, the system must be initialized to assure proper operation.



*Any handling of system integrated circuits must be done in a static controlled environment. Please use satisfactory static preventive practices while handling system components and while working on the system KSU with cover removed. (USE A STATIC WRIST STRAP!)*

1. Disconnect system power and remove the KSU cover by removing each of the 4 front cover screws located at each corner.
2. If an Option Module is installed it must temporarily be removed to gain access to the system software EPROM socket (U9).
3. Use the diagram (refer to [Figure 2-29: DHS Components](#)) and locate the system software EPROM socket U9. Observe the orientation of the notch at one end of the EPROM so that the new EPROM is installed with the same orientation.
4. Using an IC extractor tool, remove the **DHS** software EPROM from the U9 socket.
5. Carefully remove the new software EPROM from its packing material and inspect for damage (if any damage is noticeable please contact Vodavi Customer Service).
6. Install the new EPROM into the vacated U9 socket with extreme care so that no EPROM pins are bent when inserted. The EPROM **MUST** be inserted such that the notch is oriented at the top of the chip when in place (same orientation as the previously removed chip).
7. Replace the Option Module if removed in Step 2.
8. Following proper power up and initialization, the system should function properly with the new Feature Package software features operational. All specific customer database data must be re-entered to customize system operation for use.



**Figure 2-29: DHS Components**



*SW1 must remain in the ON position following initialization to engage customer database RAM memory backup in the event of commercial/utility power outage. RAM backup battery charging occurs only when SW1 is in the ON position. The RAM battery requires 14 hr min. normal (powered) system operation for adequate charging.*



---

---

# 3

## DHS-E Description and Installation

The STARPLUS® *DHS-E™* Digital Hybrid System is a full-featured digital key telephone system. The common system architecture supports three digital key telephone models (refer to [Chapter 2, DHS Description and Installation, Digital Key Telephones](#)) a Direct Station Selector (DSS), and an expandable analog adaptor interface. The *DHS-E* is designed to meet the telecommunications needs of small to medium sized business offices.





---

---

## DHS-E Description

### *System Technology*

Incorporating state-of-the-art digital technology for voice switching and call processing, the *DHS-E* utilizes Pulse Code Modulation and Time Division Multiplexing (PCM/TDM). The *DHS-E* family is engineered to allow migration of digital telephones and accessories throughout the entire product line (refer to *Digital Key Telephones, in Chapter 2, DHS Description and Installation*). ISDN-like, 2B+D technology complements the system architecture and capabilities. On one industry standard twisted pair, key telephones perform all system functions and voice communications. Some additional features of the *DHS-E* include:

- A non-blocking switch, with no loss or degradation of voice signals.
- Stored-Program Control (SPC), that utilizes a 16-bit, 10 MHz microprocessor.
- Memory consists of 512 KB of ROM (Read-Only Memory) and 256 KB of RAM (Random Access Memory).

When an analog device interface is required, a 2-Port Analog adapter may be connected to any one digital station port. The 2B+D technology allows the *DHS-E* to split one digital key telephone port voice channel (B1) and the second voice channel (B2) to provide two independent Single Line Telephone (SLT)-type device interfaces.

The 2-Port Analog Adapter may be expanded with the 2-Port Analog Expansion (in the 2-Port Analog Adapter housing).

The 2-Port Analog Adapter and 2-Port Analog Expansion each require one dedicated digital station port.



*The application of analog devices in the *DHS-E* has the effect of two-to-one port gain. For every single digital port used to interface a 2-Port Analog Adapter/Expansion, 2 analog ports are available.*

***The 6-Port CO Module CANNOT be used in the *DHS-E* system.***

### *KSU Components*

The *DHS-E* platform is comprised of three key telephone models and a modular Key Service Unit (KSU) which houses the following KSU components:

- CPU Module
- 3 x 8 Module (up to 6)
- Modem

Four 3 x 8 Modules may be added to the two 3 x 8 Modules in the *DHS-E* KSU for a maximum configuration of 18 x 48 Central Office (CO) lines or stations. In the standard configuration, the KSU is equipped to service six CO Lines and 16 *DHS* digital key telephones. The standard configuration is equipped to service two music channels for use as Background Music and Music on Hold (BGM/MOH) and all system features. The

*DHS-E* is expandable to meet a variety of applications. Regardless of the configuration, the system has sufficient resources to allow completely non-blocked access to all facilities (intercom and CO lines).

An external music source may be connected to each BGM/MOH Jacks via a 1/8 in. phono plug for BGM/MOH listening. All system features are supported by the equipment provided in the *DHS-E* KSU. The Main Processor Board provides two Dual Tone Multi-Frequency (DTMF) receivers and two Tone Detectors specifically for ECF, DISA, Unsupervised CO Line Conference, and Dial Tone Detection.

Connectors for SMDR and PC Programming are standard 9-pin RS-232 (serial) connectors. Connectors for Loud Bell Control, External Voice Paging, MOH and BGM are 1/8" phono-type connectors.



*SLT operations do NOT use System DTMF and Tone Detection resources.*

The following system configurations are possible:

**Table 3-1: System Configurations**

Equipment Installed	Maximum Number of Loop Start Lines	Maximum Number of DHS-E Digital Key Telephones
Two 3 x 8 Modules	6	16
Three 3 x 8 Modules	9	24
Four 3 x 8 Modules	12	32
Five 3 x 8 Modules	15	40
Six 3 x 8 Modules	18	48

### *Telephone Components*

- Digital Key Telephones (refer to [System Components](#), in [Chapter 2, DHS Description and Installation](#))
- 2-Port Analog Adapter
- 2-Port Analog Expansion
- DSS (Direct Station Selector) Console



*Key telephones are available in two colors: Off-White and Charcoal Gray.*

---

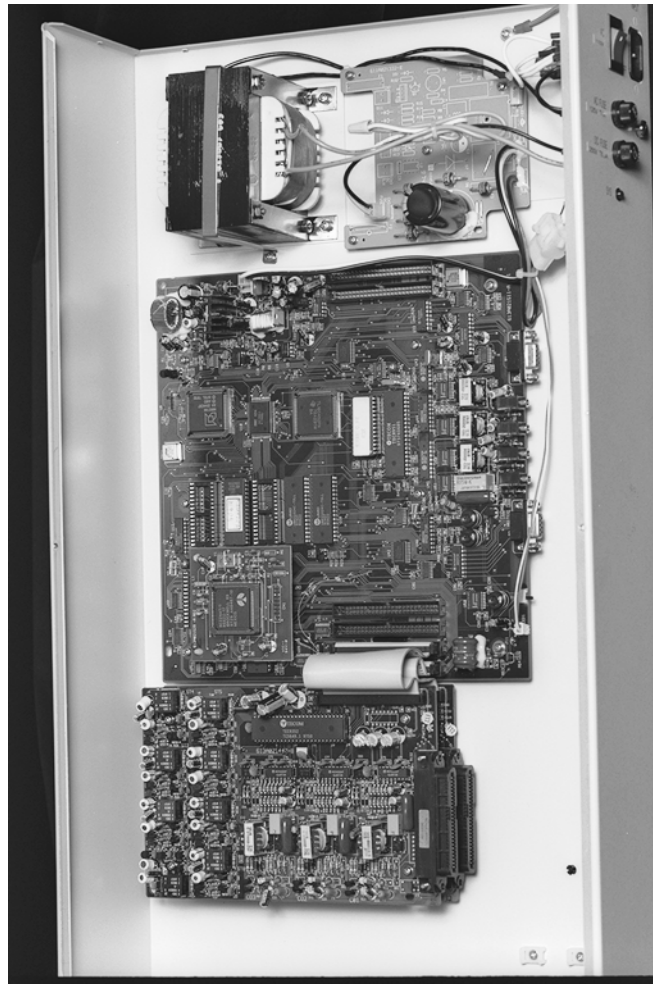
---

## *System Administration*

The system's default customer data base can be entered and changed, under password control, from any Executive Key Telephone. All Customer information is protected by an internal rechargeable NiCad or NiMh battery. Programmable password protection is allowed for each station, system administrator and external (DISA) callers. An optional PC Programming Software is available to program the *DHS-E* Systems. This Software allows the user to program OFF/LINE and then the programmed data can be uploaded to the system.

## *Key Service Unit*

The *DHS-E* KSU is a modular wall mount design. It is a self-contained cabinet with internal power supply, common control circuits (CPU board) and two 3 x 8 Modules (refer to [Figure 3-1](#)). The power supply AC transformer is hard-wire selected for either 117 V AC ( $\pm 10\%$ ). The KSU is designed for wall mount and shipped with a wall mounting template and hardware. The compact KSU weighs 26 lb. and is UL compliant. A KSU opening at the bottom of the KSU accommodates cable entry requirements through the outer housing for connection to the MDF.



**Figure 3-1: DHS-E KSU**

## Power Supply

The power supply circuitry of the *DHS-E* incorporates a linear design transformer with a choice of input voltage taps. The transformer primary windings are shipped wired for 117V AC applications. Since the power supply is linear in design the output voltage varies between 21.6V DC and 32V DC depending on load and stability of the input voltage. The output voltage is delivered to the CPU board for distribution and rectified there for logic and control voltages.

Two fuses are equipped on the power supply board, one for AC input over-voltage protection and one for DC output over-voltage protection. A DPDT (Double Pole Double Throw) switch is accessible from outside of the KSU when the KSU cover is in place. The DPDT switch will simultaneously switch AC input and DC output circuits ON and OFF. In the event battery backup operation is desired and equipped via the optional Battery Charging Unit (BCU), the KSU switch may be used to switch OFF/ON power from both sources.

The power supply wiring harness is equipped with a Mate-n-lock connector on the DC output for connection to the BCU. When equipped, the BCU will maintain complete system operation during commercial power outages. A current draw/configuration chart is included in this document (refer to [Table 3-11: Battery Sizing Chart](#)).

## Central Processor Unit (CPU)

The CPU board is standard in the Basic KSU. This board contains all circuitry required to control the fully equipped *DHS-E*. Six bus connectors are provided where the station/CO line interface 3 x 8 Module is connected. All digital voice switching and call processing data switching is accomplished on the CPU board. The CPU board also contains a 2400 baud modem for remote programming.

## Modem

The built-in 2400 baud modem will work with DISA lines or transferred lines. It will not operate with Direct Ringing CO lines. Set the "RMT X\_RATE" to 2400 baud.

## 3 x 8 Module

The 3 x 8 module provides interface of three loop-start CO lines and eight *DHS-E* key telephones.

Each CO line circuit incorporates over-voltage protection, ring detector, loop detector, loop/pulse-dial relay, current sink circuit, coupling/isolation transformer (impedance 600 ohms), hybrid circuit and combo (CODEC & filter) polarity guard circuit and radio frequency noise filter.

Each digital key telephone port is comprised of a proprietary transceiver designed using ISDN type 2B+D architecture.

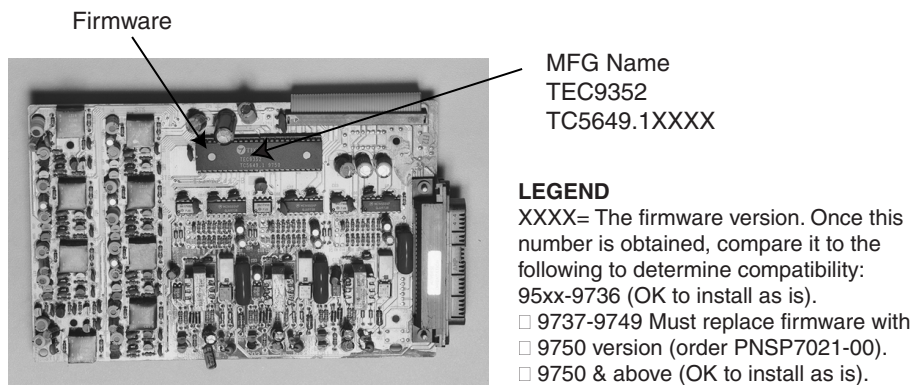
Physical connection of stations and CO lines to the 3 x 8 module is made through one male 25-pair amphenol-type connector to the MDF (Main Distribution Frame). Station power and signaling to the digital key telephones are provided via a single twisted pair from the 3 x 8 module.



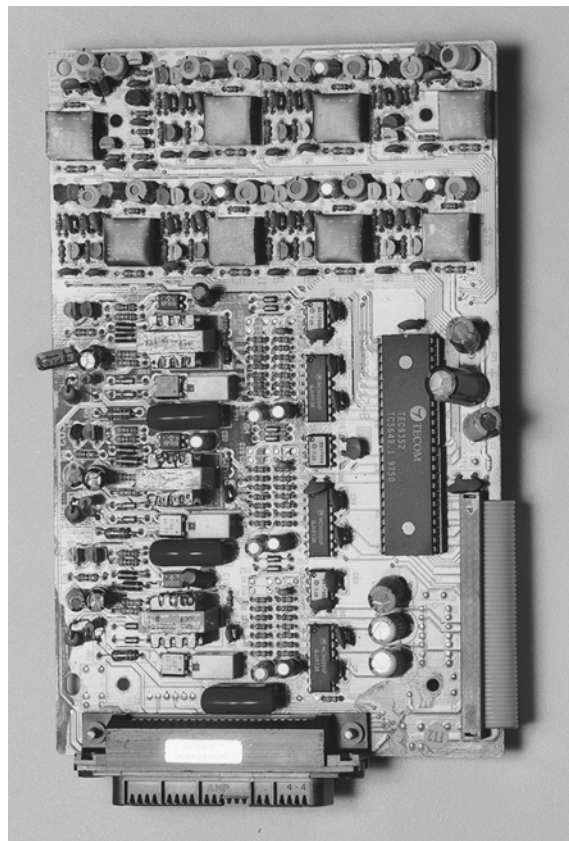
*When installing a 3 x 8 Module in location CN4, the Extender Ribbon Cable that was supplied with the KSU must be utilized. Do not lose this cable; it is irreplaceable.*



Although all existing 3 x 8 boards can be used when upgrading an existing DHS system, some pre-qualification must be performed. This pre-qualification will prevent noise problems on stations that can result from a firmware incompatibility issue. This issue can be corrected by obtaining the correct firmware from Vodavi (refer to [Figure 3-2: Firmware Caution](#) for further information).



**Figure 3-2: Firmware Caution**



**Figure 3-3: 3 x 8 Module**

## DHS-E Technical Specification Tables

**Table 3-2: Digital Hybrid System Capacities**

<b>Component</b>	<b>Description</b>
Customer Database memory protection	300 hr on a fully charged battery (the internal Nicad/Nimh battery requires 14 hr, of continuous system operation power be fully charged.)
Ports:	
CO/PBX/Centrex Lines	18
Digital Stations	48
Standard Single Line Telephones	94 (Note: one digital port must be reserved for digital station operation. One digital station port is used for every two SLT ports required (refer to <a href="#">Table 3-1</a> ).
DSS	24 (1 per station)
DTMF Receivers:	
2-Port Analog Adapter	2 (One for each SLT port)
2-Port Analog Expansion	2 (One for each SLT port)
Main Processor Board	2 (Shared for advanced call processing system features: DISA, ECF)
DTMF Senders	Unlimited. (DTMF signal generation is derived from the core system tone resource. Tone combinations are available as needed.)
Tone Detectors (Used to monitor call progress tones; Busy Tone, Ring-back Tone)	2 (Shared for advanced call processing system features; DISA, ECF, ABR. etc.)
Contacts	1 LBC contact is available.
Conference circuits	8 four-party conference circuits.
DISA circuits	Any number of CO lines (to maximum configuration) may be programmed for DISA operation.
System Attendants	1 + 1 Alternate Position for overflow call handling.

**Table 3-2: Digital Hybrid System Capacities (Continued)**

Hunt Groups:	
Members per group	8
Group Types	24 Pilot Hunt Group, All Ring Group or Voice Mail Group
Voice Mail Groups:	1 (Selected as VM type from HG.)
Members (ports)	24
Integration Method:	In-band
VM Message Waiting	[#] + [96] + station number to turn VM button LED ON. [#] + [*] + [96] + station number to turn VM button LED OFF.
VM Control Codes:	
Disconnect Digit(s)	8 digits max.
Prefix for intercom calls	4 digits max.
Prefix for transferred calls	4 digits max.
Record Digits for Voice Recorder function	4 max.
Suffix for intercom calls	2 max.
Suffix for transferred calls	2 max.
CO Line Loop Current sensing	Interrupt programmable from 50ms to 2500ms.
Paging:	
Internal Page Extension Groups	8
External Page Port (via Option Module)	1
Internal All Call	1
System (Internal/External) All Call	1
System Speed Dialing	80 Total, 16 digits per bin.
Station Speed Dialing (DKT and SLT)	20 Total per station, 16 digits per bin.
Last Number Redial	16 digits per station



**Table 3-2: Digital Hybrid System Capacities (Continued)**

Save Number Redial	16 digits per station
User Saved Number Redial	20 digits per station
Callback request per station	1
Camp On by a busy station	1
Stations Camped on to a station	1
Stations Camped on to a busy line	1
Message - Executive Notification:	6 preprogrammed 1 personal per station
Message - Executive Preprogrammed	6 preprogrammed 1 personal per station
Message Waiting	48 simultaneous
Name in Display	1 per station, 7 characters max.
Class Of Service (COS)	8 (0-7) per Day, 8 (0-7) per Night
Toll Restriction To/From Tables	100 entries, 10 digits per entry
Forced Verified Account Codes	100 bins, 8 digits max.
Unverified Account Codes	8 digits max.
Call Pick Up Groups	8 Extension Groups.
Station Lock Password	4 digits max. per station.
System Programming Password	6 digits (000000 at default).
System Reminder Alarm	8 time settings.
Station Alarm	1 per station.
Ring Schemes	3
Distinctive Ring Tones:	
Station	4 (1-5)
CO Line	4 (0-4)
External Call Forward	1 incoming line, 1 outgoing line.
Changeable Numbers Options	Station, CO, Hunt Groups

**Table 3-3: Electrical Specifications**

Component	Description
AC Power source:	Dedicated 117V AC ( $\pm 10\%$ ), 60Hz single phase
Power consumption:	1.5A max. at 120V AC (180 W)
Power Supply fuse: AC input DC output	2A 250V 1A 125V
Idle Channel Noise:	-74 dB
Cross Talk Attenuation:	75 dB (at 1kHz)
Ringling Sensitivity:	40v RMS 25 Hz
Ringer Equivalence Number:	1.2B
CO Line Signaling:	DTMF amplitude (-5 dB,-7 dB) $\pm$ 2 dB, at approx. 2 Vpp Pulse Dialing ratio 60/40 at 10 PPS
Music source/Background Music:	0 dBm at 600 $\Omega$ input impedance 1/8 in. phono jack
Contact rating (Option Module LBC):	1A at 24V DC 1/8 in. phono jack
External Page Port	0 dBm at 600 $\Omega$ 1/8 in. phono jack
Serial Ports	9-pin female RS-232 C

**Table 3-4: Environmental Specifications**

Requirements	In Operation	In Storage
Temperature KSU	32 to 104° F 0 to 40° C	-40 to 185° F -40 to 85° C
Recommended Operating Temperature:	70 to 78° F	
Temperature Station Instruments	32 to 113° F 0 to 45° C	-40 to 185° F -40 to 85° C
Relative Humidity (non-condensing)	5 to 90%	5 to 90%
Heat Dissipation (BTU)	300	
Altitude	Up to 10,000 ft.	Up to 40,000 ft.

**Table 3-5: Unit Specifications**

<b>Part Number</b>	<b>Description</b>	<b>Dimensions</b>		<b>Weight</b>
SP7000-10	Basic KSU ( <i>DHS-E</i> )	L W H	25.13 in 13.62 in 4.80 in	25.8 lbs
SP7100-00	3 x 8 Module	L W H	8.6 in. 5.2 in. 0.88 in.	0.88 lbs.
SP7310-XX*	DSS Console	L W H	8.88 in 6.62 in 1.75 in	2.64 lbs
SP7311-XX	Basic Key Telephone	L W H	9.36 in. 7.52 in. 2.58 in.	2.64 lbs.
SP7312-XX	Enhanced Key Telephone	L W H	9.36 in. 7.52 in. 2.58 in.	2.64 lbs.
SP7314-XX	Executive Key Telephone	L W H	9.36 in. 7.52 in. 2.58 in.	2.64 lbs.
SP7420-00	2-Port Analog Adapter	L W H	12.82 in. 7.38 in. 2.6 in.	0.88 lbs.
SP7440-00	2-Port Analog Expansion	L W H	7.92 in. 5.96 in. 0.88 in.	1.54 lbs.
SP7081-10	Caller ID Cable	L W H		

\* *XX Denotes color option: 71 = Charcoal, 08 = Off White*

**Table 3-6: Maximum Cable Length**

<b>Digital Key Telephone</b> (Distance measures in linear feet of cable from KSU to DKT.)	26 AWG - 850 ft. 24 AWG - 1416 ft. 22 AWG - 1983 ft.
<b>Standard Single Line Telephone</b> (Distance measures in linear feet of cable from KSU to SLT.) (2-Port Analog Adapter may be placed anywhere in between.)	26 AWG - 650 ft. 24 AWG - 1133 ft. 22 AWG - 1586 ft.

**Table 3-7: Dialing Specifications**

<b>DTMF Dialing mode:</b>	
<b>Frequency deviation</b>	± 1%
<b>Rise time</b>	3ms
<b>Duration of DTMF signal</b>	programmable 50-150ms (70ms default)
<b>Inter-digit time</b>	programmable 50-150ms (70ms default)
<b>VM Port DTMF duration</b>	programmable 60-150ms (120ms default)
<b>VM Port Inter-digit time</b>	programmable 60-150ms (120ms default)
<b>Pulse Dialing mode:</b>	
<b>Pulse dial rate</b>	10 pulses per second
<b>Pulse Make/Break ratio</b>	60/40

**Table 3-8: FCC Registration Numbers**

<b>For systems configured for Key System operation (each CO line appears on its own dedicated button).</b>	D6XTAI-25246-KF-E
<b>For systems configured for hybrid operation (CO lines may be accessed by dial codes and Pool/Loop buttons).</b>	D6XTAI-25245-MF-E

**Table 3-9: Audible Signals**

<b>Signal</b>	<b>Frequency</b>	<b>Cadences</b>
CO Line Ringing: Scheme 0 Scheme 1 Scheme 2 Distinctive 1 Distinctive 2 Distinctive 3 Distinctive 4 SLT	N/A N/A N/A SLT bell	300ms ON, 400ms OFF, 300ms ON, 4 seconds OFF 1 second ON, 3 seconds OFF 1 second ON, 3 seconds OFF Follows ring cadence of Ring Scheme selected Follows ring cadence of Ring Scheme selected Follows ring cadence of Ring Scheme selected Follows ring cadence of Ring Scheme selected Follows ring cadence of Ring Scheme selected
Intercom Ringing: Scheme 0 Scheme 1 Scheme 2 Distinctive 1 Distinctive 2 Distinctive 3 Distinctive 4 SLT	N/A N/A N/A SLT bell	1 second ON, 3 seconds OFF 1 second ON, 3 seconds OFF 300ms ON, 400ms OFF, 300ms ON, 4 seconds OFF Follows ring cadence of Ring Scheme selected Follows ring cadence of Ring Scheme selected Follows ring cadence of Ring Scheme selected Follows ring cadence of Ring Scheme selected Follows ring cadence of Ring Scheme selected
Message Wait Callback		Follows ring cadence of Ring Scheme selected

**Table 3-10: Mean Time Between Failure Analysis**

Component	MTBF (hr)
<i>DHS-E</i> System 2 (3 x 8) Modules (6 x 16)	72347.9
Case Assembly	109.0
Power Supply Unit	193.0
CPU Module	7399.1
Modem Board	377.0
3 x 8 Module	5744.0
Basic Key Telephone	2988.3
Enhanced Key Telephone	4205.3
Executive Key Telephone	4275.3
2-Port Analog Adapter and 2-Port Analog Expansion	5000.9
DSS Console	1596.7
Method: Use the figures above for each unit installed (or to be installed) and calculate the total for this system configuration. Use the total from Step 1 in place of the variable <b>x</b> in the formula at the right to calculate MTBF for this system configuration.	$(1 \div x)(10^9) = \text{MTBF hr}$

---

---

## DHS-E Installation

### *Installation Overview*

1. Plan the installation, including the Key Service Unit (KSU) and main distribution frame (MDF) location, station locations, cable runs, ground location, and optional equipment.
2. Mount the Backboard, and sketch placement of all components.
3. Mount the KSU on the MDF backboard. Use the provided mounting template to aid in spacing the mounting screws.
4. Install optional 3 x 8 Modules inside the KSU as required.
5. Attach the punch-down terminal block(s) on the backboard.
6. Run cables for the key telephone and single-line telephone locations from the MDF to each location. No cable should loop from one telephone location to another.
7. Run wiring to any optional equipment, such as external paging equipment, loud bell signaling devices, music sources, etc.
8. Route telephone and CO line port interface connections through the appropriate KSU opening, and terminate all industry standard wiring on punch-down terminal block(s) on the MDF.
9. Route auxiliary device cabling through the appropriate KSU opening and terminate as required (music source, printer/computer for SMDR, external paging equipment, etc.).
10. Terminate station cables on punch-down terminal block(s) on the MDF.
11. Terminate station cables on modular jack assemblies at the station locations.
12. Cross-connect the CO lines and station ports to station cables on the corresponding punch-down terminal block.
13. Install the station instruments and any optional station equipment, such as headsets or single line telephones.
14. Operate the RAM memory initialization switch from its factory set OFF (toward left) position to the ON (toward right) position.



*If the RAM Initialization switch was not in the OFF position prior to this installation, it must be moved to the OFF position and allowed to stay in the OFF position for 2 minutes while the system is NOT powered. This critical step is detailed in [System Check-Out](#).*

15. Plug the AC power cord into the dedicated AC outlet and power up by operating the AC power switch to the ON position.
16. Observe the power/CPU heartbeat LED for flashing status after 4-6 sec.

---

---

## General Site Considerations

The first step of *DHS-E* installation is to locate an acceptable site for the common equipment (KSUs, boards, etc.). When locating a mounting site for the KSUs, the following points must be considered:

- ❑ KSUs are designed for wall mounting and should not be mounted directly to a masonry or plasterboard wall. It is recommended that a 1/2 in. plywood backboard be firmly mounted to the wall, and the KSU and MDF be mounted to the backboard.
- ❑ The location must have access to a *dedicated* 110 V AC ( $\pm 10\%$ ), 60 Hz, single-phase circuit with a circuit breaker or fuse rated at 15 amps. A 3-wire parallel blade grounded outlet should be within approximately 6 feet of the lower left rear of the KSU mounting.
- ❑ The location must have access to a good earth ground, such as a metallic cold water pipe without non-metallic joints. The ground source should be located as close as possible to the system.
- ❑ The system should be located in an area that is well ventilated with a recommended temperature range of 68-78° F and a relative humidity range of 5-60% (noncondensing).
- ❑ The system should be located within 25 ft. of the telephone company's termination point. Also, the location should be within the prescribed station loop lengths for all keysets and terminals. If existing cabling is used, its location and conduits should be considered. Station wiring should be in the building. Station ports are not designed for installation outside of the building.
- ❑ Protection from flooding, flammable materials, excessive dust and vibration.
- ❑ The site should be away from radio transmitting equipment, arc-welding devices, copying machines and other electrical equipment capable of generating electrical interferences.
- ❑ Operation of this equipment in a residential area is likely to cause interference. In which case the user, at his own expense, is required to take any necessary measures to correct the interference.

## *Necessary Tools and Supplies*

To make installation easier, consult the following pages when preparing to install the system.

### Tools

The following tools are recommended to install your *DHS-E* system. Others may be needed for certain troubleshooting procedures.

- ❑ Use unshielded, twisted multi-pair (three-pair minimum recommended) cable to run from the MDF to all station instruments (key telephone and single-line DTMF telephones). Digital key telephones only need one twisted pair to operate.



*Use shielded cable if RFI/EFI is expected.*



- Six conductor modular jack assemblies for all station instruments (recommended).
- Standard punch-down terminal block(s), 66M1-50 type, as required.
- Industry-standard, 25-pair cable(s) with a 50-pin male amphenol/AMP type connector for connection from each equipped 3 x 8 module to the MDF.
- AC voltage surge/spike protector.

Standard telephone hand tools and mounting hardware for the KSU, MDF backboard, punch-down terminal block(s), modular jack assemblies for CO lines, etc.

Some additional tools suggested to have on-hand when installing the *DHS-E* system include:

- |   |  |  |
|---|--|--|
| □ 1 box 4 pair Cat3 or Cat5 twisted pair              | □ Drywall screws                           | □ Multi-meter (fluke)  |
| □ 25 pair Amp cables (male-female)                    | □ Electrical tape                          | □ Permanent marker (0.8 mm, 0.5 mm for certain applications)                           |
| □ 25 pair Cat3 cable                                  | □ Extension cord (three-prong with ground) | □ Phillips head screwdrivers:<br>#1 x 4<br>#2 x 4<br>#2 x 6                            |
| □ 89B-Brackets  | □ Fiber rod for fishing walls              | □ Phone jacks  |
| □ B splice connectors or Scotlok™ splicing connectors | □ Fish tape                                | □ Punch Down Tool (110 and 66 Block Blades)  |
| □ Bridge clips  | □ Harmonica adapter                        | □ RJ11 plugs   |
| □ Butt set (T.S. if possible)                         | □ In-line adapter                          | □ RJ45 plugs   |
| □ Chain for fishing walls                             | □ Ladder                                   | □ Standard screwdrivers:<br>1/8 x 4 in.<br>1/4 x 4 in.<br>3/16 x 6 in.<br>5/32 x 4 in. |
| □ Computer with RS232                                 | □ Level                                    | □ Static/Ground Strap  |
| □ Cordless drill                                      | □ Linesmen scissors                        | □ Toner  |
| □ Diagonal wire cutters                               | □ Long nose pliers                         | □ Wand (Induction Amp)   |
| □ Digit grabber                                       | □ M1-66 split blocks                       | □ Wire spools  |
| □ Drill   | □ Modular crimping tool (RJ-11 and RJ-45)  | □ Yellow 77 (lubricant for wire)   |

### Verify On-Site Equipment

Once the equipment installation site is identified and a dedicated AC outlet, earth ground, adequate lighting and ventilation are available, verify that all equipment required is on-site and was not damaged during shipping:

- Unpacking the KSU - The Key Service Unit is shipped in its own protective carton and contains the following:
  - Basic KSU
  - One mounting template
  - One System Installation & Maintenance Manual

Open the carton and verify that all items are complete and undamaged. Remove all packing material and store for future use in the event that return shipment is required. This should be performed at the installer's office with a 48-hour burn-in period prior to installation.

- ❑ Check that the type and quantity of boards received is correct. DO NOT unpack the individual boards at this time.
- ❑ Verify optional equipment is received and is in good condition.
- ❑ Verify that a Power Line Surge Protector is on-site.



*If any equipment is damaged or missing, notify the appropriate personnel to correct the situation.*

---

## DHS-E Installation

### 1. Backboard MDF Installation

A wooden backboard is recommended for all installations and must be installed when the location has masonry or plasterboard walls. A 1/2 in. plywood material is sufficient for most installations.

1. Mount the backboard at a convenient height, about 3 ft. above the floor. It can be bolted in various places to distribute the weight of the system.
2. Space should be available on the bottom side of the backboard for the MDF cabling and for optional equipment such as a music source and battery backup.
3. It is recommended that the location of each major item be roughly sketched on the backboard as an installation layout.
4. Locate the Telco-provided CO/Centrex lines at the demarc and extend them to the MDF location.

### 2. KSU Grounding

To ensure that the system will operate properly, a good earth ground is recommended. The Telco protector ground terminal or a metallic COLD water pipe will usually provide a reliable ground path. If cold water pipe is used, carefully check that the pipe does not contain insulated joints that could isolate the ground. In the absence of the cold water pipe, a ground rod or other source may be used. A No. 8 AWG copper wire should be used between the ground source and the KSU.



*The ground wire should be kept as short as possible and can be connected to the ground lug located on the bottom of the KSU. Check your local grounding regulations before installing the ground wire.*

### ***Voltage Surge/Spike Protection***

To reduce the effects of AC voltage surges and spikes that may cause system malfunctions, false logic, and/or damage to the electronic components, it is recommended that a separately sourced surge/spike protector be installed. Check the manufacturer's specifications to ensure that the device meets the following requirements:

- ❑ The power cord should not be used with a 3-wire to 2-wire plug adapter.
- ❑ A power line surge protector should be used to protect the power supply from electrical surges. The surge protector should be installed in accordance with the manufacturer's instructions and applicable local electrical codes.

- Clamp voltage transients at 300V within 5 nsec. when exposed to wave-forms as described in the ANSI/IEEE Standard C62.41-1980 (IEEE 587).
- Reduce RFI/EMI noise by at least 20 dB at frequencies between 5 kHz and 30 MHz.

### 3. Battery Backup - System

External batteries may be connected to the KSU via the optional Starplus VC61101 Battery Charging Unit (BCU). This unit may be equipped with batteries sized to meet the particular customer requirements. The approximate time, in back-up hours, is located in Table 2-11. In the event of a commercial power outage, the BCU will provide the necessary system voltage (24V) to allow full feature key telephone operation until AC power is restored or the battery voltage reaches minimum voltage thresholds and is automatically disconnected to avoid battery damage. This threshold is approximately 21 to 21.5V. The amount of system battery operation time is dependent on several factors:

- Number and type of key telephones installed
- System traffic load
- Age of external batteries
- Equipment Room Temperature
- Amp/Hour rating of external batteries
- Recovery time since last AC power interruption

The Starplus VC61106 BCU is designed for use with the DHS system. Follow the instructions supplied with the BCU to install batteries in that unit. Consult Table 2-11 for system operating current draw to select the right battery size for the desired back up duration.

**Table 3-11: Battery Sizing Chart**

Configuration	Battery Power (Hr)		
	12 AH	20 AH	40 AH
3 x 8	3.5	4.5	8
6 x 16	2	3.5	7
9 x 24	1.5	2.5	4

#### *Cautionary Steps*

To reduce the risk of fire or injury to persons, read and follow these tips:

- Use only the following type and size battery(ies) listed here as the maximum battery type and size: 24vdc, 40 AH.
- Do not dispose of any battery(ies) in a fire, the cell may explode. Check with local codes for possible special disposal instructions.
- Do not open or mutilate the battery(ies). Released electrolyte is corrosive and may cause damage to the eyes or skin. It may be toxic if swallowed.
- Exercise care in handling batteries in order not to short the battery with conducting materials such as rings, bracelets, and keys. The battery or conductor may overheat and cause burns.

- 
- ❑ Charge the battery(ies) provided with or identified for use with this product only in accordance with the instructions and limitations specified in this manual.
  - ❑ Observe proper polarity orientation between the battery(ies) and battery charger.
  - ❑ Do not mix old and new batteries in this product (applies to products employing more than one user replaceable secondary battery).

Do not mix batteries of different sizes or from different manufacturers in this product (applies to products employing more than one user-replaceable, secondary battery).

#### 4. KSU Installation

The KSU is designed for wall mounting only. The KSU should NOT be mounted directly on a masonry surface. If the KSU is to be mounted on a masonry surface, a wooden backboard of sufficient size should be attached to the wall and the KSU mounted on the backboard.

1. Using the mounting template as a guide, mark the 2 mounting screws locations on the MDF backboard.
2. Pre-drill 2 screw holes and install 2 pan-head No. 10 screws into the backboard. The screw heads should protrude about 1/4-in. from the backboard plywood surface.
3. Lift the KSU over the 2 screws allowing the screws to extend into the KSU slotted mounting holes. As the KSU is allowed to rest in place on the mounting screws it will slip over the screw shanks until the top of the slot is reached. Properly installed, the KSU power transformer (where the KSU AC power cord is located) is positioned in the upper left corner. The power switch and Power/Heartbeat LED are positioned at the left side of the KSU toward the bottom.

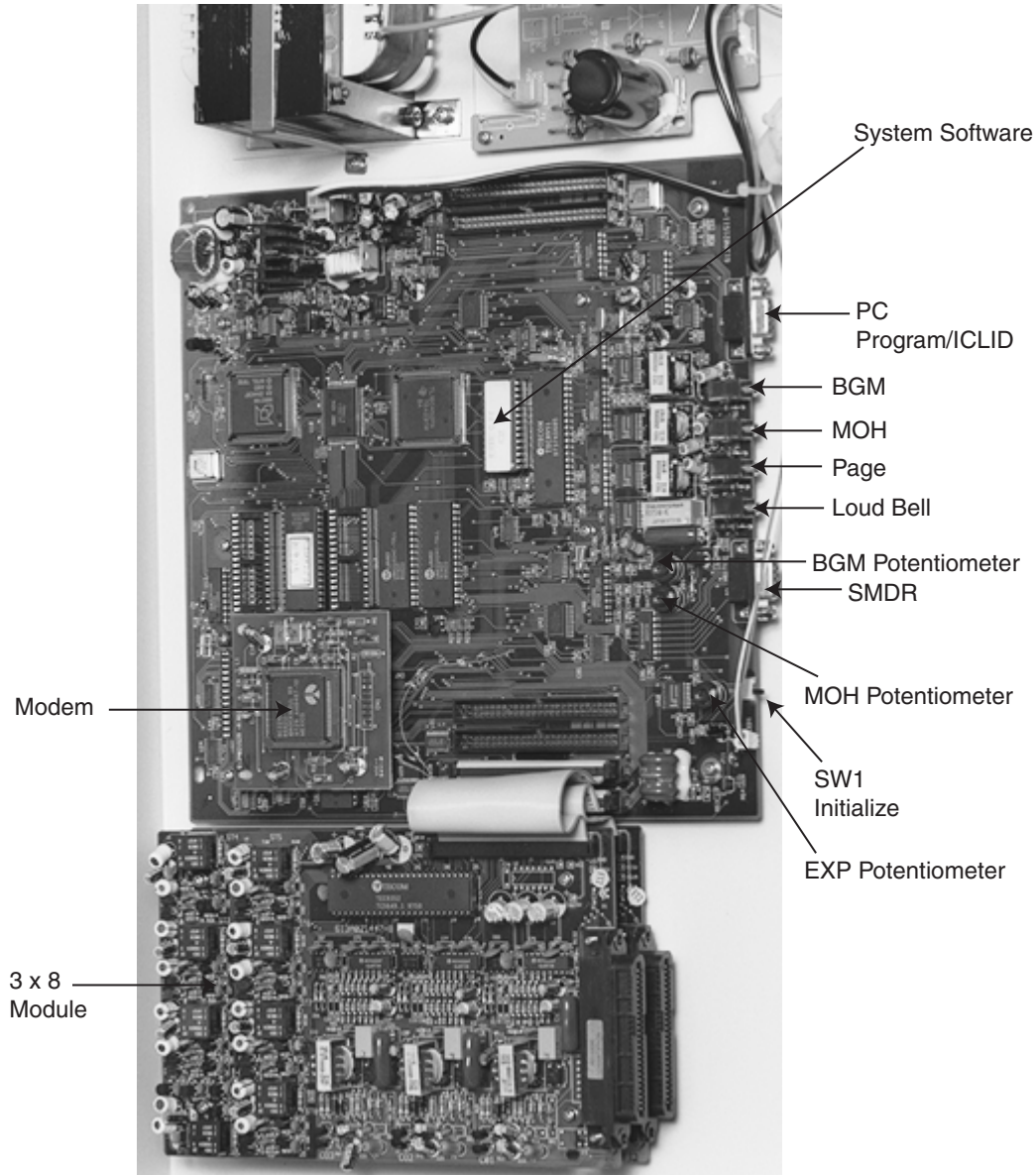


*It is very important that the KSU be correctly mounted to allow proper power supply heat dissipation.*

### 3. Installing 3 x 8 Modules



The 6-Port CO Module CANNOT be used in the *DHS-E* system.



**Figure 3-4: *DHS-E* CPU Board**

The *DHS-E* comes with two pre-installed 3 x 8 modules. Each additional 3 x 8 module requires one 25-pair amphenol type (male) ended station cable to extend the interface ports to the MDF. The station cable is plugged into the female amphenol connector at the base (orientation assumes a properly mounted KSU) of the 3 x 8 module.

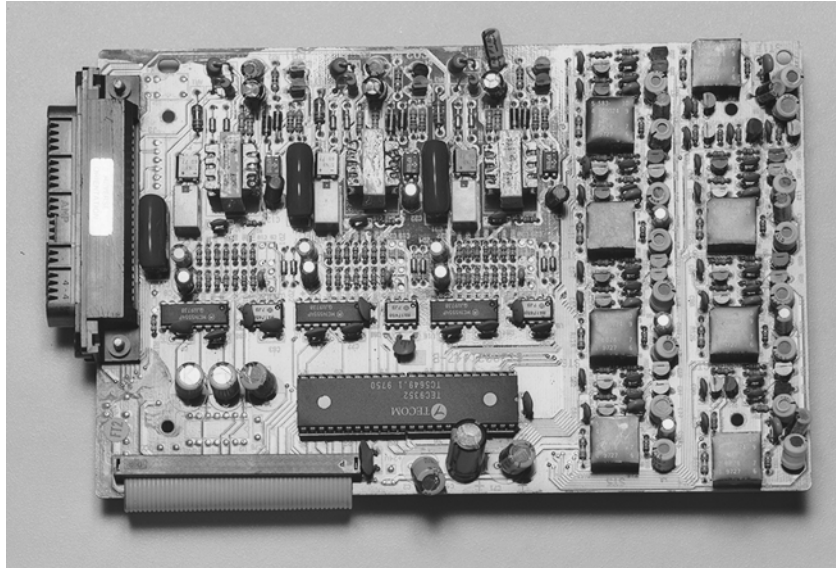


*System power should be OFF before plugging in the station cable or while working on the station punch-down block. (Although each port is over-current protected, unnecessary shorting should be avoided).*

The cable is then routed out of the KSU through an opening at the lower left of the KSU housing. A cable restraint clamp is provided and may be used to secure cables exiting the KSU. The 25-pair cable is then terminated on a punch-down terminal block on the MDF (refer to [Table 3-12](#)).

The 3 x 8 module is installed to expand system capacity and is housed in the KSU in stacking fashion over the initial two 3 x 8 modules. Four additional 3 x 8 modules can be installed in the KSU. The 3 x 8 module is shipped with four stand-off mounting posts. Follow these steps when installing a 3 x 8 module:

1. Be sure that KSU power is turned OFF, and the KSU cover is removed.
2. Connect grounded wrist strap to a suitable earth ground.
3. Locate the screws used to secure the 3 x 8 module.
4. Remove one of the module-securing screws only (so the existing board stays in place, and retain the screw for later use).
5. Insert one of the stand-off posts into the screw position where the screw from Step 4 was removed.
6. Tighten securely by hand, then finish tightening with a small hand tool. It is very important not to over-tighten any screw or stand-off post as damage to the board may occur.
7. Repeat Steps 4 through 6, until all module screws are replaced with stand-off posts.
8. Position the new 3 x 8 module over the stand-off posts installed and use the screws removed in the previous steps to secure it in place on the stand-off posts.
9. Once mounted, carefully insert the bus ribbon cable into the next available bus connector on the CPU board.
10. Connect the amphenol-ended cable to the connector on the 3 x 8 module.
11. Secure the cable in place with a clamp or cable tie.
12. Replace KSU cover and secure with cover screws, and restore KSU power when all wiring is complete. Or continue with the installation process.



**Figure 3-5: 3 x 8 Module**

## 5. Terminating Connections

### *3 x 8 Module(s)*

1. The CO line connections (as well as station connections) are made to the 3 x 8 Module via the male 25-pair connector located along the edge of the installed module (refer to [Table 3-12](#)).
2. Once the 25-pair cable is terminated on an industry standard 66M1-50 block, cross-connect (jumper wire) should be used to extend the CO line pair from the terminal block to the Telco Demarcation block. Plan to use at least one pair of bridging clips for each CO line connected so that service of any one specific CO line is simplified.

**Table 3-12: 66M1-50 Wiring Designations for the 3 x 8 Modules**

Cable Pair	Pair Color	Designation	3 x 8 Modules					
			1st	2nd	3rd	4th	5th	6th
26/1	White/Blue	N/C						
27/2	White/Orange	CO Line / Port 3	CO 3	CO 6	CO 9	CO 12	CO 15	CO 18
28/3	White/Green	CO Line / Port 2	CO 2	CO 5	CO 8	CO 11	CO 14	CO 17
29/4	White/Brown	CO Line / Port 1	CO 1	CO 4	CO 7	CO 10	CO 13	CO 16
30/5	White/Slate	N/C	<p style="text-align: center;"><b>Do not use these pairs for any reason.</b></p> <p style="text-align: center;"><b>Electrical damage may occur.</b></p>					
31/6	Red/Blue	N/C						
32/7	Red/Orange	N/C						
33/8	Red/Green	N/C						
34/9	Red/Brown	N/C						
35/10	Red/Slate	N/C						
36/11	Black/Blue	N/C						
37/12	Black/Orange	N/C						
38/13	Black/Green	N/C						
39/14	Black/Brown	N/C						
40/15	Black/Slate	N/C						
41/16	Yellow/Blue	N/C						
42/17	Yellow/Orange	N/C						
43/18	Yellow/Green	Station Port 1	STA 100	STA 108	STA 116	STA 124	STA 132	STA 140
44/19	Yellow/Brown	Station Port 2	STA 101	STA 109	STA 117	STA 125	STA 133	STA 141
45/20	Yellow/Slate	Station Port 3	STA 102	STA 110	STA 118	STA 126	STA 134	STA 142
46/21	Violet/Blue	Station Port 4	STA 103	STA 111	STA 119	STA 127	STA 135	STA 143
47/22	Violet/Orange	Station Port 5	STA 104	STA 112	STA 120	STA 128	STA 136	STA 144
48/23	Violet/Green	Station Port 6	STA 105	STA 113	STA 121	STA 129	STA 137	STA 145
49/24	Violet/Brown	Station Port 7	STA 106	STA 114	STA 122	STA 130	STA 138	STA 146
50/25	Violet/Slate	Station Port 8	STA 107	STA 115	STA 123	STA 131	STA 139	STA 147



### Conditions

- ❑ It is the installer's responsibility to assure that CO line connections are made in such a way that proper CO Hunting will sequence from the first CO line button to the last, in order on key telephones.
- ❑ Typically, the Telco service provider provides lightning protection on the premises at the service entrance.
- ❑ Test each CO Line at the MDF for dial tone, correct ringing sequence, Telco number assignment and polarity.



*If incoming CO lines Hunt from a main telephone number and are also used for outgoing (both-way CO line) service, always prioritize the incoming line order so that the last choice incoming trunks appear on the higher number CO line positions. This is because the system automatically selects idle trunks for outgoing calls, by searching from CO line 18, to CO line 17, and so on to CO line 1. This technique may avoid a head-on or Glare condition where a user trying to place an outgoing call inadvertently answers a ringing line.*

## 6. Station Cabling

Floor plans should be developed to aid in proper station cabling in a star (home run) configuration from the KSU. The cables are run from the station locations to the STN block at the MDF.

Both ends of each cable should be labeled with the station's circuit number. The circuit number designates the station port position in the KSU.

When the system is initialized, the intercom numbers are assigned in order from Port-1 (intercom number 10) to Port-24 (intercom number 33) as each Module is installed (refer to [Table 3-12](#)).

### Running Cable

From the MDF location, run unshielded, 3-pair (6-conductor) twisted cable to all key telephone locations and DTMF single-line telephone locations.



*Use shielded cable if RF1/EF1 is expected.*

Follow these guidelines:

- ❑ Install proper type cable for the application according to the National Electrical Code and local building codes.
- ❑ Avoid cable runs parallel to fluorescent light fixtures or AC lines not in conduit. If these obstacles are unavoidable, run the cables across them at right angles.
- ❑ Do not run station cables inside electrical conduit already occupied by AC wiring. To do so is a violation of the National Electrical Code.
- ❑ Do not run station cables near equipment with electric motors or through strong magnetic fields, such as those generated by large copy machines, arc welding equipment, heavy motors, etc.
- ❑ Do not place station cables where they can be stepped on or where they can be rolled over by office furniture.
- ❑ If using multi-pair (25-pair) cable runs to multiple station locations do not include AC ringing single-line sets, AC-ringing auxiliary equipment, or CO lines in a cable being

used for key telephones. Key telephones should always be isolated in separate dedicated cable runs.

- Do not exceed the measurements for the station cable lengths (using 26AWG wire) listed in [Table 3-6](#). The ohm values are loop measurements; feet (meter) values are the maximum one-way distances from the KSU.



*It is recommended that a minimum of 3-pair cable and a minimum of 4-conductor modular jacks be used for all station connections.*

### ***Terminating Cables at Station Locations***

At each station location terminate station cables on 4-conductor modular jack assemblies. Although only one pair is required for key telephone operation, the second pair is wired through to the ADP jack for a variety of applications at the desktop. For exceptions to this, refer to [Table 3-13](#).

**Table 3-13: Station Location Cable Terminations**

<b>Cable Conductor</b>	<b>Jack Wire Color</b>	<b>Designation</b>
White/Blue	Green	Telephone voice and data XT lead
Blue/White	Red	Telephone voice and data XR lead
White/Orange	Black	ADP Jack Tip lead
Orange/White	Yellow	ADP Jack Ring lead

Do not mount the modular jack assemblies on the wall at this time; they will be wall mounted later when the station instruments are installed.



*Since the digital station equipment is not polarity sensitive, reversing the digital telephone pair has no effect on operation. The Station Interface circuits are current limited and are not fused.*

## **7. Key Telephones Installation**

Key telephones may be mounted with three different orientations: Low Profile Desk Mount, High Profile Desk Mount or Wall Mounted. Packaged inside each key telephone carton are the following components:

- Key telephone
- Key telephone handset
- 7-ft. line cord
- 4-in. line cord (for wall mounting)
- 12-ft. handset cord
- Small base-wedge mount assembly
- Large base-wedge mount assembly

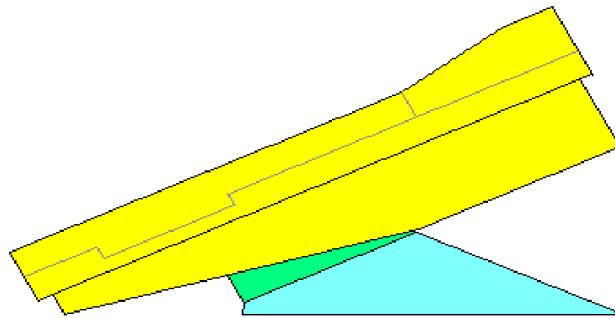


The two wedge mount assemblies (large and small) are affixed at the factory. This configuration is used for High Profile Desk Mounting.

Remove the components from the carton and determine which mounting components are required. Most telephones are installed with both mounting wedges.

### ***High Profile Mount***

For the High Profile Mounted position, reference the illustration below and attach the Base Mount wedges.

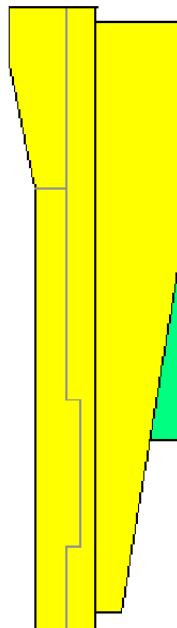


**Figure 3-6: High Profile Mount**

1. The small wedge is always used for the various telephone mounting positions.
2. The small wedge has locking tabs at one end and hooks at the other end used in a hinging fashion.

### ***Wall Mount***

When the telephone is to be Wall Mounted:

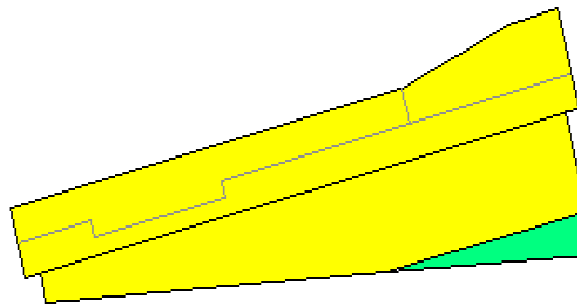


**Figure 3-7: Wall Mount**

1. Remove the two small screws that secure the small and large wedges together.
2. Store the larger wedge for possible use later (the large wedge is not used when wall mounting the key telephone).
3. Position the smaller wedge as in the illustration at the right for wall mounting. Once in position, the smaller wedge and key telephone bottom housing provide for standard 630 type wall mount wall jacks.

### ***Low Profile Mount***

When the key telephone is to be desk mounted in the Low Profile position:



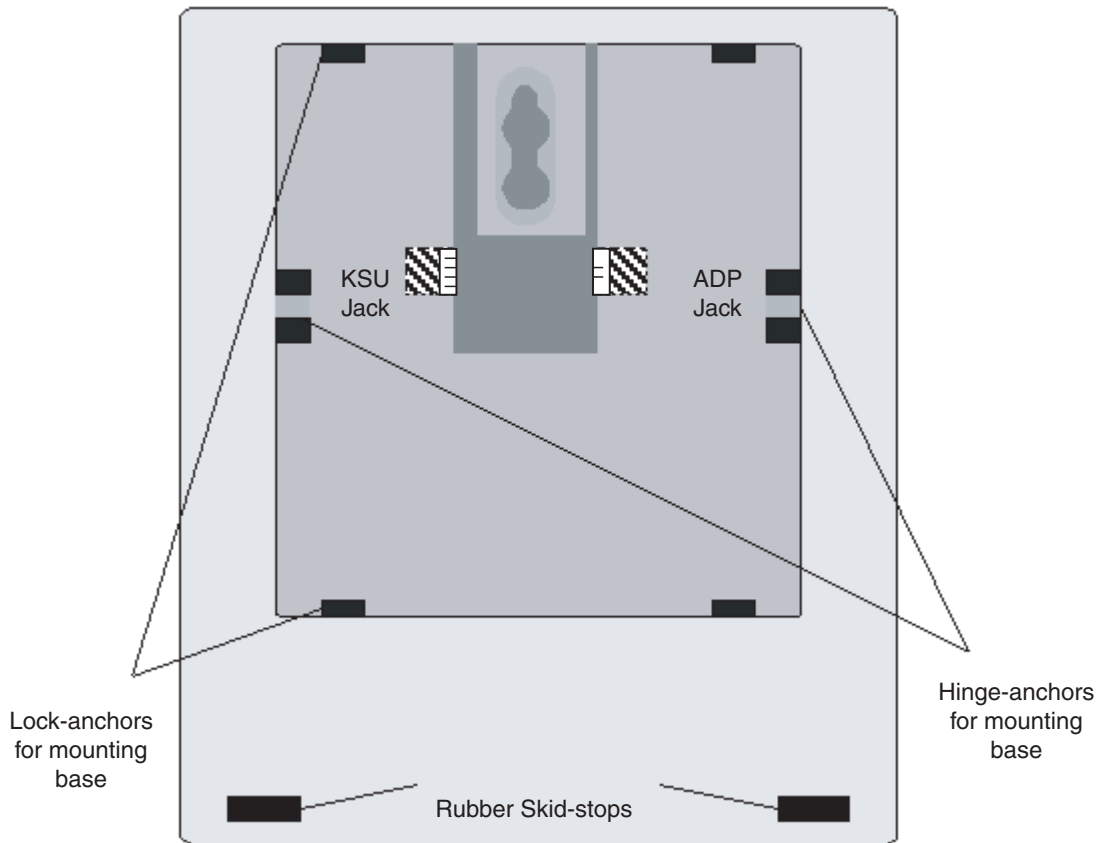
**Figure 3-8: Low Profile Mount**

1. Remove the two small screws that secure the small and large wedges together.
2. Store the larger wedge for possible use later (the large wedge is not used when mounting the key telephone in the Low Profile position).
3. Position the smaller wedge as illustrated below.

When using the Low Profile mounting position, it is important that the line cord be channeled through the slots in the telephone bottom housing, such that the smaller wedge locks them in place when in position.

### ***Key Telephone Modular Jacks***

Each key telephone has two modular jack connectors on the underside of the instrument. Both are located in a recessed connector cavity. When the telephone is held so that the rubber anti-skid feet are downward (no mounting wedge installed), the modular jacks face one another in the cavity. The modular jack at the left side of the cavity is the ADP connector and may be connected to an analog device at the desktop. *The ADP jack is only active when connected for operation at the MDF.* The modular jack at the right side of the cavity is the KSU jack and should be connected to the wall jack and station cabling for connection to the system KSU (refer to [Figure 3-9](#)).



**Figure 3-9: Key Telephone Modular Jack Locations**

- ADP Jack - When wired at the MDF, the second pair of the telephone line cord/cable will activate this jack for any analog device function. This jack and wiring are completely independent of the key telephone operation and may be used for system resources. This is not FCC listed.
- KSU Jack - Connect the station cable line cord here. Two pair are provided. The first pair is all that is required for telephone voice and data. The second pair is looped to the ADP jack for use of analog devices at the desktop.

## 8. Installing a DSS Unit

To install a DSS to the System:

1. Connect the DSS to a KSU Station port. The DSS takes the place of a Station in the system configuration.
2. Press [FEAT], #, \* , then enter the correct password and press Show from a Display Keypad to enter the Programming Mode.
3. Press Next using the soft buttons below the display screen until Station displays.
4. Press Show, and enter the DSS Station Number to be programmed.
5. Press Show.

- Then press Next until DSS Owner displays, as shown:

DSS Owner:			
bksp	next	chg	

- Press Chg, and enter the correct Station Number that will be used with the DSS.
- Press the Soft Button labeled Save to record the selection.
- Press Clear to exit the Programming Mode.

### 9. SMDR/SMDA (Output Device)

The output device or the Station Message Detail Recording (SMDR) must meet the requirements and match the RS232C pin-out described below.



*The RS232C cable connecting the SMDR device to the KSU must not exceed 50 feet (15 meters) in length.*

To connect an output device to the KSU:

- Match the baud rates on the output device and the system.
- Turn ON the AC power to both the device and the system before connecting the RS232C cable to Port-2 on the KSU. This prevents any electrical surges from being transmitted by the interface.
- Carefully connect the RS232C DB-9 male end of the interface cable from the device to the SMDR RS232C DB-9 female connector located at the bottom edge toward the left of the Option Module.

The SMDR serial port output is one way to the printer or other Call Accounting device.



*The KSU end is considered DCE and the printer, or other Call Accounting Device is DTE.*

**Table 3-14: RS-232C DB-9 Connector**

DCE	Male DB-9	Designation
<b>K S U</b>	1	DCD
	2	RX
	3	TX
	4	DTR
	5	GND
	6	DSR
	7	RTS
	8	CTS
	9	RI

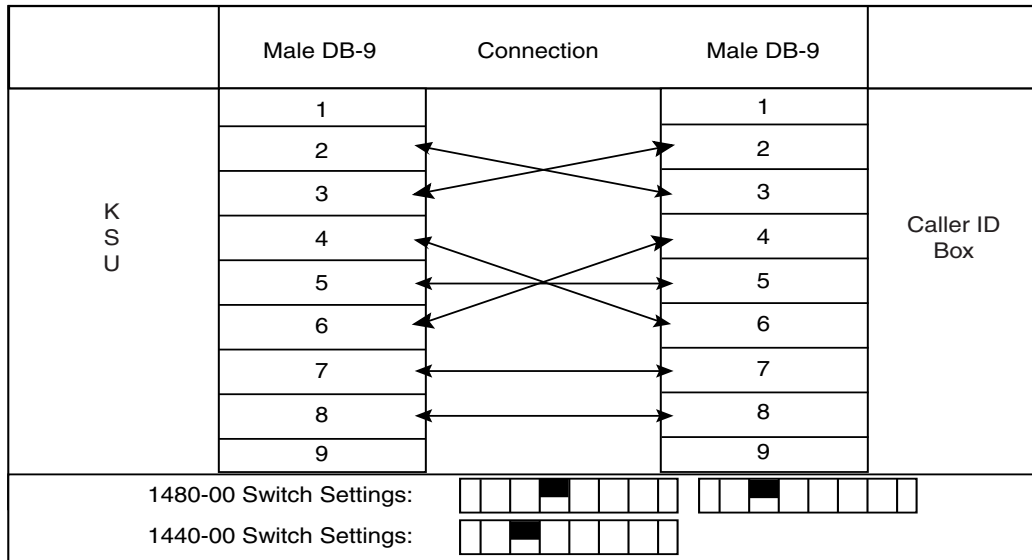
The SMDR port baud rate is programmable from 110 to 19,200 BPS. Data Format is: 8 data bits, 1 stop bit, No parity bit. *Connection of the SMDR serial port to a computer for call accounting is usually quite simple, since a straight-through cable will typically mate the devices.*

## 10. Connecting and Programming Caller ID

When Incoming Caller ID is to be used with the *DHS-E* it is necessary to use a caller ID box. The caller ID box must be connected to the *DHS-E* system ICLID/PC Programming port using the SP7081-00 Cable. The caller ID box collects data at each CO line to be used for Incoming Caller ID and passes the data to the *DHS-E* system for processing. Each CO Line Port on the *DHS-E* must be programmed for the associated caller ID box port in customer database programming. The caller ID box supports eight CO Lines. The CO Line programming parameter ICLID PORT# has been added to the *DHS-E* database programming to facilitate this need. An example of this programming is. assume a CO line is connected to the CO position 1 and to the caller ID box line position 1.

The caller ID box is connected to the *DHS-E* system via the ICLID/PC Programming port on the Main Processor Board. Consequently, the PC Programming port cannot then be used for PC-based remote programming and Incoming Caller ID data collection simultaneously. When all hardware connections are complete, adjust the caller ID box option switches for 1200 BPS operation. Program the *DHS-E* system PC Programming port for 1200 BPS operation.

When installing Caller ID, the cable that connects from the KSU to the caller ID box must be a standard null modem cable (DB9 male to DB9 male).



**Figure 3-10: Caller ID Connection**

### *Programming Caller ID*

Perform the following steps to program the caller ID box for the *DHS-E* System:

At any executive station:

1. [FEAT] + [#] + [\*] + [000000] (default password)
2. Press [SHOW]
3. Press [NEXT]
4. Press [NEXT]
5. Press [SHOW] at CO Line
6. Enter the 3-digit Line number (01-18)
7. Press [SHOW]
8. Press [NEXT] until ICLID PORT# displays
9. Press [CHG]
10. Enter the line number
11. Press [SAVE]
12. Press [NEXT] to enter another line # or press [CLEAR] to exit programming.

At any executive station:

1. [FEAT] + [#] + [\*] + [000000] (default password)
2. Press [SHOW]
3. Press [NEXT] until CALL HANDLING displays
4. Press [SHOW]
5. Press [NEXT] until WAIT ICLID displays
6. Press [CHG] until 7 displays
7. Press [CLEAR] to exit programming.

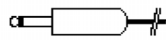


At any executive station:

1. [FEAT] + [#] + [\*] + [000000] (default password)
2. Press [SHOW]
3. Press [NEXT] until RESOURCE displays
4. Press [SHOW]
5. Press [NEXT] until RMT X RATE displays
6. Press [CHG] until 1200displays
7. Press [CLEAR] to exit programming.

## 12. External Paging Equipment (Optional)

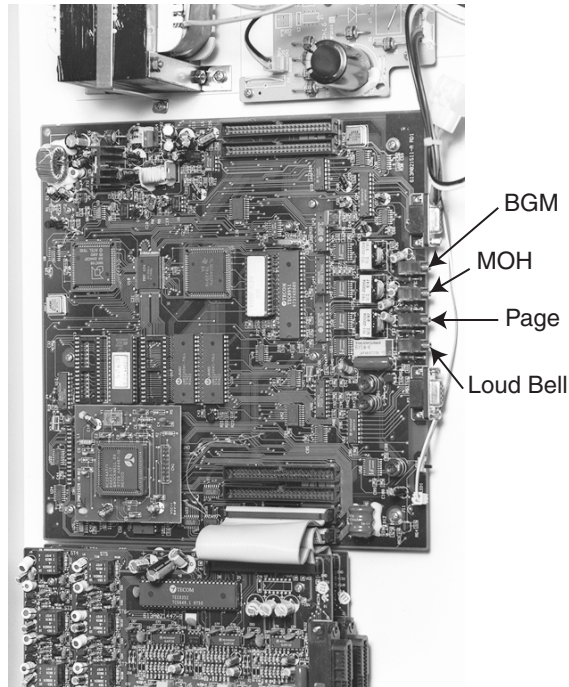
The system provides a one way paging output at the KSU from the Option Module when installed. An 1/8in. phono jack (refer to [Figure 3-11](#)) labeled J3 EXT PAGE is provided for connection to an external paging amplifier. The input specifications for the external paging equipment should accept a 600 ohm and 0 dBm interface.



**Figure 3-11: 1/8 in. Phono Jack**

### *Installation*

1. Cut a length of shielded cable to run from the amplifier to the KSU.
2. Attach a 1/8 in. male phono plug to one end of the cable.
3. Connect the other end of the cable to the high impedance input according to the manufacturer's instructions.
4. Connect the paging speaker(s) to the amplifier using speaker cable.
5. Plug in the amplifier's AC power cord. (*DO NOT use the same AC outlet being used for the KSU.*)
6. Insert the 1/8 in. phono plug into the jack labeled EXT. PAGE located on the right of the Main Processor Board (refer to [Figure 3-12](#)).
7. Set the paging amplifier's volume control to the lowest setting and turn ON the external amplifier.
8. From a station location, make a page by lifting the handset, and dialing [F] + [501], the external page feature code.
9. Adjust the amplifier to the desired level while announcing the page.
10. PAGE VOL may be adjusted to lower the output signal if the signal is too strong for the connected amplifier input (over-driving input).



**Figure 3-12: Motherboard Components**

### ***Conditions***

- ❑ If the one-way paging equipment requires DTMF signaling from the key telephone, then an unused CO Line should be dedicated for proper page interface.
- ❑ For Talk-back Paging or Multi-zone External Paging, the manufacturer recommends using a vacant CO line port for best operation.
- ❑ A 600 ohm interface is provided on every CO line; therefore, any available CO line may be used for paging.
- ❑ Since all CO line dialing is subject to toll restriction, a CO line port will not connect the station's audio until at least one DTMF digit is dialed.
- ❑ It may be necessary to assign the CO line being used for paging as a PBX type trunk with one-digit or two-digit access. Therefore, normally toll restricted extensions may still make external pages, without being restricted.

### **13. External Music Source**

The *DHS-E* KSU is shipped with two MOH/BGM Input Jacks that are located on the right edge of the Main Processor Board. The board provides two 1/8 in. phono jacks (refer to [Figure 3-11](#)) labeled J1 (MOH), and J3 (BGM) for direct connection to an external radio tuner, CD/tape player or other music source. The system music input impedance is 2.0 ohms.

To adjust the music level:

1. Set the trim POT (labeled VR1 Channel 1, VR3 Channel 2) at about mid-point.
2. Access an idle CO line, and dial into the system on another CO line.

3. When the system begins to ring, press [HOLD] to place the first call on hold.
4. Answer the ringing CO line. You should hear the MOH from the previous (now holding) CO line.
5. Adjust the music level at the source. That is, use the volume control of the radio (or other music source) to adjust the MOH level to a desirable level.
6. If the music begins to sound distorted do not increase the source level any further. Rather, adjust the source level down slightly and use the trim POT (labeled VR1) for further adjustment.
7. If a comfortable desired music level cannot be obtained using these techniques, it is likely that the music source is not properly matched to the MOH input circuitry. You may add a 60 ohm matching transformer to properly interface the music source.



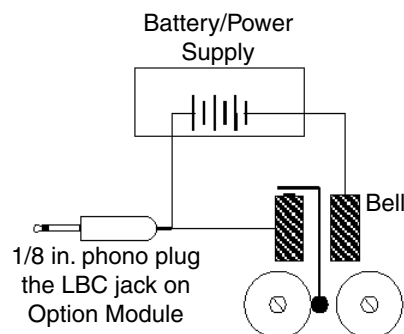
*If using a radio as the music source, place it 5 to 10 feet away from the KSU.*

## 14. Loud Bell Control

The system provides a dry contact closure to signal externally powered alerting devices for any incoming CO Line call. Transferred CO Lines that recall system wide will also activate the LBC, in the same cadence as for an incoming CO Line ring.

### *Installation*

1. Determine which CO lines should operate the LBC relay. Program each of these lines separately for LOUD BELL = Y.
2. Cut a length of cable to run from the MDF to the Main Processor Board.
3. Attach a male 1/8 in. phono plug to one end of the cable.
4. Insert the 1/8 in. phono plug into the J8 jack (along the right edge of the Main Processor Board).
5. Terminate the other end of the cable on an industry standard 66M1-50 block for interconnection to the loud bell and power source.
6. Terminate the Loud Bell and power supply leads on an industry standard 66M1-50 block.



**Figure 3-16: Loud Bell Control Installation**

7. Using cross-connect (jumper) wire connect each of the three LBC components (contact, bell and power source) in series fashion.



*The LBC output on the KSU provides only interrupted dry contact closure, during the ringing period of incoming CO Lines.*

*Relay contact on **DHS-E** are rated at 24V DC, 1.0 amp. Do not apply AC voltage to these contacts.*

## 15. Two-Port Analog Adapter

The 2-Port Analog Adapter is used to connect analog SLT and other analog devices to the system. The analog device must provide DTMF (touch tone) signals in order to make intercom calls, access outside lines and to activate system features. Some examples of analog devices are: telephone answering device (TAD), facsimile machine (FAX) or modem.



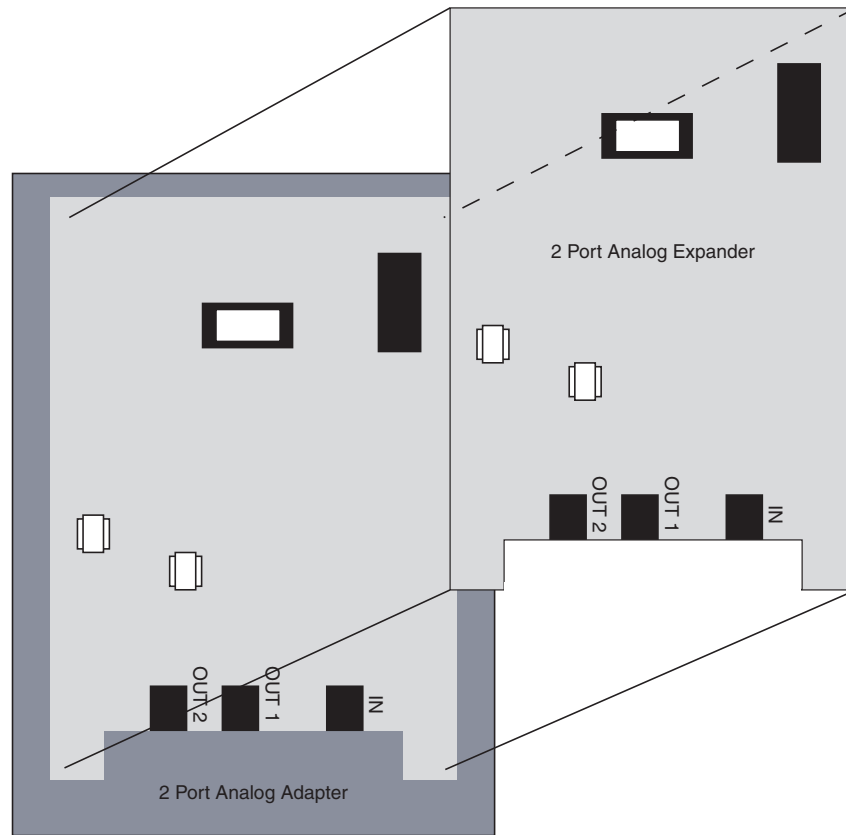
*The 2-Port Analog Adapter is not an OPX device as determined by FCC Rules. Additional equipment is required to support OPX lines. The Analog Adapter will not support Message Waiting Indication for SLT devices. The Analog Adapter will supply Stutter Dial Tone to the user.*

The 2-Port Analog Adapter is designed for installation at the MDF but may be positioned anywhere along the cable path between the KSU and the SLT (or other analog device).



*Do not exceed the maximum cable length from KSU to SLT regardless of where the 2-Port Analog Adapter is installed.*

1. The 2-Port Analog Adapter is contained in a wall mount enclosure with pre-drilled flanges for simple mounting. Properly mounted, the hinged cover will open upward and lock into position for servicing.
2. Inside the enclosure, the 2-Port Analog Adapter PCB is seen with three RJ-11 modular jacks along the bottom edge of the PCB. One oriented toward the right side of the 2-Port Analog Adapter PCB is labeled IN. The other two jacks are labeled OUT1 and OUT2.
3. Extend each of these jacks to the MDF using modular cords and terminal blocks.
4. Once on the MDF, connect the IN jack to the desired digital station port to be used for analog device interface. This connection requires that the green and red wires (white/blue pair) be used.
5. The modular jack OUT1 is now operational as an analog device port with the same station number that would have been used by a digital key telephone connected to this port.
6. The modular jack OUT2 is also now operational as an analog device port with a station number assigned from the upper range (B2 voice channel). The number assigned is from 151-181. Determining the number is done by association; if the B1 voice channel station number connected to the 2-Port Analog Adapter is 101 then the B2 voice channel station number is 159. Use this relationship in numbering to determine the B2 channel station number, or simply dial an Executive Key Telephone from the B2 station port and read the display.



**Figure 3-17: 2-Port Analog Adapter**

## 16. Two-Port Analog Expander

Installing a 2-port Analog Expander converts two digital ports to analog. One 2-Port Analog Expander may be installed on top of the 2-Port Analog Adapter.

### *Installation*

1. Position the 2-Port Analog Expander over the stand-off posts that are factory installed on the 2-Port Analog Adapter.
2. Using the screws supplied, secure the 2-Port Analog Expander to the stand-off posts (refer to Figure 3-17).



*Only one 2-Port Analog Expander can be installed on a 2-Port Analog Adapter.*

---

## 17. Headset Installation

The system supports integrated headset operation. Customers may take advantage of this standard system feature at any key telephone. Most headsets will operate without extra equipment or need for additional steps in user operation.

### *Installation*

1. A headset adapter that uses a rocker-type switch to select between Headset and Handset use is desirable. The headset adapter is plugged directly into the Handset jack.
2. The telephone handset is then plugged into the headset adapter.

Non-amplified headsets receive operating voltage from the headset circuitry built into the phone. (*Refer to the headset manufacturer's instructions for information regarding compatibility, power source, power adapter or batteries, and special options*).



*On amplified headsets with self-powered (battery) headset adapters, the key telephone MUTE operation may not mute the headset. This is because the key telephone MUTE function removes system battery from the microphone at the handset jack. External power supplied to the headset will maintain its microphone voltage and allow the user to override the key telephone MUTE operation. In this case, the headset adapter MUTE function must be used (refer to the headset manufacturer's instructions for more details).*

---

## System Check-Out

After completing installation on the **DHS-E** system, it must be initialized so that default data can be loaded. Prior to actual power up and initialization, the **DHS-E** should be checked-over to avoid startup delays or improper loading:

1. Make sure that the KSU is properly grounded.
2. Verify that all PCBs are firmly seated onto their connectors.
3. Inspect the MDF for shorted wiring and improper polarity that would affect the Digital Key Terminals or DSS consoles.
4. Make sure that the plug-ended MDF cables connected to the KSU are secure and are plugged into the correct position.

### *Power Up Sequence*

The power up sequence involves the proper application of AC power to the system. A successful power up is assured if the installation procedure has been followed:

1. Plug the AC power cord of the KSU into the dedicated 117V AC outlet.
2. Locate the database INITIALIZATION switch SW1 on the CPU Module. It is located at the bottom edge of the CPU Module oriented in the center. It is also labeled ON and OFF.

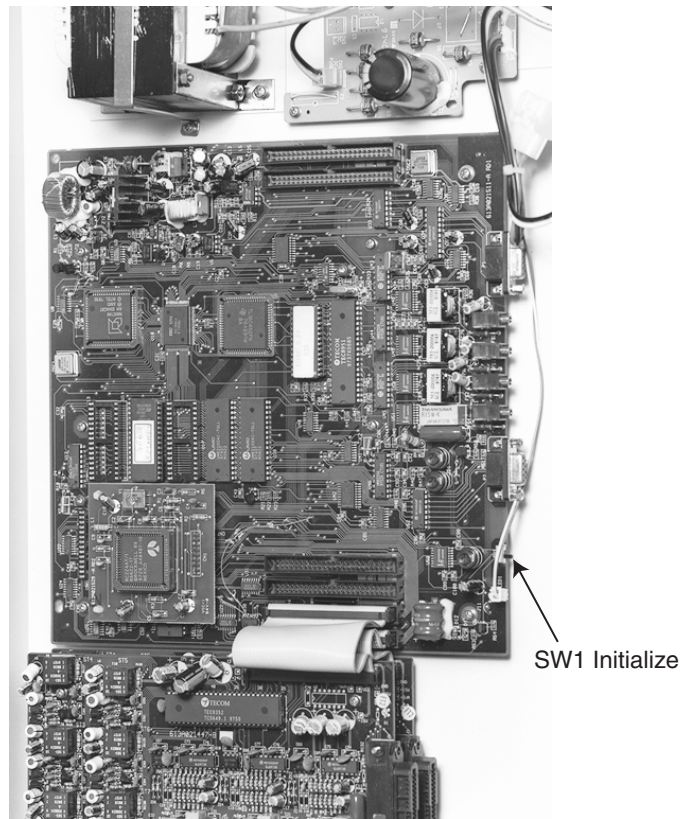
This switch controls connection of the dynamic RAM battery circuit. When switched OFF, customer volatile database programming is not protected by the memory battery in the event power is lost. In normal operation this switch will be ON at all times.

3. To load default at this time, turn KSU power OFF.
4. Operate the INITIALIZATION (SW1) to the OFF (left) position.

5. Allow the system and switch to remain in this state for approximately two minutes.
  6. Operate the INITIALIZATION (SW1) to the ON (right) position.
  7. Restore system power.
  8. Observe the CPU/Power LED. After approximately 4 - 6 sec., the LED should begin to flash.
  9. If the LED remains unlit or lit without flashing, repeat the above steps from Step 2.
- Once the power up sequence is complete, DEFAULT DATA is loaded and the system should be fully operational.



Refer to [Chapter 7, Maintenance/Troubleshooting](#), for further assistance if power up cannot be activated.



**Figure 3-18: Motherboard**



*SW1 must remain in the ON position following initialization to engage customer database RAM memory backup in the event of commercial/utility power outage. RAM backup battery charging occurs only when SW1 is in the ON position. The RAM battery requires 14 hours minimum normal (powered) system operation for adequate charging.*

---

---

# 4

## Keystation Features and Operation

The System and Key Station features of the STARPLUS<sup>®</sup> DHS/DHS-E™ Systems are listed and described in this chapter. An abbreviated feature index is provided in [Table 4-1: Feature Access Codes](#), full-feature descriptions are provided alphabetically following [Table 4-2: System Numbering Plan](#).





---

---

## General Conventions

- Press the [CLEAR] button to cancel the current operation.
- The [FEAT] button joined with dial key codes will appear throughout the text. This button is used to access most system features.
- System resources are accessed using directory numbers to dial access the resource (station numbering, Hunt Group numbering, etc.).
- Any feature or resource code may be stored for one-button access under an available Programmable Feature Button.
- Operation steps are oriented for the Executive Key Telephone since the interactive LCD prompts encompass all Executive Key Telephone functions.
- System programming can be executed at any idle Executive Key Telephone. Only one station may enter the system programming mode at any time.
- Three LCD interactive Soft Buttons are positioned beneath the display on the Executive Key Telephone. These buttons are used during feature operation for interactive display prompt menus. For orientation purposes, the Soft Buttons may be referred to as the left, center and right Soft Buttons.
- Valid programming is confirmed with a single beep tone from the speaker.
- Invalid programming is alerted with a double beep tone.

Instructions in this chapter are predominantly the same for the *DHS* and the *DHS-E*. The major differences concern the numbering plan:

- *DHS* uses a 2-digit numbering plan.
- *DHS-E* uses the 3-digit numbering plan.

Feature Access Codes are also the same; however, the exhibits in this document show only a 2-digit Intercom number or Station number (xx). When working with *DHS-E*, refer to the 3-digit numbering plan.

The following is an example of the LCD display at an idle Executive Key Telephone. The Soft Buttons are immediately below the bottom line of the display oriented at left, center and right positions.



**Figure 4-1: Soft Buttons**

---

---

## Soft Button Prompts



**bksp:** When the new programming data entry is not desired, the station user may press the backspace [bksp] button to erase the last data entered and return to the immediately preceding prompt.

**save:** When the new data is entered, the system will check the entered data automatically. If the entry is invalid, the prompt will be refreshed. The station user must press the store [save] button to confirm entry and continue with the next prompt item.

**chg:** Press the change [chg] button to modify the current prompted item. If the data/message to be changed is generated by the system itself, the current programming item will be replaced by new data (toggled between YES and NO, or cycled through several data/messages) when the user presses the [chg] button.

**next:** Repeated depressions of the [next] button will present the next selection or the next programmable item within the current category.

**back:** Repeated depressions of the [back] button operate similarly to the [next] button where the previous programming category is selected, or the previous programming item within the current category is selected.

**show:** Press the display [show] button to enter into detailed item feature programming of a specific category, or to display current programmed content of the feature.

**clear:** The [clear] button can be used at anytime in system programming. Depressing this button aborts any programming in progress and returns the Executive Key Telephone to an idle state.

Table 4-1: Feature Access Codes

Feature	DHS		DHS-E	
	LCD	Non-Display	LCD	Non-Display
Account Code				
Forced	F+[7]+[1]+aaa	F+[7]+[1]+aaa +save	F+[7]+[1]+aaa +*	F+[7]+[1]+aaa +save
Unforced	F+[7]+[1]+*	F+[7]+[1]+*	F+[7]+[1]+*	F+[7]+[1]+*
Alarm Station (Hour/ Minute)	F+[9]+[2] + soft button	F+[9]+[2] + hh mm	F+[9]+[2] + soft button	F+[9]+[2] + hh mm
Cancel	F+*+[9]+[2]	F+*+[9]+[2]	F+*+[9]+[2]	F+*+[9]+[2]
Authority Code - Traveling Class of Service	F+[5]+[5]	F+[5]+[5]	F+[5]+[5]	F+[5]+[5]
Automatic Busy Redial	F+[7]+[8]	F+[7]+[8]	F+[7]+[8]	F+[7]+[8]
Automatic Line Selection	F+[9]+[5]	F+[9]+[5]	F+[9]+[5]	F+[9]+[5]
Cancel	F*[9]+[5]	F*[9]+[5]	F*[9]+[5]	F*[9]+[5]
Attendant Administration	F#[0]+pppp	Unavailable	F#[0]+pppp	Unavailable
Background Music (1 and 2 Toggle)	F+[5]+[2]	F+[5]+[2]	F+[5]+[2]	F+[5]+[2]
Call				
Hunt Group	82-89	82-89	800-807	800-807
Make an outside line call	CO line button	CO line button	CO line button	CO line button
Call Intercom				
Cancel	F*[9]+[1]	F*[9]+[1]	F*[9]+[1]	F*[9]+[1]
Idle /Busy	soft button	F[9]+[1]	soft button	F[9]+[1]
Call Forward				
Busy	F+[2] + soft button	F+[2] +[1] + ss	F+[2] + soft button	F+[2] +[1] + ss
Busy/No Answer (x = 0-4)	F+[2] + soft button	F+[2] + [5] + ss + x	F+[2] + soft button	F+[2] + [5] + ss + x
Calls From Station	F+[2] + soft button	F+[2] +[3] + ss	F+[2] + soft button	F+[2] +[3] + sss

Table 4-1: Feature Access Codes

Feature	DHS		DHS-E	
	LCD	Non-Display	LCD	Non-Display
Cancel	F+[2]	F+[2]	F+[2]	F+[2]
Direct (all modes)	F+[2] + soft button	F+[2] + [2] + ss	F+[2] + soft button	F+[2] + [2] + sss
Display <FP3>	F+#+[6]	F+#+[6]	F+#+[6]	F+#+[6]
Idle	F+[2] + soft button	F+[2] + [0] + ss	F+[2] + soft button	F + [0] + sss
No Answer (x = 0/1/2/3/4)	F+[2] + soft button	F+[2] + [4] + ss + x	F[2] + soft button	F+[2] + [4] + sss + x
Call Park	F+[7]+[3] + ss	F+[7]+[3] + ss	F+[7]+[3] + sss	F+[7]+[3] + sss
Answer by CO Line	F+[7]+[3] + cc	F+[7]+[3] + cc	F+[7]+[3] + ccc	F+[7]+[3] + ccc
By Station	F+[7]+[3] + ss	F+[7]+[3] + ss	F+[7]+[3] + sss	F+[7]+[3] + sss
Call Pickup				
Directed	F+[5]+[3] + ss	F+[5]+[3] + ss	F+[5]+[3] + sss	F+[5]+[3] + sss
Group	F+[5]+[4]	F+[5]+[4]	F+[5]+[4]	F+[5]+[4]
Call Transfer	HOLD + ss + TRANS	HOLD + ss + TRANS	HOLD + sss + TRANS	HOLD + sss + TRANS
Call Waiting Allow	F+[6]+[8]	Unavailable	F+[6]+[8]	Unavailable
Caller ID				
Answered Call Table <FP3>	F+#+[9]	Unavailable	F+#+[9]	Unavailable
Unanswered Call Table	F+#+[9]	Unavailable	F+#+[9]	Unavailable
Camp On				
Busy Station	soft button	2	soft button	2
CO Line	F+[9]+[3]	F+[9]+[3]	F+[9]+[3]	F+[9]+[3]
□ Cancel	F+*+[9]+[3]	F+*+[9]+[3]	F+*+[9]+[3]	F+*+[9]+[3]
CO Line Flash	F+[3]	F+[3]	F+[3]	F+[3]

**Table 4-1: Feature Access Codes**

Feature	DHS		DHS-E	
	LCD	Non-Display	LCD	Non-Display
Conference				
Forced Release	F+[7]+[4]	F+[7]+[4]	F+[7]+[4]	F+[7]+[4]
Forced Release CO	F+[7]+[4] + cc	F+[7]+[4] + cc	F+[7]+[4] + ccc	F+[7]+[4] + ccc
Forced Release Station	F+[7]+[4] + ss	F+[7]+[4] + ss	F+[7]+[4] + sss	F+[7]+[4] + sss
Supervised	F+[6]+[0]	F+[6]+[0]	F+[6]+[0]	F+[6]+[0]
Talk Privately	soft button	F+[5]+[7]	soft button	F+[5]+[7]
Unsupervised	F+[7]+[7]	F+[7]+[7]	F+[7]+[7]	F+[7]+[7]
Directory Dial <FP3>	F+[7]+[9]	Unavailable	F+[7]+[9]	Unavailable
Distinctive Ringing Station	F+#+[7]	F+#+[7]	F+#+[7]	F+#+[7]
Do Not Disturb	F+[4]	F+[4]	F+[4]	F+[4]
DSS Console Button Program	F+#+[5]	F+#+[5]	F+#+[5]	F+#+[5]
Hold				
Auto	F+[9]+[4]	F+[9]+[4]	F+[9]+[4]	F+[9]+[4]
Exclusive	FEAT + HOLD	FEAT + HOLD	FEAT + HOLD	FEAT + HOLD
Retrieve	HOLD	HOLD	HOLD	HOLD
Intercom call (2 or 3 digits)	10-81	10-81	100-195	100-195
Message Waiting				
Cancel	F+*+[9]+[6]	F+*+[9]+[6]	F+*+[9]+[6]	F+*+[9]+[6]
Executive Notify	F+[9]+[0]	Unavailable	F+[9]+[0]	Unavailable
Send	F+[9]+[6]	F+[9]+[6]	F+[9]+[6]	F+[9]+[6]
Night Service	F+#+[2]	F+#+[2]	F+#+[2]	F+#+[2]
Operator (dial operator station)	[0]	[0]	[0]	[0]

Table 4-1: Feature Access Codes

Feature	DHS		DHS-E	
	LCD	Non-Display	LCD	Non-Display
Page				
All Stations	F+[5]+[0] + soft button	F+[5]+[0]+[0]	F+[5]+[0] + soft button	F+[5]+[0]+[0]
All (Station and External)	F+[5]+[0] + soft button	F+[5]+[0]+[2]	F+[5]+[0] + soft button	F+[5]+[0]+[2]
Deny	F+[9]+[9]	F+[9]+[9]	F+[9]+[9]	F+[9]+[9]
External Paging Speakers	F+[5]+[0] + soft button	F+[5]+[0]+[1]	F+[5]+[0] + soft button	F+[5]+[0]+[1]
Meet Me Answer	F+[5]+[9]	F+[5]+[9]	F+[5]+[9]	F+[5]+[9]
Station Group (g=group number)	F+[5]+[0] + soft button	F+[5]+[0]+[3] + g	F+[5]+[0] + soft button	F+[5]+[0]+[3] + g
Pause - Displays (P)	F[7]+[0]	F[7]+[0]	F[7]+[0]	F[7]+[0]
Redial - Last Number	F+[8]	F+[8]	F+[8]	F+[8]
Save Dialed Number (SDN)	F+[5]+[1]	F+[5]+[1]	F+[5]+[1]	F+[5]+[1]
Speed Dial				
Dialing	F+[1]	F+[1]	F+[1]	F+[1]
Programming	F+#+[1]	F+#+[1]	F+#+[1]	F+#+[1]
Storing (dd = 00-99)	F+#+[1]	F+#+[1] + dd + n + HOLD	F+#+[1]	F+#+[1] + dd + n + HOLD
Station				
Feature Button Programming	F+#+[3]	F+#+[3]	F+#+[3]	F+#+[3]
Feature Check	F+#+[8]	Unavailable	F+#+[8]	Unavailable
Headset Mode	F+[9]+#	F+[9]+#	F+[9]+#	F+[9]+#
Intercom Mode Select (H-T-P)	F+[9]+[8]	F+[9]+[8]	F+[9]+[8]	F+[9]+[8]
Lock	F+[9]+[7]	F+[9]+[7] + pppp + #	F+[9]+[7]	F+[9]+[7] + pppp + #
□ Password Change	F+[9]+[7]	F+[9]+[7] + pppp + nnnn	F+[9]+[7]	F+[9]+[7] + pppp + nnnn

Table 4-1: Feature Access Codes

Feature	DHS		DHS-E	
	LCD	Non-Display	LCD	Non-Display
Unlock	F+[9]+[7]	F+[9]+[7] + pppp[	F+[9]+[7]	F+[9]+[7] + pppp[
System Programming	F+#+* + pppppp	Unavailable	F+#+*+ pppppp	Unavailable
User Saved Number Redial (Memo pad saved number)	F+[5]+*	F+[5]+*	F+[5]+*	F+[5]+*
Voice Mail Monitor	F+[6]+[4]	F+[6]+[4]	F+[6]+[4]	F+[6]+[4]
Voice Over Busy  (while busy tone is heard)	Soft Button	F+[5]+[6]	Soft Button	F+[5]+[6]
Allow	F+[9]+*	F+[9]+*	F+[9]+*	F+[9]+*
Deny	F+*+[9]+*	F+*+[9]+*	F+*+[9]+*	F+*+[9]+*
Voice Recorder	F+[7]+[2]	F+[7]+[2]	F+[7]+[2]	F+[7]+[2]
<p><b>Legend</b></p> <p><i>aaa = account code (up to 24 digits)</i>  <i>cc = DHS CO numbers</i>  <i>ccc = DHS-E CO numbers</i>  <i>dd=00-99</i>  <i>F = indicates press the [FEAT] button before dialing code.</i>  <i>g = Group numbers</i>  <i>hh = hour</i>  <i>H-T-P = <b>H</b>ands Free - <b>T</b>one - <b>P</b>rivacy</i>  <i>mm = minute</i>  <i>n = number</i>  <i>nn = bin number</i>  <i>nnn = new password</i>  <i>pppp = current password</i>  <i>ss = DHS</i>  <i>sss = DHS-E</i></p>				



**Table 4-2: System Numbering Plan**

DHS	DHS-E	PARAMETERS
01-12	700-717	CO Line Range
10-81	100-195	Station Numbers
82-89	800-807	Hunt Groups / Voice Mail Group
9/0	9/0	CO Line Group Access Code (9 is the default code for CO Line access.)
0/9	0/9	Operator Code (0 is the default system Operator Attendant code.)

---

## Account Code

### *Forced Verified*

#### **Description**

When enabled, you must dial an account code in order to make an outgoing call on a CO line. The system compares the code you dialed with those in the Account Code Table. If a match is found, you can make the outgoing call.

#### **Operation**

1. Press an idle CO line button.
2. When you hear a tone, dial a valid account code.
3. Upon hearing confirmation tone and dial tone, you may now dial on the line.
4. The account code will be displayed in the SMDR call record printout.
5. If an error occurs, you may re-dial a new account code by returning to Step 1.

#### **Conditions**

- If you dial an invalid account code, you will hear error tone and will not be able to access the line. An Executive telephone will display CALL RESTRICTED.
- When you dial a valid account code, your telephone is still monitored for toll restriction according to the Class of Service (COS) assigned to your telephone.

### *Unforced/Unverified*

#### **Description**

You may dial a personal or departmental account code for future tracking of time spent on customer accounts.

#### **Operation**

1. Press an idle line button.
2. Press [FEAT].

3. Dial [7] +[1].
4. Dial account code.
5. From an Enhanced Telephone, press [\*]. From an Executive Telephone, press [save].
6. If an error occurs, you may re-dial a new account code by returning to Step 1 in this procedure.



*At an Executive Telephone, you may press [bksp] to erase each number in the account code, or press [chg] to erase the entire account code.*

---

## ADP Modular Jack

### Description

All key telephone types are equipped with an Analog Device Port (ADP) jack. The ADP jack is an open, twisted-pair conductor path that may be extended from the KSU via the second pair of the station cabling. The ADP may be used to extend a SLT system station port or CO line to the digital key telephone desktop for convenient connection of any analog interface device (answering machine, modem, facsimile machine, etc.).



*The ADP jack of any telephone may be wired for connection to the main telephone CO line for use as a power failure standard telephone interface in the event of a power outage.*

The standard 2-pair key telephone mounting cord (line cord) provided with each key telephone extends the second station cable pair to the key telephone ADP jack. Any analog device connected to the ADP jack operates independently of key telephone operation.

---

## Alarm - Station

### Description

You may activate your own private alarm on your telephone to remind you of special appointments, events, etc. When the alarm activates, you will hear tone ringing for 6 seconds. After the 6 seconds, the alarm is automatically canceled. If you desire the alarm to sound at the same time everyday, you must program it each day.

### Operation

#### *Basic and Enhanced Telephones*

To turn ON a signaling alarm:

1. Press [FEAT]
2. Dial [9] + [2]
3. Dial HHMM where HH is hour, MM is minute (24-hour clock).

To turn OFF a signaling alarm:

When the alarm time is reached, you will hear tone ringing.

1. Press [FEAT]
2. Dial [\* + [9] +[2]

### ***Executive Telephones***

To turn ON a signaling alarm:

1. Press [FEAT]
2. Dial [9] + [2]
3. Press CHG
4. Dial HHMM where HH is hour, MM is minute (24-hour clock).
5. Press [SAVE]

To turn OFF a signaling alarm:

When the alarm time is reached, you will hear tone ringing and the display will show:

ALARM	REACHED
ack	

1. Press [ack]

### ***Canceling an Alarm***

To cancel a programmed alarm:

1. Press [FEAT]
2. Dial [\*] + [9] + [2]. An Executive Telephone will display ALARM DELETE.



*The Alarm Clock feature code may be programmed on any programmable feature button.*

### **Conditions**

- The alarm clock will be canceled automatically after the alarm time is reached.
- The Executive Telephone display will be unchanged until [ack] is pressed or when the telephone is used for another call.
- SLT stations do not have this feature.

---

---

## Alarm - System

### Description

The system administrator may establish system-wide alarm notifications through system programming for various desired events. There are eight system alarm times that are maintained in the system programming. These alarms occur continuously, for the desired times, 7 days a week. For instance, if a system alarm is set once for 12:00 PM (lunch break), this alarm will occur every day at 12:00 PM and does not have to be reprogrammed for the following day. The alarm alerting is actually a one-minute period of Background Music played over every station's speaker.



*Alarm sound is reset at the station if the station goes off-hook and then back on-hook.*

### Conditions

- An external music source is required for this operation. The same music source used for Background Music is applied to the System Alarm Clock.
- Stations listening to BGM will not hear the System Alarm.
- If a station user is on a call (using the handset or speakerphone) during the alarm period, or in Do-Not-Disturb (DND) mode, the music alarm will not play at that busy station.

---

## Alternate Answering Position

### Description

A second station can be programmed as the alternate attendant. The alternate answering position serves as a back-up position to the primary attendant. CO ringing will forward to the alternate answering position after the pre-programmed Ring Alternate Position time.



*In reference to the time and date message display, the station number or station name will be displayed in the Day service mode; otherwise, the message NIGHT will be substituted, indicating Night service mode.*

### Conditions

- Any key telephone may serve as the Alternate Answering Position.

---

## Attendant

### Description

One primary attendant is provided in the system for support of necessary services like Line Recall, Forced Incoming Intercom Call Forward and Manual Night Service operation. A second, or alternate, attendant position may be established for common sharing of incoming CO calls or load sharing during peak traffic periods. The attendant position may be occupied by any key telephone type. However, maximum efficiency is gained by use of an Executive Key Telephone, since call handling is enhanced by use of system prompts and messages.

The attendant may establish a private personal password for control of the system service mode (Day/Night/Time), Time Of Day settings and System Speed Dial number programming.

One valid station number must be assigned to serve as the attendant.



*Station 10 is the default Attendant Position and is assigned CO line ringing for all CO lines at default on the DHS, and on the DHS-E Station 100 has the same functions.*

### Conditions

- The Attendant's personal 4-digit password is used by the attendant (or any other station) to perform System Administration functions (Service Mode, Time of Day, System Speed Dial programming).

---

## Attendant Administration

### Description

Attendant Administration is used to set the features Service Mode (Day/Night/Time), System Date and Time, and System Speed Dial. You may enter into Attendant Administration using the password of the assigned system Attendant telephone.

### Operation

1. Press [FEAT]
2. Dial [#] + [0]. The display shows:

```
CHK  PSWD  :__
bksp save  chg
```

3. Dial the password.
4. Press [save]. The display shows:

```
SELECT FUNCTION
svc   time  spd
```

5. You have three programming choices:

- ❑ System Service Mode
- ❑ System Date and Time
- ❑ System Speed Dial Numbers

### ***System Service Mode***

1. Press [svc]. The display shows:

```
SERVICE : DAY
back next chg
```

2. Press [chg] to select between DAY, NITE, and TIME.
3. Press [CLEAR] to exit programming or [back] to change other features.

### ***System Date and Time***

1. Press [time]. The display shows:

```
SYSTEM TIME
back next show
```

2. Press [show]. The display indicates:

```
YEAR : YR
back next chg
```

3. If the year is correct, press [next].
4. If you are programming a new year, dial the numbers for the current year.
5. Press [save]
6. Press [next] to continue programming System Date and Time.
7. Press [back] or [next] to return to the main Attendant Administration menu. The display will show:

```
SELECT FUNCTION
svc time spd
```

### ***System Speed Dial Numbers***

1. Press [spd]. The display shows:

```
SYSTEM SPEED NO
bksp show chg
```

2. Dial the System Speed Dial bin [20-99] to be changed.
3. Press [show]. The display will show what is currently stored in the speed bin:

```
EMPTY
back next chg
```

4. Press [chg]. The display will show:

```
-
back next show
```

5. Dial the number to be stored in the bin.
6. Press [save]
7. Press [back] to return to Step 4 and continue programming speed dial numbers or press [next] to return to the main menu, or press [chg] if the speed dial number was incorrectly entered.

#### ***Additional information for Speed Dial***

- To enter a CO Line Flash in a Speed Dial bin, enter [FEAT] + [3]. The display shows “\.” To enter a Pause in a Speed Dial bin, enter [FEAT] + [7]+[0]. The display changes to “P”.
- To enter a bin chaining command in a Speed Dial bin enter [FEAT]+1+nn.
- When the code [FEAT] + [7]+[0] or [FEAT] + [3] is entered into a speed dial bin they occupy one digit position.
- When the code [FEAT]+ [1]+nn is entered into a speed dial bin it occupies 3 digit positions.
- System Speed Dial bin 99 is reserved for External Call Forward, if available on your system.



Press [CLEAR] at any time to exit the programming mode. The Attendant Administrator code may be programmed on any programmable feature button.

---

## **Authority Code - Traveling Class of Service**

### **Description**

If you have extended dialing privileges, you may access your same COS at a telephone without extended dialing privileges. Long distance and restricted CO line calls can be made from telephones that are normally restricted.

### **Operation**

At the telephone without extended dialing privileges:

1. Press [FEAT]
2. Dial [5] + [5]
3. Dial your station number.

#### ***Basic and Enhanced Telephones***

1. Perform the Operation Steps 1-3.
2. Dial your password.
3. You may now dial according to your COS.

#### ***Executive Telephones***

1. Perform the Operation Steps 1-3.
2. An Executive Telephone will display:

AUTHORITY CD ___ bksp save chg
-----------------------------------

3. Press [save]

4. Dial your password.
5. Press [save]. The display shows:

AUTHORITY ACCEPT

6. You may now dial according to your COS.

### **Conditions**

- When setting Traveling COS, the temporary COS accessed will be effective for one minute before the original station COS is restored.
- Features and programming, such as line access/ring/receiving assignment are not transferred with temporary COS use.

---

## Automatic Busy Redial

### **Description**

Automatic Busy Redial (ABR) may be used to redial the last number. The system will automatically dials the number and then monitors the line for a busy signal. If a busy signal is detected, the system ends the call and attempts to dial the number again. The redial cycle will continue until the maximum number of attempts designated in programming is reached.



*ABR requires the Option Module on the DHS for operation.*

### **Operation**

1. Press [FEAT]
2. Dial [7] + [8]. An Executive Telephone will display:

CO LINE X  
 -->1/10



*The system will continue redial attempts until busy tone is no longer detected, or the maximum number of attempts is reached, or any other feature is used on the telephone.*



---



---

## Automatic Line Selection

### Description

This feature allows you to access a specific outside line or intercom (ICM) automatically when you lift the handset or press [SPKR].

A line will not be accessed automatically when your telephone is receiving an incoming call (outside or intercom) or a line is recalling at your telephone. However, you may override this incoming call priority operation by pre-selecting an outgoing line before lifting the handset.

### Operation

#### *Basic and Enhanced Telephones*

1. Press [FEAT]
2. Dial [9] + [5]
3. Dial the following codes to select the item you want the telephone to access automatically: [0] - intercom, [1] - any outgoing line, [2] + [x] - any specific line, where x is that line dial [0] (0-9 for line 10, [\*] for line 11, [#] for line 12).

#### *Executive Telephones*

1. Press [FEAT]
2. Dial [9] + [5]. The display will show:

SELECT	:	ICM
		chg

3. Press the [chg] button to select between ICM, OUTG LN (any outgoing line), CO LN (for each of the equipped lines).

## Canceling an Automatic Line Selection

#### *Basic and Enhanced Telephones*

1. Press [FEAT]
2. Dial [\*] + [9] + [5]

#### *Executive Telephones*

1. Select [empty] during Step 3 of the programming sequence.

### Conditions

- A Line Programmed for Automatic Line Selection must be programmed as available for access in system programming.
- When Automatic Line Selection is set to EMPTY, you will not hear a dial tone when you lift the handset or press [SPKR]. However, you may still dial intercom numbers.
- The selection OUTG LN (for any outgoing line) is only available when the System Type is set for PBX in system programming. When set for OUTG LN, intercom numbers may still be dialed while on hook.

---

## Background Music

### Description

When your telephone is idle and the feature is enabled and activated, you can hear background music (BGM) through the loudspeaker. You can use the feature code to select between BGM Channel 1, BGM Channel 2 (if the system is so equipped), and No BGM. The BGM automatically turns OFF when you receive or make a call. BGM turns on again when the telephone is idle.

### Operation

To enable/disable:

1. Press [FEAT]
2. Dial [5] + [2]



*If a feature button is programmed for BGM, the lamp for that button will not light to indicate BGM is activated. Hearing the BGM will be your confirmation that the feature is activated. The DHS requires the Option Module to support the second BGM Channel. The DHS-E supports 2 BGM Channels.*

---

## Busy Lamp Field (BLF)

### Description

Depending on user requirements, any Programmable Feature Button can be programmed as a Busy Lamp Field (BLF) button to monitor a station's status. When the programmed station is off-hook or in Do Not Disturb (DND), the button LED will light red. This same button is used as a one-button Direct Station Selection (DSS) call button for quick inside calling.



*Each station has a default feature button mapping, refer to Chapters 2 and 3, DHS and DHS-E Description and Installation, to determine the default map of the telephone models.*

### *Combination DSS/BLF*

### Description

Any feature button may be programmed as a combination DSS/BLF button. The DSS/BLF button allows you to call a specific station with the touch of one button. This same button will light whenever the associated station is busy (off-hook) or in the Do Not Disturb mode.

---



---

## Call Back

### Description

This feature allows you to queue a station which is busy, in Do Not Disturb (DND), or idle. When you send a Call Back to a busy station, the Call Back process will begin when the busy station hangs up. When you send a Call Back to an idle station, the Call Back process will begin once the user performs an operation at that station and then hangs up. When the Call Back process begins, you will hear bursts of tone signaling you to pick up the handset or press [SPKR]. Then the queued station begins ringing.

### Operation

Call the station that you want to queue. An Executive Telephone will display the following according to the status of the telephone you are calling:

CALLING	STA	xx
cbck	msg	

3. Station you are calling is in Tone Ringing mode.

STA	xx	BUSY
cbck	msg	next

4. Station you are calling is busy.

STA	xx	WAIT
cbck	msg	

### *Basic and Enhanced Telephones*

To send a Call Back:

1. Press [FEAT]
2. Dial [9] + [1]

To answer a Call Back:

1. When the Call Back process begins, your telephone will ring a special Call Back ring for 30 seconds. Lift the handset or press [SPKR].

### *Executive Telephones*

To send a Call Back:

1. Press [cbck]. The display will show either:

CBCK TO STA	xx
-------------	----

or

CALL	BACK	DENIED
------	------	--------

To answer a Call Back:

1. When the Call Back process begins your, telephone will ring a special Call Back ring for 30 seconds. The display will show:

```
CALL BACK TO  xx
              reply  del
```

2. Lift the handset or press [SPKR],  
OR  
Press [reply] to continue the Call Back. The display will show:

```
CALLING STA  xx
              cbck msg
```

3. If you press [del] in Step 2, the Call Back will be canceled and the display will show:

```
CALL BACK DELETE
```

To cancel a Call Back:

1. Press [FEAT]
2. Dial [\*] + [9] + [1]

### Conditions

- The station you are calling must be busy or in the Tone Ringing mode. Call Back will be denied when there is already a Call Back request at the called station.
- Only one Call Back may be initiated at a time.
- To invoke Call Back at a station in Voice Call Allow mode, you must first Force Tone Ringing. At an Executive Telephone, if the Call Back is not answered during the ring reply time, the response message will be displayed until you press [reply] or [del].
- The Call Back process begins when both your telephone and the called party's telephone are hung up.

---

## Call Forward

### *Display <FP3>*

#### Description

When any type of station call forwarding is invoked, the LCD display will normally indicate the call forwarding mode at all times. This enhancement has been made to make the call forwarding mode display optional. The Call Forward Display defaults to ON.

#### Operation

1. Press [FEAT]
2. Then dial [#]+[6]

3. The setting is a toggle; the LCD shows either "FWD MSG DSP ON" or "FDW MSG DSP OFF."
4. When OFF, the LCD will show normal Time and Date display even when Call Forwarding is invoked.

## Station

### Description

There are many Call Forward choices:

- Forward calls when your telephone is idle.
- Forward calls when your telephone is busy.
- Use the Follow Me feature to receive calls at a temporary location and activate the feature remotely from another station.
- Forward your calls when there is no answer.
- Combine busy and no answer call conditions for forwarding calls.
- Forward Intercom calls, incoming CO and transferred CO calls.



Regardless of whether the station where calls are being forwarded is a key telephone or single line telephone, the user at the forwarded station will hear special Intercom Reminder tone signifying that Call Forward is activated.

## Call Forward Modes

### Basic and Enhanced Telephones

Use the following programming code combinations to activate the desired Call Forward feature.

**Table 4-3: Call Forward Programming**

Idle Call Forward	Press [FEAT] + [2] + [0] + Station number
Busy Call Forward	Press [FEAT] + [2] + [1] + Station number
All Call Forward	Press [FEAT] + [2] + [2] + Station number
Follow Me Call Forward	Press [FEAT] + [2] + [3] + Station number + password
No Answer Call Forward	Press [FEAT] + [2] + [4] + Station number + [x] <sup>*</sup>
Combined Busy/No Answer	Press [FEAT] + [2] + [5] + Station number + [x]

\*  $x = 0, 1, 2, 3, \text{ or } 4$  where  $(0-4) = (10-50)$  seconds).

### Executive Telephones

1. Press [FEAT]
2. Dial [2]. The display shows:

CALL FORWARD
na      busy      next

---

---

### *No Answer*

1. Press [na]. The display will show:

```
NO ANS FWD TO
bksp save chg
```

2. Dial the station number where calls will be forwarded, then press [save].
3. Optional: Press CHG until desired value is displayed.

### *Busy*

1. Press [busy]. The display shows:

```
BUSY FORWARD TO --
bksp save chg
```

2. Dial the station number where calls will be forwarded, then press [save].

### *Busy/No Answer*

1. For more forward options press [next]. The display shows:

```
CALL FORWARD
bsy/na idle next
```

2. Press [bsy/na]. The display shows:

```
BSY/NA FWD TO --
bksp save chg
```

3. Dial the station number where calls will be forwarded, then press [save].

### *Idle*

1. Press [idle]. The display shows:

```
NO ANS FWD TO
bksp save chg
```

2. Dial the station number where calls will be forwarded, then press [save].

### *Direct (All Call)*

For more forward options press [next]. The display shows:

```
CALL FORWARD
direct follow
```

1. Press [direct]. The display shows:

```
DIRECT FWD TO
bksp save chg
```

2. Dial the station number where all calls will be forwarded, then press [save].

## Follow Me

1. Press [follow]. The display shows::

```
FOLLOW FROM
bksp save chg
```

2. Dial the station number from which calls are to be forwarded.
3. Press [save]. The display shows:

```
CHK PSWD
bksp save chg
```

4. Dial the password for that station.
5. Press [save]. The display will momentarily display the following message while confirmation tone is heard.

```
FOLLOW FROM xx
```

### Conditions

- If the station identified is in Do Not Disturb, Follow Me Call Forward will not be allowed and the message STATION XX DND will be displayed.

## Cancel

1. Any call forward mode can be canceled at the station that is forwarded by pressing [FEAT] + [2]. The display will indicate DELETE FORWARD. Let's assume that you are Station 10 and Station 12 is Busy Call Forwarded to Station 16.
2. Call Station 12, which is busy on another intercom call.
3. Your call is forwarded to Station 16 and you hear ringback tone. At an Executive Telephone, your display shows:

```
CALLING STA 16
cbck msg
```

4. If Station 16 is also busy, you will hear a busy tone. At an Executive Telephone the display shows:

```
STA 16 BUSY
cbck msg next
```

At Station 16 ringing is heard and the display reads:

```
STA 10 CALLING
12 CFW
```



*Call Forward can be pre-programmed on any feature button. When active, the lamp on the assigned CALL FORWARD button will light on the Basic and Enhanced Telephones. On an Executive Key Telephone, the display can be programmed to show the station or group to which it is forwarded.*

---

---

## Conditions

- ❑ When Call Forward is active at any telephone, Special (stutter) Dial Tone is heard when the user accesses intercom dial tone.
- ❑ Call Forward cannot be activated at a telephone in Do Not Disturb (DND). If DND is currently active, you will hear an error tone and the display on an Executive Telephone will show RELEASE DND.
- ❑ Only one type of Call Forward can be active at a station at any time.
- ❑ Call Forward and Do Not Disturb are mutually exclusive. Only one of these two features may be active.
- ❑ After programming Call Forward, the Call Forward message defaults to display on the LCD.
- ❑ Call Forward cannot be programmed for more than three stations in series. For instance, if Station (A) forwards to Station (B) and Station (B) forwards to Station (C), Station (C) cannot forward calls.
- ❑ Any number of stations may be programmed for Call Forward to the same destination, simultaneously.
- ❑ All Call Forward will forward all intercom calls, regardless of busy/idle state.
- ❑ Call Forward No Answer shows a timer value on the display of an Executive Key Telephone which allows the station to adjust the time a call will ring before it forwards. This option remains displayed until some other action is taken at the telephone.
- ❑ Follow Me Forward activation must be canceled at the station from where calls were forwarded.



## Caller Identification (ICLID)

### Description

Incoming Caller Identification (ICLID) is an optional service offered by the local telephone company. When properly equipped, the *DHS/DHS-E* will display this caller ID information. Executive telephones that are assigned to ring for this incoming line will display the caller data while the call is ringing.

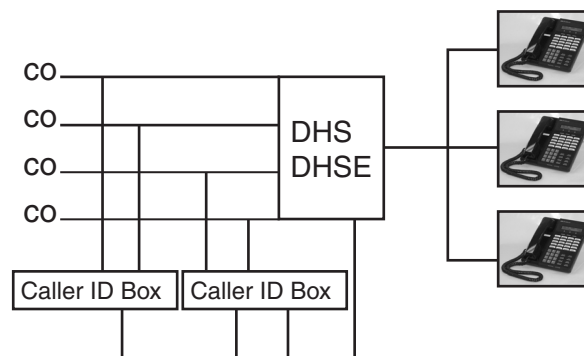
The key system operation of this feature is dependent on the feature first being activated from the Telephone Central Office (CO) so that the number/name of the calling party will be delivered over the individual tip and ring of the CO lines during the first silent interval between ringing.

The features implemented are:

1. Calling number or name display on initial ring-in of a line on the display keysets.
2. Incoming call number/name recording on the SMDR printout.
3. Retaining a list of the last 100 Unanswered Calls in a table for user access.

### Related Programming

Refer to [Chapter 6, System Programming, "ICLID Port"](#).



**Figure 4-2: System Configuration**

### Operation

In the following example, the caller name is Vodavi Communications Systems, Inc. Since the telephone company can only provide 15 characters for any caller's name, the likely resulting display would be:

LN1 Vodavi Communic
------------------------

The display for the name can vary depending upon the actual data input for the caller's name. When you answer the call, the display changes as follows:

```
CO LINE 2  00:03
Vodavi
```

Most caller names will be available in the data received from the telephone company. However, in the event that only a telephone number is provided, that data will be displayed instead of the caller name.

```
CO LINE 2  00:03
202-123-4567
```

When the name is displayed, the *DHS/DHS-E* has received both the caller name and number from the telephone company. In this case, the caller number can be displayed (if desired) by pressing the right soft button, or after answering the call. The current Caller ID mode is changed with each depression of the right soft button.



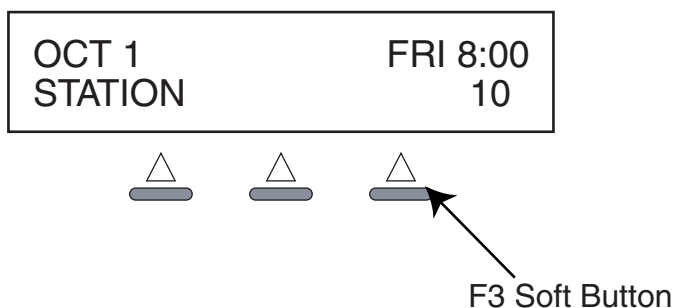
*No soft button prompt is present in the display since the area above all soft buttons is filled with caller ID data.*

*Caller ID data is also output to a SMDR device when equipped.*

### Name/Number Caller ID <FP3>

#### Description

The calling party numbers should be displayed if available on incoming caller ID calls, in addition, the user may toggle between the number and the name while the call in ringing by pressing the <F3> Soft Button.



**Figure 4-3: F3 Soft Button**

#### Operation

1. Incoming call originally appears as shown);

```
CO LINE 2  00:03
Vodavi
```

2. Press the <F3> Soft Button while the call is ringing, and the following display shows:

```
CO LINE 2  00:03
202-123-4567
```

OR

1. After call is answered, press the <F3> Soft Button to toggle between the incoming call number and name.

### ***Calling Number/Name Display***

Essentially, whenever an incoming call is received at the system, the name and number received along with the ringing signal will be stored in the line control tables and used at various points in the processing of the call. The primary function implies that the calling name/number will be displayed (if available) at any point where the LINE RINGING is displayed in the system.



*If two lines are ringing in at the same time, the display will show the oldest line information. After one of the lines is answered, the display will show the information on the unanswered line.*

The specification for this feature is that the system will display its LINE RINGING message as normally implemented and alter that display to the calling number/name if the information is made present on the line. This will allow the normal operation of the system when ICLID information is not presented or the device which intercepts it and provides the information to the KSU is missing or failed.

```
00000001111111
1234567890123456
```

```
NNNNNNNNNNNNNN
```

OR

```
XXXXXXXXXXXXXXXX
```

If the *calling name* is available, the display will be shown as above where "X" represents the internal table storage of the calling name. Note that the CO delivery of the calling name is 15-characters. If the CO delivers a name, it will be positioned left justified in the 15-character field on the display. If no name is available, the delivered number will be left justified in the display, as shown for the "N"s.

For example, Executive Key Telephones will display the number or name (if programmed) of the internal station that is calling. In addition, transfer recalling lines and forwarded calls will display the original destination station's identity:

1. At an Executive Key Telephone, place an intercom call to station xx. As ringback tone is heard, the following display is seen:

```
CALLING STA      xx
```

---

---

At the Executive Key Telephone receiving this intercom call, the following message is displayed (internal ring, the calling party's number "nn" is displayed):

STA nn CALLING

2. Or when a station User Name is programmed for the calling/called station that name will appear in the display as follows:

TOM CALLING

### *Calling Number/Name SMDR*

As with feature implementation, the intent is that the system operate normally in the absence of ICLID information or the failure of the ICLID equipment. If the information is present at the time that an SMDR record is generated for a call, it will alter the content and format of the SMDR output record.

If the calling number is available, the number will be output in the SMDR record in the same location as the dialed number is located in the outgoing calls.

If the calling name is present, an additional line will be output in the SMDR identifying the name. This record will immediately follow the normal SMDR record. The normal SMDR record will include an indicator which identifies that a following record with name identification is present.

Unanswered calls will be recorded on the SMDR as a system option to allow the identification of callers for statistical and call-back purposes. These calls will be identified with an (NA) indicator in Station Number space of the SMDR the SMDR record.

When Incoming Caller ID is provided by the servicing telephone company, the caller data may be retrieved at the CO line interface and delivered to the *DHS/DHS-E* KSU via an external ancillary device connected to the ICLID/PC Programming RS-232 port. This external (optional) device must be configured in the *DHS/DHS-E* to associate the line circuit number from the unit to the *DHS/DHS-E* line position to be used with the caller ID line. For instance, if the telephone company CO line with caller ID feature enabled is connected to the *DHS/DHS-E* on CO line position 1 and connected to the ICLID device - position 4; CO line 1 of the *DHS/DHS-E* must be programmed for ICLID Port 04. Each *DHS/DHS-E* CO line circuit that is to be used with telephone company caller ID must be programmed with an associated ICLID device port number. The default value 0 indicates that no caller ID will be received on this CO line.



ICLID use on the *DHS* requires the Option Module.

## Default

The *DHS* CO Lines (1-12), and *DHS-E* CO Lines (700-717) are set for (0)—not associated with an ICLID Port number.



*Wait ICLID time in Call Handling must also be programmed to allow the DHS/DHS-E systems to collect the caller ID data before ringing any system telephones. In addition, ICLID requires Telephone Company service and the following additional hardware:*

## Answered Call Table <FP3>

### Description

Caller Identification information for up to 200 answered calls is stored in a system-wide Answered/Unanswered Call Table. While reviewing the answered calls, you will have the option to dial a number, obtain more information for a particular call, or delete a call.

### Operation

1. Press [FEAT].
2. Dial [#] + [9]. The display will show:

```
ANS CALL TABLE
USE VOL +/- KEYS
```

3. Press either the [volume up] or [volume down] button to begin reviewing calls.

```
VODAVI          * dial
more del
```



*Answered Calls are displayed with an asterisk in the upper right of the display screen.*

*Answered/Unanswered calls are combined into one table that can accommodate up to 200 total calls.*

To dial the name/number displayed (long distance call):

1. Press [dial].

```
VODAVI
longd      local
```

2. Press [longd]. The number 1 will be dialed followed by the telephone number.

To dial the name/number displayed (local call):

1. Press [dial].

```
VODAVI
longd      local
```

2. Press [local]. The area code will not be dialed.

## Unanswered Call Table

### Description

Caller Identification information for 200 unanswered calls is stored in a system-wide Unanswered/Answered Call Table. While reviewing the unanswered calls, you will have the option to dial a number, obtain more information for a particular call, delete a call, etc.

### Operation

1. Press [FEAT].
2. Dial [#] + [9]. The display will show:

```
UNANS CALL TABLE
USE VOL +/- KEYS
```

3. Press either the [volume up] or [volume down] button to begin reviewing calls.

```
VODAVI
dial  more  del
```

To dial the name/number displayed (long distance call):

1. Press [dial].

```
VODAVI
longd      local
```

2. Press [longd]. The number 1 will be dialed followed by the telephone number.

To dial the name/number displayed (local call):

1. Press [dial].

```
VODAVI
longd      local
```

2. Press [local]. The area code will not be dialed.

### Review Call Information

1. Press [more]. Continue pressing the button to review information such as, the telephone number of the caller, the date, time of the call and name of the caller.



Press [CLEAR] at any time to exit the Caller ID Unanswered Call Table.

### Conditions

- Any Executive telephone user can review the Caller ID Unanswered Call Table, but the table can be reviewed by only one telephone at a time.
- A call answered by voice mail or auto attendant device is considered an answered call by the system and will not appear in the unanswered call table.

---

---

## Call Park

### Description

This feature allows you to have calls parked at your telephone that can be retrieved from any telephone in the system. Calls are parked and retrieved by dialing the Call Park code followed by the pre-assigned station number.

### Operation

During a call on Line 1:

1. Dial [FEAT] + [7] + [3]. At an Executive Telephone, the display will show:

CALL PARK

2. Dial the station number. For example, if station 12 is dialed, the display at an Executive Telephone will show:

CALL PARK TO 12

3. If a call is currently parked at station 12, the display will show:

PARK 12 IS BUSY



*The Call Park feature code may be programmed on any programmable feature button.*

### Conditions

- ❑ Each telephone/station has one personal station number used to park one CO line call.
- ❑ From your telephone, you can park a call at any station number, even if a key telephone is not assigned to that park number.
- ❑ Calls can be retrieved from any station, regardless of model or button assignments.
- ❑ CO Lines that have been parked are on System Hold and may be accessed by any station.

## Answer

### Operation

You may retrieve a parked call by using one of the 3 following methods:

1. Dial [FEAT] + [7] + [3] followed by the associated station number *DHS* (10-82) and *DHS-E* (100-195),  
OR
1. Dial [FEAT] + [7] + [3] followed by the CO line number (1-12 *DHS*) (700-717 *DHS-E*),  
OR
1. Press the flashing CO line button (if the CO line for the parked call appears on the telephone).

To retrieve a parked call: (Executive Telephones ONLY)

1. Press [FEAT].
2. Dial [7] + [3]. At an Executive Telephone, the display will show:

CALL PARK ANSWER

3. Dial the station number where the call is parked.

### Conditions

- Any station can retrieve a parked CO line, even if the station is normally not allowed to access or receive a call on that line.
- A user invokes Call Park Answer and has no CO line button for the line retrieved from call park may use Hold Call Answer to place the call on hold and retrieve the call from hold.

---

## Call Pickup

### Description

You may answer calls ringing at another station using the Direct Call Pick Up or Group Call Pick Up feature. Direct Call Pick Up allows you to retrieve calls ringing at any other station by dialing a code and the station number of the ringing station. Group Call Pick Up allows you to retrieve calls within the same station group. If multiple calls are ringing at a station, a priority list determines which call will be answered first.

**Table 4-4: Call Pickup Priority List**

CO LINE CALLS	ICM CALLS
1. Camped-On	1. Incoming
2. Recalling	2. Voice Call
3. Transferred	
4. Incoming	



If several calls of the same priority are ringing at the station, the calls are answered in the order they are received.

### *Direct*

1. Press [FEAT].
2. Dial [5] + [3]. At an Executive Telephone, the display will show:

DIRECT PICKUP

3. Dial the station number to pick up the call.

### *Group*

1. Press [FEAT].
2. Dial [5] + [4].



*The Call Pickup feature code may be programmed on any programmable feature button.*

---

## Call Waiting

### **Description**

You will hear a notification tone through the speaker whenever an inside caller is waiting and this feature is enabled. You may accept or reject the call using the display soft buttons. This feature affects the Voice Over Busy feature. When you prefer off-hook tone signaling, activate the Call Waiting feature to prevent inside parties from invoking the Voice Over Busy feature (unless there is another ICM call currently waiting for the same station).

### **Operation**

1. To enable Call Waiting, Press [FEAT].
2. Dial [6] + [8]. The display will show:

CALL WAIT ALLOW

To disable Call Waiting:

1. Follow Steps 1 and 2 above to also disable the feature. The display will show CALL WAIT DENY.

Using Stations 12 and 16 as an example, while Station 16 is busy:

1. Station 12 makes an intercom call to Station 16.
2. Station 12 hears a ringback tone and the display shows:

STA	16	WAIT
cbck	msg	

3. Station 16 hears one ring tone and the display shows:

STA	12	WAIT
reply		reject

4. Station 16 can either reply or reject the call:

To reply:

Press [reply]. The display at Station 16 shows:

CONNECT STA 12
----------------

The original call at Station 16 is placed on Hold automatically if Auto Hold Allow is enabled, or disconnected if not enabled. The display at Station 12 shows:

CONNECT STA 16
----------------

To reject:

1. Press [reject]. Station 12 hears busy tone and the display shows:

STA	16	BUSY
cbck	msg	next



*The Call Waiting feature code may be programmed on any programmable feature button.*

### Conditions

- If a feature button is programmed for Call Wait Allow, the programming status of this feature will be indicated on its associated red lamp. A steady red light indicates that the feature has been enabled.
- Call Waiting does not operate when the called station is dialing or no longer connected to a call but has not yet hung up.

---

## Camp On

### *Busy CO Line*

#### **Description**

This feature allows you to Camp On a busy CO line and reserve that CO line for use when it becomes available. This feature eliminates the need for you to continually observe the line status for availability. You may only have one Camp On active at any time.

## Operation

### *Basic and Enhanced Telephones*

1. Press the busy line button. You will hear busy tone.
2. Press [FEAT].
3. Dial [9] + [3]. You will hear error tone if the line is already camped-on. You will hear ringing when the line becomes available and the lamp for the line will flash.
4. Press the line button or lift the handset.

### *Executive Telephones*

1. Press the busy line button. The display shows:

CO LINE	x	BUSY
camp		

2. Press [camp]. The display shows:

CAMP ON CO LN	x
---------------	---

3. If the line is already camped-on, the display shows:

CAMP ON FAILURE
-----------------

4. You will hear ringing when the line becomes available and the display will show:

LN	x
----	---

5. Press the line button or lift the handset. The display shows:

CO LINE	x
---------	---

To cancel:

1. Press [FEAT].
2. Dial [[] + [9] + [3]. At an Executive Telephone, the display will show:

CO LINE CAMP DEL
------------------

## Conditions

- CO lines can be camped-on by one station at a time.
- Stations can Camp On one busy CO line at a time.
- The Camp On Alerting Ring Time is 30 seconds. If the camp on goes unanswered during the 30 second ring time, the camp on is canceled.
- CO lines that have been camped will recall the Camp On initiator. The camped CO line will become available to other stations if the camped station fails to answer within 30 seconds.

- Camp On at a station using a Pooled Group button for access of CO lines, is the same as that of a station with CO line button appearances, except that, to answer a Camp On, the user must lift the handset to be connected to the camped CO line.
- During the time that the Camp On is recalling the initiator, a new incoming call will take precedence over Camp On and will be answered when the station goes off-hook.

## *Busy Station*

### **Description**

Camp On is used to privately alert a busy station for immediate consultation. Camp On alert tone is heard at the busy station every 30 seconds as a reminder. The party currently speaking with the busy station does not hear the tone.

### **Operation**

#### *Basic and Enhanced Telephones*

1. While listening to the busy tone after calling a station, dial [2].

#### *Executive Telephones*

1. While listening to the busy tone after calling a station, the display will show:

STA	xx	BUSY
cbck	msg	next

2. Press [next]. The display will show:

STA	xx	BUSY
camp	voice	

- Press [camp]. The display will show:

CAMP ON TO xx
---------------

You will hear a confirmation tone, followed by, Music-On-Hold (if equipped) until your Camp On is answered. When the camped-on station places the current call on hold, or hangs up, the Camp On will ring at the station.

3. If the camped-on station has already received a Camp On from a different station, your Camp On will be denied; you will hear an error tone and the display will show:

CAMP ON FAILURE
-----------------

### **Conditions**

- Each station can have only one Camp On at a time.

---

---

## Class of Service

### *Day/Night*

#### **Description**

The system provides eight COSs for assignment of outside line dialing privileges. Each system station may be assigned one Day COS and one Night COS. The station COS is primarily used for restriction and control of long distance dialing. Toll restriction tables allow customized dialing privileges to be assigned to any or all COSs. This COS is directly referenced in the Restriction, CO Line Call Discrimination, Digit Interval Table programming. System Speed Dial is specially linked with COS such that all speed dial bins override toll restriction programming in the toll restriction tables. It should be noted that stations assigned COS (0-5) have access to all System Speed Dial Bins (20-99). Stations assigned COS 6 can only access System Speed Dial Bins (20-39). Stations assigned COS 7 have no access to System Speed Dial. COS affects the station override of DND where a station with a lower level COS can be overridden by a station with a higher level of COS. For instance, an extension with COS 0 may override a station with COS 1. COS also affects the operation of Privacy Release. Stations with equal or greater levels of COS may join a busy CO line conversation when Privacy Release is enabled. For example, a station assigned COS 1 may join a CO line conversation with a station assigned COS 1 or lower.



*The highest level COS is 0 (the most dialing privilege) and the lowest COS level (least dialing privilege) is 7.*

#### **Operation**

Station COS is assigned in system programming and is not a feature that requires specific operating instructions. A station's COS will determine what digit sequences may be dialed on CO lines.

---

## CO Line Group Assignment

#### **Description**

The system provides four CO Line Groups for assignment of specific CO lines. The CO Line Group assignment is used for CO Line Pool access. The CO Line Groups are designated by 2-digit notation when programmed on station programmable feature buttons. CO Line Group 1 is programmed by dialing [01], CO Line Group 2 is programmed by dialing [02], etc. An All CO Line Group code is available for programmable feature button assignment by dialing [00] for that feature button. At default, all CO Lines are assigned to Group 1.

---



---

## CO Line Pool

### Description

The CO Line Pool assignment preserves feature buttons and reduces the number of individual CO line appearances required at a key telephone. The CO Line Pool allows random CO line outgoing access and becomes a virtual Answer button, with illumination, for receiving incoming or transferred calls. A CO Line Pool button can be assigned to access CO Line Group 1, CO Line Group 2, CO Line Group 3, CO Line Group 4, or All CO Line Groups. Alternatively, CO Line Groups (1-4) can be assigned to separate distinct feature buttons. Dialing code [9] is not allowed.

### Operation

1. Press the feature button programmed for CO line group operation. An idle CO line in the associated group will be accessed. (The last CO line in the group is always accessed first. When the feature button is programmed for All Group operation, the last CO line in the highest group number is accessed first.) The group button LED is green and blinking.

CO LINE x

2. If CO Lines are camped-on by other key telephones or busy, busy tone will be heard and the display will show the following.

CO LINE UNAVAIL



*Any programmable feature button may be programmed as a CO line group button. Even if a key telephone has no CO Line or CO line group buttons assigned, an outside CO line call can be transferred to the station. There will be no visible LED indication at the called station.*

### Conditions

- ❑ When all CO lines in a certain group are busy, any attempt to access an idle CO line by pressing the CO line group button will receive busy tone, and the system will assign any busy CO line for the station to establish Camp On Busy CO Line.
- ❑ If a station has multiple CO line group buttons programmed without any individual CO Line buttons, Incoming calls will be indicated on only one idle CO Line Group button, to which the CO Line is assigned.
- ❑ If a station has a group button and individual CO Line button, an incoming CO Line call will be indicated only on an individual CO Line button.
- ❑ When pressing an individual CO Line button, the LED indication on an assigned group button will not be affected.

- Pressing an idle CO line group button to originate/answer a CO line call will affect the LED indication of an individual CO line button (i.e., CO line status will be indicated on both CO line group button and an individual CO line button). The LED indication on a CO line group button and an individual CO line button will be treated in the same way.
- Certain states and telephone companies prohibit PBX-type equipment operation behind Centrex lines.

---

## CO Line Signaling

### Description

Incoming CO line calls are indicated by a flashing red LED and distinctive tone from the key telephone speaker. Depending on the programmed database, a station may see incoming call flash indication without an audible indication, and still answer the call. If the station is not assigned CO Line Receive in the database for a specific CO line, incoming calls on that CO line will not flash at the station but instead will display a CO line busy indication.

### Operation

1. incoming calls signaling on CO line 1 and CO Line 2 display as follows:

LN1 LN2.
----------

### Conditions

- Only those stations with corresponding CO line ring and receive assignments will display the current incoming CO line call status. CO line receive must be enabled for the station.
- When the remote party abandons the incoming call before it is answered, the incoming call signaling of the affected CO line will be removed after (1.6 to 6.4 sec.), depending on the connected CO.

At default, only the attendant is allowed to receive external CO line ring and can answer all incoming CO line calls.

---

## CO Line Type Assignment

### Description

Each CO line can be assigned as PBX, CO or OPEN. The Open assignment is reserved for CO lines equipped on the system, but not connected to telephone company network facilities. The Open type indication alerts the system that this CO line should not be used to place outgoing calls when system features are invoked which initiate automatic CO line selection. The PBX CO line type indication invokes other system automatic

operations for handling PBX Station-to-Station calls and PBX trunk calls, separately. When a programmed PBX trunk access code is dialed, the system is alerted that the user is accessing a telephone company facility to make a network call. When this occurs, the system monitors digits dialed after the PBX access code and compares them against the Allowed Digit Interval Table in the COS for that station. The programmed PBX Trunk access code also notifies the system that a pause should be inserted when redialing telephone numbers dialed on that CO line beginning with the PBX access code. This operation applies for Speed Dial, Last Number Redial, Save Dialed Number, User Save Number Redial, and Automatic Busy Redial.

CO line type assignment indicates that the CO line is a direct telephone company facility access CO line. Toll Restriction monitoring is commenced from the first digit dialed and no other special call handling characteristics are implemented on CO lines of this type. At default, CO line type is set to CO for all CO lines.

---

## Conference

### *Supervised*

#### Description

The system can accommodate 8 four-member (party) conferences simultaneously. Conference combinations may consist of two CO lines maximum and any number of stations to a maximum of four members. One inside key telephone station is the controller of the conference and constitutes one conference member.



*Before a conference can be established with a maximum of four members, a three-member conference must first be established.*

To establish a conference while on a line:

1. Press [HOLD]. The current call is placed on hold and intercom dial tone is heard.
2. Press another line button (or dial a *DHS* system station and go to step 4).
3. Dial the second party. (Repeat Steps 1-3 to add a third party).
4. To join the parties in a conference, Press [FEAT].
5. Dial [6] + [0]. The display shows:

CONFERENCE

6. You will hear a confirmation tone and momentarily the display will change to:

LNx ss  
private                      forced

To add a fourth party:

1. Press [HOLD].



2. Dial the fourth party.
3. Press [FEAT].
4. Dial [6] + [0].

The conference initiator may force-release a conference member or talk privately with a conference member.

### ***Basic and Enhanced Telephones***

To force-release:

1. Press [FEAT].
2. Dial [7] + [4].
3. Dial the station number or press the line button to release.

To talk privately:

1. Press [FEAT].
2. Dial [5] + [7].
3. Dial the station number or press the line button to talk privately.

### ***Executive Telephones***

To force release or talk privately:

1. Press [private] or [forced].
2. Dial the station number or press the line button to release or talk privately.



*Any conference feature code may be programmed on any available programmable feature button.*

## **Conditions**

- The station who establishes a conference is called the controlling party, and only the controlling party is allowed to invite or forcibly release any attending internal or external party, or to setup a private talk with any one attending party.
- When adding new parties to a conference and while speaking privately to a particular conference member, other members of the conference will be connected to Music-On-Hold.
- When the controlling party exits a conference, the most recently invited internal party will be designated as the new controlling party.
- Conference can only be established at a key telephone.
- Each of the calls involved in a holding conference will be placed on Exclusive Hold.
- When a conference is established, each party will hear a conference confirmation tone.

## ***Unsupervised***

### **Description**

This feature allows you (as the conference controller) to exit a conference, yet enable two outside lines also engaged in the conference to continue their conversation. This conference is called Unsupervised, since no internal user is involved as a member of the

conference. To establish an Unsupervised conference, you must first build a Supervised conference.



*Unsupervised Conference requires the Option Module for operation on the DHS system.*

## Operation

- Two CO lines are conferenced (F+[6]+[0]) at your station:

LNx	LNx	
private		forced

- Press [FEAT].
- Dial [7] + [7]. At an Executive Telephone, the following display will be seen momentarily.

UNSUPERVISED	CNF
--------------	-----

- If no further action is taken, the display returns to idle status. At this time, the two lines are conferenced.

To rejoin the unsupervised conference:

- At your station, press [FEAT].
- Dial [6] + [0].

## Conditions

- New conference parties may only be added when the conference controller is a member of the conference.
- If an outside line hangs up, the line will be released.

---

## Dial Pulse to DTMF Conversion

### Description

When a CO line is set to pulse (rotary) dialing, the digits following [\*] will be sent in DTMF tone mode. Pulse-to-tone change-over can be programmed into any Speed Dial bin, if desired (Refer to [Chapter 6, System Programming, Table 6-1: Database Programming Table](#)).

---

---

## Direct Inward System Access (DISA)

### Description

This feature allows you to remotely access system features such as System Speed Dial, Line Access for long distance calling, CO Line-to-CO Line Conferencing, and Intercom dialing. Any number of DISA lines may be assigned incoming DISA access based on the system service mode (Day, Night or Always).

Talk time can be manually extended by the outside DISA party.

There are 24 passwords available, each 4 digits in length. Since the passwords are relatively short, caution should be exercised when permitting unauthorized use of the DISA facilities.



*DISA requires the Option Module for operation on the DHS.*

### Operation

CO line 1 is programmed for DISA operation. When a call is made to CO line 1, that call is automatically answered and a DISA dial tone is heard.

When a DISA dial tone is heard:

1. Dial [#].
2. Dial one of the DISA passwords (24 possible).
3. Dial [#]. Once your password is verified, a second dial tone is presented.

### *Attendant Access*

When the first dialed digit is the Operator Code, the call will be directly transferred to the attendant.

Using System Speed dialing:

1. Dial [1].
2. Dial the System Speed Dial Bin (20-99).
3. The system will select an idle CO line and dial the stored speed dial number.

To access a CO Line:

1. Dial [2].
2. Dial a line number (*DHS 1-12, DHS-E 700-717*).
  - [1-9] = Line 1-9
  - [0] = Line 10
  - [\*] = Line 11
  - [#] = Line 12
3. If the CO line selected is idle, DISA will connect the line for dialing.

To place an intercom call:

1. Dial [3].
2. Dial the Station Number



*If you do not dial the station number within the 10-second time-out period, your call will be transferred to the attendant station.*

To disconnect a CO line DISA call:

1. Dial [0] + [#].



*A programmed Talk Time will disconnect all DISA-CO Line calls when it expires.*

To extend the DISA talk (conversation) time:

1. When the DISA call is in progress, Dial [0] + [\*] to extend the preset conversation time.



*The default COS of day and night for DISA CO lines is 0. Each DISA CO line has its own COS for dialing privileges.*

## Conditions

- Two DISA CO lines may be used simultaneously. If more than two DISA CO lines are signaling for answer, the subsequent calls will receive an internal busy tone.
- DISA CO line (COS) assignment coincides with Toll Restriction COS Tables.
- The activation time for a DISA CO line is programmable for Never, Day, Night or Always.
- If you dial a station number which is non-existent, your call will be directly transferred to the attendant.
- The CO Line-to-CO line conference time is programmable for 1, 2, 3, 5, 10, and 15 minutes (default is one minute). The CO line-to-CO line conference time may be set to automatically drop the connected outside parties upon expiration of a pre-programmed time.

## Directory Dial <FP3>

### Description

Enables station users to obtain a directory of station users and have the system dial the extension shown in the display. The DHS system provides locations for up to 200 names each consisting of a maximum of 12 characters. Directory Dial also enables users to program a name along with a speed dial bin for use in later locating a speed dial number. The system displays the name associated with a speed dial number on the LCD display so that when the desired name is shown, the user may then have the system dial the number.

### Operation

1. Press [FEAT]
2. Dial [7]+[9]

bksp	show	chg
------	------	-----

3. Enter name using the key pad (refer to Table) or use volume keys to scroll through names.
4. Press the soft key <show> to locate the most likely entry and volume keys to scroll the names, until you locate the one you were trying to find:

CHARLES_	bksp	show	chg
----------	------	------	-----

Then press any soft key to dial, once the desired name is displayed.

CHARLES_	ICM
15	

To execute a speed dial number using directory dial:

1. If the destination is a speed dial number, the number stored in the speed dial bin will be displayed

CHARLES_	SPD
1234567	

2. Press a soft key

CALLING STA 15
cbck msg

3. Once an idle line is accessed, the number displayed is dialed.

---

---

## Distinctive Ringing - Station <FP3>

### Description

You may choose from four distinctive ringing tones to signal incoming calls. This allows you to easily distinguish your calls from calls ringing at other stations near you.

### Operation

#### *Basic and Enhanced Telephones*

1. Press [FEAT]
2. Dial [#] + [7]
3. Dial a ringing tone code (1-5).



*The Distinctive Ring code #5 results in no ringing; it turns the ringer off.*

#### *Executive Telephones*

1. Press [FEAT]
2. Dial [#] + [7]. You will hear the current ringing tone. The display will show:

```
RING TYPE : 1
             chg
```

3. Press [chg]. You will hear the new ringing tone. The display will show:

```
RING TYPE : 2
             chg
```



*The Distinctive Ringing feature code may be programmed on a programmable feature button.*

---

---

## Do Not Disturb (DND)

### Description

DND allows you to temporarily block and discontinue ringing from incoming CO calls and intercom calls. You can activate DND while your telephone is idle or busy. Some stations with a higher COS may override a station's DND condition.

When you have activated DND, you will hear a special intercom (stutter) reminder tone when you lift the handset or use the speakerphone. If you have assigned a button on your telephone specifically for DND, that button will light whenever you activate the feature.

### Operation

1. Press [FEAT]
2. Dial [4]. You will hear a confirmation tone on an Executive Telephone displays:

DO NOT DISTURB

3. Repeat Steps 1 and 2 above to cancel DND. You will hear a confirmation tone on an Executive Telephone. The display the will show the following prior to returning to the idle display message:

DND DELETE



*The DND feature code may be programmed on a programmable feature button.*

### Conditions

- Do Not Disturb cannot be enabled if you have activated Call Forward.
- At any time while your telephone is idle, you may immediately divert an incoming tone ringing intercom call to the attendant by using the DND feature.
- Your DSS/BLF button on other key telephones will flash when you activate DND.
- May cause analog VM integration situations, such as recalling at main attendant instead of the intended voice mailbox.

---

---

## DND Override

### Description

If you have an Executive Telephone you may override a station in DND if you have a higher COS. When you override a station in DND that station will hear tone ringing.

### Operation

Let's assume Station 16 is in DND:

1. Call Station 16. You will hear a DND tone and your display shows:

```
STA   16   DND
      cbck  override
```

The Override option is displayed only if your COS is higher than the Station 16 COS.

2. Press [override]. If Station 16 is idle, your display shows:

```
CALLING STA xx
      cbck  msg
```

OR

3. If Station 16 is busy, your display shows:

```
STA      xx   BUSY
      cbck msg  next
```

OR

4. If Station 16 is busy with Call Wait enabled, your display shows:

```
STA      xx   WAIT
      cbck msg
```



---

---

## Drop Time-Out

### Description

This feature is enabled in the system programming on a per station basis. When enabled, any outgoing CO line will be automatically timed and then dropped, after the system Warning Tone Timed is exceeded. This feature is normally used to control outgoing call traffic.

### Operation

If the Warning Time is set at 3 minutes and station x is set to Drop Time-out = Y, the active CO line call will continue as usual until 3 minutes of conversation has elapsed.

CO LINE 2 03:00

1. The display will then change to:

CO LINE DROPPED

2. The display will then return back to idle.

### Conditions

- The time limit of Drop Time-Out is closely associated with Warning Tone Time programming. If the station Warning Tone Time is set for 5 minutes and the Drop Time-Out feature is enabled, after 5 minutes have expired, the outgoing CO line call in progress will be released automatically; a double beep also is heard.
- If Drop Time-Out is enabled, only outgoing CO line calls at that station are affected. No Drop Time-Out is enabled.

---

## DSS Console <FP3>

### Description

One DSS console may be assigned to a station. Each DSS Console uses one digital station port. Up to 24 DSS consoles may be installed on a system. The DSS console buttons are programmed by the station user using the FEAT + # + 5 command, then pressing the button on the DSS to be programmed. All system feature codes may be stored on the Programmable Feature Buttons for one-button operation. Certain programmed feature buttons will light when activated (DND, Call Forward, DSS/BLF, etc.), while others such as Call Pick-Up, Background Music, Last Number Redial, do not.

Features are separated into three distinct categories for programming on a button: CO line, station, or feature.

## Operation

### *Enhanced Telephones*

To program DSS console buttons:

1. Press [FEAT]
2. Dial [#] + [5]
3. Press a Programmable Feature Button.

To program a system feature button:

1. Dial [2]
2. Press [FEAT]
3. Dial the system feature code.
4. Press [HOLD]

To program a BLF/DSS button:

1. Dial [1]
2. Dial the station number.
3. Press [HOLD]

To program a CO line button:

1. Dial [0]
2. Dial the CO line number or code for a CO line group. [Table 4-5: CO Line Flex Button Codes](#).
3. Press [HOLD]

**Table 4-5: CO Line Flex Button Codes**

00 = Any Group	4 = CO Line 4
01 = CO Line Grp 1	5 = CO Line 5
02 = CO Line Grp 2	6 = CO Line 6
03 = CO Line Grp 3	7 = CO Line 7
04 = CO Line Grp 4	8 = CO Line 8
05 = ICM (Intercom)	9 = CO Line 9
1 = CO Line 1	10 = CO Line 10
2 = CO Line 2	11 = CO Line 11
3 = CO Line 3	12 = CO Line 12

To erase the contents of a programmable feature button:

1. Press [FEAT]
2. Dial [#] + [5]
3. Press the Programmable Feature Button.
4. Dial [0]
5. Press [HOLD]

### *Executive Telephones*

To program DSS console buttons:

1. Press [FEAT]
2. Dial [#] + [5]. The display shows:

```

PRESS DSS KEY
  
```

3. Press a programmable feature button. The current contents of that button is displayed.

```

F96
      show chg
  
```

4. Press [show]. The name of the current feature stored is displayed.

```

MESSAGE WAITING
  
```

5. Press [chg]. The display shows the following (DHS):

```

SELECT FUNCTION
CO   LN   STA   FEAT
  
```

Or on the DHS-E:

```

SELECT FUNCTION
      DIR  feat
  
```

Two feature button categories are available for feature button programming on the DHS-E; DIR (directory) and feat (feature).

To program a CO line button:

1. Press [DIR]:

```

DIR NO.:__
      bksp save chg
  
```

2. Dial the CO line number (700-717), refer to [Table 4-6: CO Line Feature Button Codes](#).

```

CO LINE ___
      bksp      save   chg
  
```

3. Press [save]

To program a BLF/DSS button:

1. On the DHS, press [STA], then chg.
2. Dial the Station number.
3. Press [save]

OR

1. On the DHS-E, Press [DIR]. The display shows:

```
DIR NO.:102
bksp save chg
```

2. Dial the station number.
3. Press [save]

To program a system feature:

1. On the DHS, press soft key [feat], then [chg].
2. Dial the Feature code number.
3. Press [save]

OR

1. On the DHS-E, press soft key [feat]. The display shows:

```
FTR CODE: __
bksp save chg
```

2. Press [FEAT]. F will appear on the display:

```
FTR CODE: F50
bksp save chg
```

3. Dial the feature code.
4. Press [save]

To erase the contents of a programmable feature button:

1. Press [save] instead of dialing a code.



*If you dial an invalid code, you will hear error tone and an Executive Key Telephone display will show CODE UNAVAILABLE.*

## Conditions

- ❑ In some cases, a user may program a feature button for a specific CO line although access is restricted to that line via system programming. In this situation, the telephone is still governed by system programming and would still be unable to access the CO line if restricted.
- ❑ Valid feature codes must be in the form of either Fn or Fnn where F is the feature button and n is either a 1-digit or 2-digit code, including asterisk [\*] and pound [#] dialed from the key pad.

- Any feature button programmed with a code previously assigned to a different feature button will cause the previously programmed feature button to become unassigned.
- Programmable feature buttons cannot be programmed for CO line group operation when the system is configured for KEY system operation.

---

## Emergency Numbers

### Description

The *DHS/DHS-E* System Speed Dial feature provides use of emergency number calling at stations that may be otherwise restricted from dialing. All 80 System Speed Dial bins functionally override a station COS. This capability allows easy adaptation in applications where restriction is required. The System Speed Dial Emergency Number function is further partitioned by station COS. Stations assigned COS 0-5 have access to all 80 System Speed Dial bins, Stations assigned COS 6 have access to System Speed Dial bin (20-39) only, and COS 7 Stations have no access to System Speed Dial. In all cases, stations that have access to System Speed Dial can override restrictions that have been established for manually dialed calls for emergency numbers. Since the System Speed and Emergency Numbers are controlled by the system administrator, via system programming, certain stations may be allowed to use these pre-programmed numbers for business purposes only, while restricting other unauthorized or personal calls.



*At default, all stations have COS 0 and may access the Emergency System Speed Bins.*



*Certain COS assignments may cause 911 calls to be blocked.*

---

## End-to-End Signaling

### Description

This feature allows digital key telephone stations to generate in-band DTMF tones on ICM calls to an on-site voice mail system. DTMF digits will only be sent to the SLT port when connected to a 2-Port Analog Adapter/Expansion that is programmed as a VM PORT.

---

---

## External Call Forward (ECF)

### Description

Assuming that one line has been programmed as the ECF Incoming CO line and another line has been programmed as the ECF Outgoing CO line and System Speed Dial bin 99 contains a telephone number where calls will be forwarded:

### Operation

When the ECF Incoming CO line is ringing, the system:

- Answers the incoming call.
- Seizes the outgoing CO line.
- Dials the telephone number stored in System Speed bin 99.
- Makes a CO line-to-CO line conference. A system DTMF receiver is connected to detect any service request from the external party.

### Conditions

- External Call Forward requires the *DHS* Option Module for operation.
- The activation time is programmable (Never, Day, Night, or Always).
- The CO line-to-CO line conference time is programmable (1, 2, 3, 5, 10, and 15 minutes).
- The default conversation time is one minute.
- The system maintains the forwarded connection until the conversation time expires or the forwarded party releases the connection by dialing [0] + [#], or [0] + [\*] to extend the call.

---

## Flash

### Description

When Flash is accessed, the system will generate a timed open loop flash condition on any CO line. Flash should be programmed on a feature button when the system is used behind Centrex or PBX. If Call Waiting service is provided, you can use the Flash feature to answer a second incoming call while connected to another outside party.

### Operation

While on a CO line call:

1. Press [FEAT]
2. Dial [3]. An Executive Telephone will display: (CO line loop is opened for the programmed Flash Time).



- At an Executive Telephone, the display returns to the CO line connected display following the flash time-out or 10 seconds later.

CO LINE 1	xx:xx
-----------	-------

### Conditions

- The Flash code may be stored in any speed dial bin.
- The Flash code may be stored in the Last Number Redial buffer. When you activate redial, an Executive Telephone display will show a / (forward slash) to indicate the Flash code.
- The Flash time is programmable from 100ms to 1500ms in increments of 100ms (1/10th of a second).
- At an Executive Telephone, when the flash code is dialed a / (forward slash) will be displayed temporarily and then the display will return to the previous message unless other digits are dialed.
- Single line stations cannot use system generated hook-flash.

## Feature Button Inquiry

### Description

You may review the programming for feature buttons at an idle Executive Telephone. To review the programming, dial the Feature Button Programming mode.

### Operation

- Press [FEAT]
- Dial [#] + [3]. The display shows:

PRESS FEATURE BTN
-------------------

- Press the desired feature button to view its contents (code). In this example, button 20 is pressed.

F96__	show chg
-------	----------

- Press [show]. The name of the feature is displayed.

MESSAGE WAITING
-----------------

- The display then returns to the previous screen.



*Buttons without feature programming will display BTN UNAVAILABLE.*

---

---

## Feature Button Programming

### Description

Depending upon the telephone model, 8 or 20 programmable feature buttons are available. The Basic model has eight dual-colored feature buttons for CO line, station, or feature access code assignments. The Enhanced and Executive models have 20 dual-colored programmable feature buttons.

All system feature codes may be stored on the programmable feature buttons for one-button operation. Certain programmed feature buttons will light when activated (DND, Call Forward, DSS/BLF, etc.), while others do not, such as Call Pick-Up, Background Music, Last Number Redial.

Features are separated into three distinct categories for programming on a button: CO line, station, or feature.

### Operation

#### *Basic and Enhanced Telephones*

To program a feature button:

1. Press [FEAT]
2. Dial [#] + [3]
3. Press the desired feature button.

To program a system feature button:

1. Dial [2]
2. Press [FEAT]
3. Dial the system feature code.
4. Press [HOLD]

To program DSS console buttons:

1. Press [FEAT]
2. Dial [#] + [5]
3. Press a Programmable Feature Button.

To program a DSS/BLF button:

1. Dial [1]
2. Dial 2-digit *DHS* or 3-digit *DHS-E* station number (10-81) (100-195).
3. Press [HOLD]

To program a CO line button: (*DHS only*)

1. Dial [0]
2. Dial the CO line number or code for a CO line group. Refer to the table below for CO Line Codes.
3. Press [HOLD]



**Table 4-6: CO Line Feature Button Codes**

DHS		DHS-E	
00 = Any Group	02 = CO Line Grp 2	200 = CO Line Grp 1	202 = CO Line Grp 3
01 = CO Line Grp 1	03 = CO Line Grp 3	201 = CO Line Grp 2	203 = CO Line Grp 4
04 = CO Line Grp 4	6 = CO Line 6	700 = CO Line 1	709 = CO Line 10
05 = ICM	7 = CO Line 7	701 = CO Line 2	710 = CO Line 11
1 = CO Line 1	8 = CO Line 8	702 = CO Line 3	711 = CO Line 12
2 = CO Line 2	9 = CO Line 9	703 = CO Line 4	712 = CO Line 13
3 = CO Line 3	10 = CO Line 10	704 = CO Line 5	713 = CO Line 14
4 = CO Line 6	11 = CO Line 11	705 = CO Line 6	714 = CO Line 15
5 = CO Line 7	12 = CO Line 12	706 = CO Line 7	715 = CO Line 16
		707 = CO Line 8	716 = CO Line 17
		708 = CO Line 9	717 = CO Line 18

To program a CO button: *(DHS-E only)*

1. Dial [1] + line number.
2. Press [HOLD]

To erase the contents of a programmable feature button:

1. Press [FEAT]
2. Dial [#] + [3]
3. Press the Programmable Feature Button.
4. Dial [0]
5. Press [HOLD]

### ***Executive Key Telephones***

To program a feature button:

1. Press [FEAT]
2. Dial [#] + [3]. The display shows:

PRESS FTR BTN
---------------

- Press a programmable feature button. The current contents of that button is displayed. For this example, let's use button 20.

```
F96
      show chg
```

The following sequence of steps applies to *DHS-E* only:

```
MESSAGE WAIT
      chg
```

```
DIR NO.:__
      bsp save chg
```

```
FTR CODE:__
      bsp save chg
```

- Press [show]. The name of the current feature stored is displayed.

```
MESSAGE WAITING
```

- Press [chg]. The display shows the following:

```
SELECT FUNCTION
co Ln sta feat
```

Three feature button categories are available for feature button programming: CO lines (co Ln), Station (sta), and Feature (feat).

To program a CO line button:

- Press [co Ln]:

```
CO LINE__
      bksp save chg
```

- Dial the CO line number. [Table 4-6: CO Line Feature Button Codes](#). An intercom button may also be assigned in this sequence. The allowable range includes CO lines, CO line Groups and ICM button assignment.
- Press [save].

To program a DSS/BLF button:

- Press [sta]. The display shows:

```
STATION__
      bksp save chg
```

- Dial the station number.
- Press [save]

To program a system feature:

1. Press [FEAT]. The display shows:

```
FTR CODE: __
bksp save chg
```

2. Press [FEAT]. F will appear on the display:

```
FTR CODE: F
bksp save chg
```

3. Dial the feature code.
4. Press [save]

To erase the contents of a programmable feature button:

1. Press [save] instead of dialing a code.



*If you dial an invalid code, you will hear error tone and an Executive Key Telephone display will show CODE UNAVAILABLE.*

## Conditions

- ❑ In some cases, a user may program a feature button for a specific CO line although access is restricted to that line via system programming. In this situation, the telephone is still governed by system programming and would still be unable to access the CO line if restricted.
- ❑ Valid feature codes must be in the form of either Fn or Fnn where F is the feature button and n is either a 1-digit or 2-digit code, including asterisk [\*] and pound [#] dialed from the dial pad.
- ❑ Any feature button programmed with a code previously assigned to a different feature button will cause the previously programmed feature button to become unassigned.
- ❑ Programmable feature buttons cannot be programmed for CO line group operation when the system is configured for KEY system operation.
- ❑ The *DHS/DHS-E* DSS console programs the same way, but a different feature code [feat] + [#] + [5] is used.

---

## Flexible Line Assignment

### Description

A station may be assigned outgoing access to any or all of the system CO lines in System Programming. The user may program any CO line or line group to appear under any one of 8 to 20 dual-colored feature buttons. However, the line(s) cannot be used for outgoing calls unless granted outgoing privileges by the system administrator. A station programmed with Line Assignment privileges may retrieve held calls.



*The number of dual-color LED buttons available depends on the key telephone model.*

---

---

## Flexible Receive Assignment

### Description

Stations may be allowed to answer or retrieve from hold, specific CO lines assigned in system programming. Receive assignments should be assigned to any stations that need to answer incoming calls. A station does not have to hear ringing or be programmed with Flexible Ring Assignment in order to answer an incoming CO line. Also, Call Pickup can be used to answer the oldest incoming CO calls. During System Night Service operation, Night Service stations will ring and can answer all incoming CO lines, regardless of the normal Day mode configuration.

---

## Flexible Ring Assignment

### Description

A station can be programmed to ring for any, or all incoming CO lines. The Ring Assignment will not establish ringing at any station that does not also have the Receive Assignment enabled for the associated incoming CO line. In this situation, the CO line appearance would provide a visual indication only, without the ability to answer the incoming call by Direct Line Button Access. A designated Night Service station will receive audible ringing and can answer all lines when the system is operating in the Night Service mode.

---

## Forced Intercom Call Forward

### Description

Tone ringing intercom calls can be immediately forwarded to the attendant by pressing the DND button.

### Operation

1. When your telephone is set to Tone Ring and another station is calling you, an Executive Telephone will display:

STA xx CALLING

2. Press [FEAT]
3. Dial [4]. An Executive Telephone will display:

DO NOT DISTURB

### Conditions

- ❑ If the intercom (ICM) call in progress is with the attendant, Forced Intercom Call Forward will not operate. When DND is enabled, standard DND operation is followed.
- ❑ If forced DND is activated, the operation is treated as if the calling party makes a new ICM call to the attendant.
- ❑ You cannot activate Forced Intercom Call Forward if Call Forward is already enabled.

---

## Forced Tone Ringing

### Description

In certain environments where background noise is predominant or where speaker volume has been minimized, a station in Voice Announce mode may not hear your voice when you place an intercom call. This situation may be averted by using the Forced Tone Ringing feature. After connection to a Voice Announce station, you may change the alert signal at the called station from Voice Announce to Tone Ring.

### Operation

1. You have just placed an intercom call to a station in Voice Announce mode (Hands-Free or Private) and cannot get a response. At an Executive Telephone, the display shows:

VOICE CALL    xx msg
-------------------------

1. Dial [\*] to change the alert signal at the called station from Voice Announce to Tone Ringing. At an Executive Telephone, the display shows:

CALLING STA 10 clbk msg
----------------------------

2. A Tone Ringing alert signal is sent and continues at the call station until answered.
3. If your call remains unanswered, you may dial [\*] again to return to Voice Call Announce mode.

### Conditions

- ❑ It is not possible to force a station from Tone Ring mode to Voice Announce mode if that is the mode they have selected.
- ❑ If you want to leave a Call Back request at a called station that doesn't answer, the alert signal must be set for Tone Ringing.

---

---

## Headset Mode

### Description

When the headset is installed, the [SPKR] button is used to turn the headset ON and OFF (switch between headset and speakerphone modes). If the [SPKR] button is pressed while the telephone is idle, the headset is turned ON. When the [SPKR] button is pressed again, the speakerphone mode is activated. At any time during any of these modes the handset may be lifted to disengage the headset or speakerphone mode.

### Operation

To turn ON the headset:

1. Press [FEAT].
2. Dial [9] + [#]. An Executive Telephone will display the following and you will hear confirmation tone.

HEADSET ENABLED

3. Once engaged, the headset is operated using the [SPKR] button.

To answer an incoming call using the headset:

1. Press [SPKR]. The (SPKR) lamp flashes to indicate that the headset is active.

To switch from Headset to Speakerphone Mode:

1. Press [SPKR] again. The (SPKR) lamp will light steady to indicate that you are now using the speakerphone.

To return to Headset Mode:

1. Press [SPKR] again.

To switch from Headset/Speakerphone Mode to Handset Mode:

1. Lift the handset.

To switch from Handset Mode to Headset/Speakerphone Mode:

1. Press [SPKR] until the desired mode is active (you can determine which mode is active by observing the SPKR lamp).
2. Hang up the handset.

To turn OFF the headset:

1. Press [FEAT].
2. Dial [9] + [#]. An Executive Telephone will display the following and you will hear confirmation tone.

HEADSET DISABLED



*You may assign a feature button with the Headset feature code and use the button to turn the headset ON and OFF. When the headset is enabled, that button will light.*

### Conditions

- ❑ While using the headset, you may pick up Intercom Voice calls by pressing [SPKR].
- ❑ Incoming CO line calls may be answered by pressing [SPKR] (for automatic priority ring selection) or by pressing the specific CO line button.
- ❑ Other features like background music and muted ring continue to operate in the same manner while you are off-hook.
- ❑ Non-amplified headsets may be powered directly from the key telephone. In most cases this interface permits the key telephone to control the Volume Up/Down and Mute features. Some headsets may require the use of the headset adapter keys to adjust the volume, mute and other headset functions.
- ❑ Pressing [CLEAR] will disconnect calls when the Headset mode is active.

---

## Hold

### *Abandon (Loop Supervision)*

#### Description

Each CO line has a programming option that directs the system to monitor distant party disconnect or False Hold conditions. This is a useful network feature in busy office environments where the inside party accidentally presses the [HOLD], [ICM] or [DSS] button while expecting the outside line conversation to be concluded. Anytime the system detects a disconnect signal from the Central Office, an existing Hold condition will be released, freeing that line for future inbound traffic.

#### Operation

1. While connected to any CO line:

CO LINE 1    xx:xx

2. Press [HOLD]

#### Conditions

- ❑ The CO line must have loop supervision interrupt signal from the local carrier upon disconnect by the outside party. All types of Hold like System Hold, Exclusive Hold and Conference Hold are related to the Hold Abandon feature.
- ❑ Certain Central Offices do not provide loop supervision.
- ❑ If the outside held party disconnects, the system will automatically release the held CO line.

At default, Call abandon is enabled for all CO lines.



*If using CO lines for paging or ancillary devices, assign devices to lowest available line.*

---

---

## *Automatic*

### **Description**

You may enable this feature on your telephone to simplify call handling, avoid accidental lost calls, and assist call transfers. Automatic Hold will occur when you skip from line button to line button or intercom call to outside call and vice-versa. For instance, if you are currently on a call on Line 1 and press Line 2, the call on Line 1 will be placed on Hold automatically. The need to press [HOLD] is eliminated, except if you want to place a call on Exclusive Hold. This feature is ideal for attendant operation. You can answer an incoming call and then press the desired DSS/BLF button to place the intercom call and put the line on hold in one action.

### **Operation**

To enable/disable:

1. Press [FEAT].
2. Dial [9] + [4].

During a telephone conversation on a line or an intercom call:

1. Press a different line button. The first call is automatically placed on Exclusive Hold.



*The Automatic Hold feature places a call on Exclusive Hold.*

### **Conditions**

- If you access an idle line and skip to another line before dialing, the first line will not be automatically placed on Hold.
- If you have the Automatic Hold feature programmed on a feature button, the feature button lamp will light when the feature is enabled.

## *Call Answer/Select*

### **Description**

Call Answer allows a user to place and retrieve calls ON and OFF of hold by simply pressing the HOLD button. When multiple calls are holding at the station, Call Answer will access the CO line that has been holding for the longest period of time while placing the current call on hold. Call Answer works for all CO lines regardless of the station CO line button programming.

### **Operation**

1. Press [HOLD]. A currently connected call will be placed on hold. If there was a previously held call, this call is now connected.

### **Conditions**

- Call Answer will also operate for intercom calls placed on hold.
- If the person on Hold hangs up, the system will automatically release the held CO line.



- Line appearance is not required for station to put call on hold.

## *Exclusive*

### **Description**

When using the [FEAT] button and the [HOLD] button together, you may place an outside call on private hold. The held line will appear in use at other stations.

### **Operation**

1. Press [FEAT]
2. Press [HOLD]

### **Conditions**

- When you place a CO line call on Exclusive Hold, the green lamp for that line at your telephone will flash fast and the red lamp will light steady at other stations.
- A CO line call will be placed on System Hold after the Exclusive Hold time expires. You will hear a tone alerting you that the timer has expired and your call is now on System Hold. The green lamp at your telephone will flash slowly and the red lamp at other stations will begin to flash slowly.
- Exclusive Hold is used only for CO line calls.
- The Exclusive Hold duration is programmable from 1-8 minutes in system programming.

## *Reminder Time*

### **Description**

The system provides a programmable timer to remind you that a call has been left on System or Exclusive Hold. When enabled, you will hear one ring tone repeated each time the selected time expires.



*The Hold Reminder time is system programmable and can be set for: 0 (disabled), 10, 30, 60, 90 seconds.*

### **Conditions**

- Hold Reminder applies to both intercom and CO line calls.
- Hold Reminder applies to CO line calls that are on System Hold, Exclusive Hold or Screened Transfer Hold.

## *System*

### **Description**

You may place any CO line on System Hold by one button operation of [HOLD]. When you place a line on System Hold, the green lamp for that line will flash at the I-Hold rate. This System Hold line will flash the red lamp at all other stations.

---

---

## Operation

While on a line, the green lamp for that line is I-Use flashing (double wink rate):

1. Press [HOLD]. The green lamp now flashes at a slow rate and the call is placed on System Hold.



*Any party who is placed on Hold will hear music, only if available through the external music source connection.*

## Conditions

- Pressing [HOLD] will place a conference on Exclusive Hold if you are the controlling party and you temporarily exit to add another party.
- When an intercom call (conference) is placed on Hold, the steady lamp indication of the other station(s) will not change.

---

## Hour Mode Selection

### Description

Standard 12-hour time or military 24-hour time can be selected for common display at all Executive Key Telephones. The correct system time is entered in system programming along with the Hour Mode Selection, from any Executive Key Telephone station using the system programming password. The AM and PM indications are not displayed.



*When programming related features, military 24-hour time is referenced.*

---

## Station Hunt Groups

### Description

Up to 8 hunt groups may be assigned. Hunting is always in a linear fashion. Each Hunt Group can contain up to 24 members. Hunt Group directory numbers are (82-89) or (800-807). One Hunt Group may be assigned as a Voice Mail type Hunt Group for system voice mail integrated operation. There are 3 data fields in Hunt Group programming: GROUP TYPE, GROUP MEMBER and RING ASSIGNMENT.

---

## I-Hold Indication

### Description

I-Hold Indication allows you to easily distinguish between a call you placed on hold at your telephone and calls placed on hold at other telephones. When you place a call on System Hold, the associated line lamp will flash at the System Hold rate but will light green. The same held CO line at other stations will flash at the System Hold rate but will light red.

---



---

## I-Use Indication

### Description

When you are using a CO line, the associated lamp will light green and flash at a double-wink rate at your telephone. This lamp will light steady red at other telephones.

---

## Intercom Call

### Description

All intercom calls are made by dialing the station unique 2-digit *DHS* or 3-digit *DHS-E* intercom number. If a station feature button is programmed as a BLF/DSS button, it may be used to place an intercom call. Any intercom call can be placed hands-free without lifting the handset. However, acoustic conditions at the local and/or distant station may dictate the use of the handset to achieve optimum voice connection.

Each station user determines how intercom calls are received; either in Voice Announce Hands-Free mode, Voice Announce Privacy mode, or Tone Ringing. The intercom calling station can force the called station from Voice Announce mode to Tone Ring mode by pressing [\*] after dialing the station number.

### Operation

#### To place an ICM call:

1. Dial the *DHS* 2-digit or *DHS-E* 3-digit station number on the telephone dial pad.

CALLING STA xx
cbck msg

2. Ringback tone is heard or if the called station is in Voice Announce mode, a connection is automatically selected.

VOICE CALL xx
msg

3. If the called station is busy, busy tone is heard.

STA xx BUSY
cbck msg next

4. If the called busy station has Call Wait enabled, ringback tone is heard.

STA xx WAIT
cbck msg

### Other Displays:

- When the station is in DND:

STA      xx      DND
----------------------

- If the station number dialed is not connected:

OUT OF SERVICE
----------------

- If the called station is your own station number.

YOUR NUMBER
-------------



*Intercom calls to key telephones selected for Voice Announce Hands Free or Voice Announce Private ([FEAT] + [9] + [8]) are logically answered by the system at the called station.*

### Conditions

- Intercom dial tone may be automatic upon lifting the handset or after pressing the [SPKR] button, if enabled under the Auto Line Select [FEAT] + [9] + [5] station feature.
- The mute button lights indicating private mode when an incoming intercom call is answered.

---

## Last Number Redial (LNR)

### Description

The Last Number Redial (LNR) feature automatically dials the last number dialed from your telephone. LNR will repeat a hook-flash in the same sequence as it was first dialed. If a speed dial number was first dialed, LNR will dial the speed dial number and any subsequent manually dialed digits. A maximum of 16 digits can be stored in the LNR buffer for every station.

### Operation

You may either choose a specific CO line for use with LNR by first pressing that CO line button or you may allow the line to be selected automatically by the LNR feature.

1. Press a line button.
2. Press [FEAT].
3. Dial [8]. The previously dialed number is dialed on the CO line selected.

4. In the event that all CO lines are busy, you will hear busy tone and if you have an Executive Telephone, it will display:

ALL CO LINES BUSY

5. If the Last Number Redial memory is empty, you will hear error tone and an Executive Telephone will display:

LNR EMPTY



*The LNR feature code may be programmed on a programmable feature button.*

### Conditions

- Last Number Redial cannot be applied to intercom calls.
- When you activate LNR, the system will first select the previously used CO line to dial. If that CO line is busy, any idle CO line in the same CO line group will be selected. If all CO lines are busy, you will hear busy tone and an Executive Telephone will display ALL CO LINES BUSY.
- The system programming data fields Dial Wait Time and Dial Tone Detection directly affect the performance of LNR. When these features are enabled, the telephone will either wait until dial tone is detected on a CO line, or wait for a pre-programmed period of time before digits are dialed from the LNR memory on the CO line.
- To LNR immediately depends on whether tone detection is allowed or pause timers apply. If tone detection is allowed, the system will Redial the last number after CO dial tone is detected. Otherwise, the system will Redial the last number only after the pause time for tone detection is exceeded.

## Letter Scheme

### Description

Station User Names (programmed into the customer database) may be enhanced for special requirements using the choices available in the Letter Schemes. The end user may select from six different lettering schemes that can be programmed for use at any one installation. While User Names are being entered (in system programming) and while the user is editing an Outgoing Message, the chosen Letter Scheme characters will be accessible with successive depressions of the [1] dial pad key. Use the table below to determine what letter scheme best suits this installation.

**Table 4-7: Letter Scheme Characters**

Character for n <sup>th</sup> depressions of dial key "1".						
	1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>	5 <sup>th</sup>	6 <sup>th</sup>
Scheme 0	Æ	Ē	Ø	Œ	à	Á
Scheme 1	Ç	Ā	Ō	Ŋ	À	Ä
Scheme 2	ò	é	é	è	à	ù
Scheme 3	č	ö	é	ŋ	ō	ř
Scheme 4	á	é	ó	ü	ú	
Scheme 5	ł	ż	ř	ę		

## Loud Bell Control (Optional)

### Description

The system provides one dry contact closure for interface to an external Loud Bell device which is associated with incoming CO line ringing. If Loud Bell is assigned to a specific CO line, the incoming call signaling on this CO Line will initiate LBC operation. The Loud Bell contacts will follow the CO ring cadence programmed in system programming (data field Ring Scheme). The external loud bell ringing device is customer provided. It is recommended that a 24V DC 0.5 amp device be used. An external power source is required.



*The DHS system also requires the Option Module for this feature to function.*

---



---

## Message

### *Outgoing*

#### **Description**

You may send a message waiting, a customized message, or one of 6 pre-programmed messages to other Executive Key Telephone users on the system. A basic message waiting is sent by pressing the soft [call me] button. You may customize the first message by using the dial pad and selecting letters (16 characters maximum) to spell your message. You can send one of the remaining 6 messages by simply pressing the [send] button (soft button) when the desired message is displayed.

#### **Operation**

When you dial another Executive Key Telephone, you will be given the option to leave a message:

CALLING STA xx  
MSG

1. Press [msg] and the display changes to:

MESSAGE TYPE  
CALLME            PREPROG

To send a Message Waiting:

1. Press [call me].

To send a customized message:

1. Press [preprog].

EMPTY  
send next chg

2. Press [chg].

\_ bksp save chg

3. Spell the message (16 letters/symbols maximum) using the dial pad keys.
4. For instance, to select the letter H, press dial pad key [4] twice.

**Table 4-8: Dial Pad Key Programming**

Depressions:	1	2	3	4	5	6	7	8	9	*	0	#
1st	*	A	D	G	J	M	P	T	W	†	Q	‡
2nd		B	E	H	K	N	R	U	X		Z	
3rd		C	F	I	L	O	S	V	Y			

- \* Dial Key [1] is used to select special characters. Refer to [Letter Scheme](#). Depending on the Letter Scheme selected (programmed), Dial Key 1 may be used to insert various special characters.
- † Dial [\*] before a Dial Key to insert the number on the dial pad key instead of a letter in this character position.  
When [\*] is pressed after a letter has been selected for this character position, the selected letter is forced to lower case.
- ‡ In some cases, you may wish to select letters accessed by the same dial pad key. After you select the first letter, dial [#] to accept that letter and advance to the next position to dial the next letter. For instance, to spell TOM you would dial [8] + [6] + [6] + [6] + [#] + [6].  
Dial [#] to insert a space.

To send a pre-programmed message:

1. Press [next]. The display shows:

CALL OPERATOR  
send next

2. Continue pressing [next] until the desired message is displayed. The programmed messages are as listed in Table 4-9:

**Table 4-9: Available Outgoing Pre-Programmed Messages**

CALL OPERATOR	VISITORS WAITING
CALL HOME	URGENT
CALL SCHOOL	COME SEE ME

3. Press [send].

To view a message:

1. The Message Wait button will flash and the display shows:

MSG FROM STA xx  
show del

2. Press [show] to display the message sent to you.



## Executive Notify

### Description

Executive Notify provides you with a method to inform intercom callers of the reason you are away from your telephone. An Executive Notify message can be pre-programmed in the system database and may contain up to 16 characters or digits. There are six pre-programmed messages and one private message which may be edited at your telephone according to your personal preference. The message you select will appear on your telephone's display. Any Executive key telephone that intercom calls (tone ring only) you will view that message on their display.

### Operation

To program a message:

1. Press [FEAT].
2. Dial [9] + [0]. The display will show:

```
MSG FROM STA xx
show del
```

To customize a message:

1. Press [chg].
2. Use the dial pad keys to enter your personalized message. [Table 4-8: Dial Pad Key Programming](#) to determine how to select desired letters.

To select a pre-programmed message:

1. Press [next].

```
OUT FOR LUNCH
store next
```

2. Continue pressing [next] until the desired message is displayed. The pre-programmed messages are as listed in Table 4-10:

**Table 4-10: Available Executive Notify Pre-programmed Messages**

OUT FOR LUNCH	IN A MEETING
BE BACK SOON	OUT OF OFFICE
LEFT FOR THE DAY	ON VACATION

3. Press [store].



*The Executive Notify feature code may be programmed on a programmable feature button.*

When another Executive Key Telephone user calls you, the message OUT FOR LUNCH will be displayed on the caller's telephone display:

OUT FOR LUNCH cbck msg
---------------------------

The caller has the option of using the Call Back feature or leaving a message for you.

## Message Waiting

### Description

A busy or unattended station may be notified of a call attempt via the Message Waiting feature. At the Executive Key telephone, the display will show messages waiting and provide prompts to assist you in responding to the messages. Executive telephone users have the choice of leaving a simple Call Back Message Wait or a pre-programmed message.

For non-display telephones (Basic and Enhanced), a message waiting button may be programmed on a feature button. The red lamp for that programmed button will flash to notify the user of messages waiting.

### Operation

#### *Basic and Enhanced Telephones*

To send a Message Waiting:

1. Press [FEAT].
2. Dial [9] + [6].
3. Dial the station number where the message is to be left.

To answer a Message Waiting:

1. Press [FEAT].
2. Dial [9] + [6] or press a flashing MESSAGE WAIT button (if a feature button has been programmed for Message Wait).

#### *Executive Telephones*

To send a Message Waiting:

Upon calling Station xx and receiving no answer or busy:

CALLING STA xx cbck msg
----------------------------

OR

STA xx BUSY cbck msg next
------------------------------



*[cbck] won't be displayed unless called station is in tone mode.*

3. Press [msg].

```
MESSAGE TYPE
call me preprog
```

4. Press [call me]. You will hear confirmation tone.

```
MSG TO STA xx
```

To answer a single Message Waiting:

1. Your telephone display shows the following and the Message Waiting lamp (if a button is programmed) will flash:

```
MSG FROM STA nn
reply del
```

2. Press [reply] to answer the message or [del] to delete the message without replying.

To answer multiple Message Waitings:

1. Your telephone display shows the following:

```
MSG FROM STA xx
more reply del
```

2. Press [more] to review the other messages.

To cancel a Message Waiting left at another station:

1. Press [FEAT].
2. Dial [\*] + [9] + [6].
3. Dial the station number where the message was left.

### Conditions

- The system will allow a total of 48 message waitings in the system at any one time.
- At Executive Key telephones, the message waiting indication will not be removed until [reply] or [delete] is pressed.
- Each station can leave only one message waiting at any one station; for example, Station (A) cannot leave 2 message waitings at Station (B).
- Each station may receive more than one message waiting from various stations.
- A feature button must be assigned on the Basic and Enhanced models in order to receive visual Message Waiting indication.
- Multiple messages are retrieved in the order that they were left.

---

---

## Music-on-Hold (MOH)

### Description

Any intercom or CO line call placed on Hold will hear music, if the system is equipped with an External Music Source. This music source can be monitored at an idle station as BGM music. There is one music source interface connector in the standard *DHS* configuration. When equipped, the optional Option Module provides interface for 2 music sources in the *DHS*. The *DHS-E* includes both music source interfaces as a standard feature. One source may be used exclusively for BGM, and the other for BGM and Music-On-Hold.



*Use of certain music sources for BGM or MOH may violate copyright laws.*

---

## Mute

### Description

During a conversation, you may prevent the distant party from hearing your voice by disabling voice transmission.

### Operation

1. Press [MUTE] to enable or disable.



*The [MUTE] button may also be used for Push-to-Talk operation during a Voice Over Busy call connection.*

---

## Muted Ringing

### Description

While the user is on another call, incoming ICM/CO line calls will automatically ring at a muted lower level at that station. When the station is idle, incoming calls ring at the loudness level previously programmed from the volume up/down buttons.

---

## Name In Display

### Description

The station user name or department can be programmed to appear on the LCD of an Executive Key Telephone. The station intercom number will also be displayed when a name has been programmed. The name may consist of upper and lower case letters, plus numbers. DSS/BLF buttons may be conveniently labeled to associate stations by name, instead of station number.

### Conditions

- When a User Name is programmed for stations, the STA normally displayed at that idle station will be replaced with the programmed name.
- Names may be 7 or fewer characters in length.

---

## Night Service

### Description

The system can be programmed for Night Service operation which affects incoming CO line ringing and receive assignments. Any station may manually switch the system service from Day to Night mode, or vice-versa using the Night Service code. During Night Service mode, station and DISA Class Of Service (COS) outside dialing privileges are changed in accordance with the Toll Restriction Night COS programming.

### Operation

At any telephone, while in the idle state:

1. Press [FEAT]
2. Dial [#] + [2]

### Conditions

- Each time the Night Service code is entered, the system mode of operation changes to the opposite mode.
- When the system is in the Night Service mode, all Executive Key Telephones will display night.

---

---

## On Hook Dialing

### Description

You may make outgoing calls without lifting the handset and monitor the dialing status through the built-in speaker. The [SPKR] button lamp is lit when monitoring a call.

The Basic key telephone can monitor outside calls and receive one-way paging announcements, but cannot reply unless the handset is lifted. The Enhanced and Executive models provide full hands-free speakerphone operation in addition to On-Hook Dialing.

### Operation

1. Press a [CO line] to make a call or dial a [station number] while on hook (handset hung up).



*When On-Hook Dialing, the type of line accessed depends upon the individual key telephone pre-programmed selection of intercom, CO line, or no selection (EMPTY).*

---

## Page

### Description

You can perform several types of pages:

- Internal Paging - page a group or place a system-wide internal page.
- External Paging - access external/ancillary paging equipment.
- All Call Paging - access all paging zones (internal and external).



*Paging is one-way only. The Page Allow/Deny setting does not interfere with a station's ability to make a page or to establish a Meet Me page.*

### Operation

#### *Basic and Enhanced Telephones*

To perform internal paging:

1. Press [FEAT].
2. Dial [5] + [0] + [0].

To perform external paging:

1. Press [FEAT].
2. Dial [5] + [0] + [1].

To perform All Call paging (internal and external):

1. Press [FEAT].
2. Dial [5] + [0] + [2].

To perform group paging:

1. Press [FEAT].
2. Dial [5] + [0] +[3].
3. Dial Group Number (1-8).

### ***Executive Key Telephones***

1. Press [FEAT].
2. Dial [5] + [0]. This display will show:

PAGING all    extern    next
---------------------------------

To perform internal paging:

1. Press [all].

To perform external paging:

1. Press [extern].

To perform All Call paging (internal and external):

1. Press [next]. The display shows:

PAGING both    group
-------------------------

2. Press [both].

To perform group paging:

1. Press [group]. The display shows:

PAGE GROUP both    group
-----------------------------

2. Dial the group number (1-8)



*Any of the paging codes may be stored on a programmable button.*

### **Conditions**

- The display will show PAGE FAILURE if a page fails due to no available idle station or a busy external amplifier.
- Page Groups coincide with Station Groups. There are 8 possible Station Groups.
- Various types of paging may be answered from any idle station.

## External

### Description

The system provides one-way, dedicated paging access to a paging amplifier. The External Paging Zone may be accessed individually or with all 8 Internal Paging Zones as an All Call Page.

### Operation

#### *Basic and Enhanced Telephones*

1. Press [FEAT] + [5] + [0] + [1].

#### *Executive Telephones*

1. Press [FEAT] + 5 + 0.

PAGING  
all extern next

2. Press [extern].



*The External Page access code may be programmed on any feature button. The DHS requires the Option Module for this feature to function.*

## Allow/Deny

### Description

You can block one-way pages (internal, group, and all page) over the key telephone speaker by dialing the Page Deny code. You will still hear intercom calls and private voice announcements. Background Music, if enabled, is not affected by the Page Allow/Deny feature.

### Operation

To allow page announcements:

1. Press [FEAT].
2. Dial [\*] + [9] + [9]. The display will show:

PAGE RECV ALLOW

To deny page announcements:

1. Press [FEAT].
2. Dial [9] + [9]. The display will show:

PAGE RECV DENY





*The Page Allow/Deny feature code may be stored on a feature button.*

### Conditions

- ❑ Stations initiating internal pages may receive error tone if not stations are available in page group. External paging is unaffected.

## Meet Me

### Description

Anyone paging internally or externally may be answered for a private Meet Me connection. After hearing the page, you can dial the Meet Me Page code from any telephone and be connected to the person paging. During a Meet Me Page, the internal and external paging zones are released and new pages may be initiated.

### Operation

1. While a page is currently in progress, an Executive Telephone displays:

STA	xx	PAGE
-----	----	------

2. Press [FEAT].
3. Dial [5] + [9]. The display shows:

CONNECT STA xx
----------------



*The Meet Me Page code may be programmed on any available feature button.*

### Conditions

- ❑ A page may be answered at any telephone using the Meet Me Page code, even if the page announcement is not heard over the telephone speaker.
- ❑ The page may be any zone page or all page.
- ❑ Meet Me Page is functional regardless of group assignments.

---

---

## Pause

### Description

You can insert a pause to generate an intentional delay in dialing on outgoing CO line calls. A pause or a combination of pauses may be stored in the Speed Dial bins to allow timed access to special services, while allowing you to monitor the progress of the call. A pause will appear as P on an Executive Telephone display. Last Number Redial will remember any pauses dialed manually.

### Operation

1. During dialing on any CO line or when programming a Speed Dial bin (refer to [Speed Dialing](#)), press [FEAT].
2. Dial [7] + [0]

P



*Pause may be stored on a programmable feature button and is also used in programming fields that accept a Pause character.*

---

## PBX Compatibility

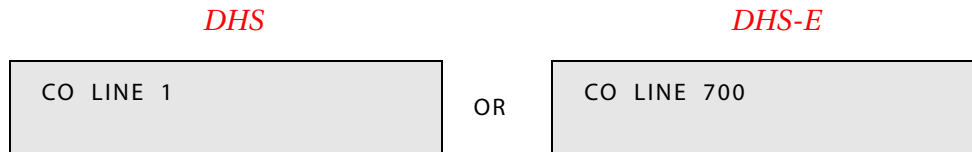
### Description

Any CO line in the system may be programmed as a PBX type facility. Station users may use that PBX facility via a CO line button. To make a PBX call, that CO line button is accessed and the PBX station number is dialed. To use the PBX facility to make an outgoing call, the PBX trunk code must be dialed to receive outside Central Office dial tone. This code may be programmed into the system as a PBX trunk access code. Once programmed, the system will identify these codes when dialed and adjust feature operation accordingly.

### Operation

CO Line x is connected to a PBX for PBX feature access. The PBX uses the code 9 to access a PBX trunk for out call dialing. (Code 9 has been programmed into the *DHS* as the PBX CODE for trunk access.)

1. When CO line x is accessed, PBX dial tone is heard.



2. If the digit [9] is dialed, the *DHS* is aware that this call is being placed on a PBX trunk (outgoing call).

9-

3. A hyphen (-) is inserted automatically after dialing 9 for better display clarity. Subsequent digits dialed are displayed after the hyphen.

9-15551212



*When the PBX CODE is programmed, the DHS will apply station toll restriction when the next number is dialed. LNR and ABR will recognize the code and automatically insert a pause following the code. At default, no CO line is type PBX, the PBX access code is 9, and the PBX Auto Pause Insertion time is one second.*

### Conditions

- The PBX access code may be 1 or 2 digits.
- After entering PBX access code, the system will automatically stop dialing for a specified time (1 - 9 secs programmable) and then continue the dialing.

---

## Station Lock/Unlock

### Description

You may use this feature to prevent unauthorized outside calling from your telephone. The feature code is also used to program your private 4-digit password number.



*Use of Station Lock [Feat 97] will restrict access to 911.*

### Operation

#### *Basic and Enhanced Telephones*

To lock the telephone:

1. Press [FEAT].
2. Dial [9] + [7].

3. Dial your password.
4. Dial [#].

To unlock the telephone:

1. Press [FEAT].
2. Dial [9] + [7].
3. Dial your password.
4. Dial [\*].

To change your password:

1. Press [FEAT].
2. Dial [9] + [7].
3. Dial your current password.
4. Dial the new password.

### *Executive Telephone*

To program Station Lock/Unlock:

1. Press [FEAT].
2. Dial [9] + [7]. The display shows:

```
CHK PSWD__
bksp show chg
```

3. Dial your password (default is 0000).
4. Press [show]. The display shows:

```
LOCK TELEPHONE
pswd yes no
```

To lock the telephone:

1. Press [yes]. The display shows:

```
PHONE LOCKED
```

To unlock the telephone:

1. Press [no]. The display shows:

```
PHONE UNLOCKED
```

To change your password:

1. Press [pswd]. The display shows:

```
NEW PSWD : __
bksp save chg
```

2. Dial your new password (up to 4 digits). The display shows:

```
NEW PSWD : 1234
bksp save chg
```

3. Press [save].



*The Phone Lock feature code may be programmed on a programmable feature button.*

### Conditions

- When your telephone is locked you can only make intercom calls. You may still answer calls and held lines while your telephone is locked. This includes speed dial access and CO lines marked as toll override.
- If you accidentally forget your password it may be retrieved through the system database administration password.
- The Attendant designated station private password is used to enter Attendant Administration.
- If you try to make a CO line call from a locked telephone, you will hear error an tone and the display will show PHONE LOCKED.

---

## Privacy

### Description

Factory default settings provide privacy for all intercom and CO line calls. These calls may not be monitored or interrupted by other stations. If your COS allows, and if the Privacy Release and Voice Over Busy features are available to you, as determined by your programmed COS, you may use those features to override the Privacy feature.

---

## Privacy Release

### Description

Privacy Release may be enabled on a system-wide basis to allow up to three users to join a conversation on busy CO lines (maximum of 4 users). When Privacy Release is enabled through programming, you may press a busy CO line button at an idle telephone to join that conversation.

Your programmed COS determines whether you have access to Privacy Release. If your COS is equal to or greater than that of the station engaged in the conversation on the CO line, you will be allowed to join the conversation.

### Operation

When you want to join a conversation on a busy CO line:

1. Press that CO line button. A conference is established and the user that originated the call is the conference controller. The controller display reads:

```
LNx  ss  ss
private      forced
```

2. Your telephone display shows:

```
LNx  ss  ss
```

Where "ss" in each display indicates the station numbers that are joined in the call.

### Conditions

- If there are already four parties joined together, further attempts by other stations to join the CO line conversation will receive busy indication.
- A telephone must have a CO line button appearance of the busy CO line to join.

Refer to [Conference](#) for details of options from the controller telephone.

---

## Private Line

### Description

The Private Line assignment provides a quick and secure method of programming one or more lines for access by only one station. If the associated Private Line is assigned to a feature button at other stations, the button will light when busy but cannot be accessed from Hold, answered on incoming calls, or used for outgoing access. Calls will not forward and cannot be answered from Park location. The Private Line is used exclusively by the station that is assigned the Private To station in system programming.

### Conditions

- Incoming calls signaling on a private CO line will ring its associated station regardless of whether the CO line ring assignment is allowed in programming.
- Private Line programming will override CO line ring and CO line receive.

---

## Pulse To Tone Switch-Over

### Description

When the system is connected to Dial Pulse (rotary) outgoing CO lines, you may manually force the system to output DTMF tones for access to special services over the same Dial Pulse CO line.

## Operation

1. As you dial on a dial pulse CO line, dial [\*]. All subsequent digits will be sent as DTMF digits.



*Pulse to Tone Switch-Over can be programmed in any Speed Dial bin.*

## Conditions

- The dialing conversion can only be from Pulse Mode to Tone (DTMF) mode.

---

## Recall (Transfer Recall)

### Description

Transferred CO lines will recall to the transferring station if the call is unanswered after the Recall Time expires. During the recall, the outside party continues to hear the transfer Ring Back tone, and the CO line returns to System Hold.

### Operation

1. When a transferred CO line recalls, the display at an Executive Key Telephone will indicate where the initial transfer was routed:

LNx RECALL	
STATION	xx



*Recalls are not directed to the programmed Alternate Attendant station.*

---

## Reminder Tones

### Description

If you have Do Not Disturb or Call Forward enabled, you will hear a Reminder Tone whenever you access intercom dial tone. The Reminder Tone is a distinctive interrupted stutter dial tone. Once you dial a digit, the Reminder Tone is removed until the next time you access intercom.

---

---

## Ringing Line Priority

### Description

Ringing Line Priority is a system-wide feature that automatically connects incoming calls based on a predetermined priority. The ringing station is automatically connected to the priority ringing facility, upon lifting the handset or pressing the [SPKR] button.

Ringing Line Priority can be overridden at the station by first pressing a direct appearing line, CO line group, feature button or by dialing an intercom number on hook.

The priority is:

- Intercom Call Back
- Camped CO Line
- Recalled CO Line call
- Transferring CO Line call
- Incoming CO Line call
- Incoming ICM call

### Operation

#### To pick up an incoming call:

1. Lift the handset or press the [SPKR] button when station rings.

---

## Save Dialed Number (SDN)

### Description

Save Dialed Number (SDN) is normally used whenever you want to retain a telephone number to be dialed later. Once stored, that number will be recalled when you dial the SDN code, regardless of what feature operations or numbers have been dialed at your telephone since you stored the number.

### Operation

After dialing a number that is busy or is not answered:

1. Press [FEAT]
2. Dial [5] + [1]. At an Executive Key Telephone, the display shows:

SAVE DIALED NUM

#### To dial a saved number:

1. Press [FEAT]
2. Dial [5] + [1]. The telephone attempts to access the same CO line used when the number was saved. If it is busy, another CO line in the same group is accessed and the number is dialed.



### Conditions

- The SDN is a maximum of 16 digits.
- If the SDN buffer is empty, the display will show NO SAVED NUMBER.
- If all CO lines are busy, the display will show ALL CO LINES BSY.



*Save Dialed Number feature code may be stored on any feature button.*

---

## Station Message Detail Recording (SMDR)

### Description

This feature allows the system administration to track all incoming and outgoing CO line traffic. Station Message Detail Recording (SMDR) is output from the SMDR RS232 serial port located on *DHS-E* Central Processor Board or the *DHS* Option Module. An external serial printer or call accounting device may be connected for permanent record keeping or call cost accounting. Data communications is one direction only through this port and is programmable for data rate selection in system programming.

If entered, an account code may also be output for each call record. SMDR information includes CO line used, station number, time and date the call was placed, number dialed, duration of the call, Ring Time to Answer, an account code (if entered), and a comment for special call handling record. The system will also provide ring-in duration and call processing information relative to the call as it was handled by the system. [Table 4-11: SMDR \(Data Examples\)](#) for data examples.

**Table 4-11: SMDR (Data Examples)**

STA	TRK	DGT_DIALED	RING	DATE	TIME	DURATION	ACCOUNT	BR	CMT
XX	XX	XXXX...XXXX	MM:SS	XX/ XX	HH:MM:SS	HH:MM:SS	XXXXXXXXX		XXX X
11	01		00:00	01/02	11:15:55	00:00:47		\$	LNH
10	03	12345678901234		01/02	11:10:36	00:02:54	12345678	\$	LNC
14	01	555-1212		01/02	11:09:43	00:00:51		\$	LNC
10	01		00:32	01/02	11:15:36	00:00:52		\$	LNC
11	01		00:00	01/02	11:15:36	00:00:47		\$	LNC
11	01	443-6000		01/02	01:53:36	00:00:33		\$	LNC
21	02	602-443-6000	00:03	01/02	02:53:36	00:00:39		\$	LNC
21	02	VODAVI COMM	00:03	01/02	02:53:36	00:00:39		\$	LNC
UNANSWERED CALLER ID SMDR OUTPUT SAMPLE RECORD (FEATURE PACKAGE 2)									
ST	TRK	DGT_DIALED	RING	DATE	TIME	DURATION	ACCOUNT	BR	CMT
NA	02	602-555-1212	00:53	01/01	01:53:12	00:00:00	12345678		
NA	02	ABC Incorporated	00:53	01/01	01:53:12	00:00:00	12345678		

MM = minute

HH = hour

SS = second

STA = Station number/Incoming DISA CO line number/Incoming ECF CO line number

TRK = CO line number, 2 digits with prefix 0

DGT\_DIALED = Telephone number (outgoing call only, maximum 16 digits, left aligned)

RING = CO line incoming ringing duration before answer (Incoming call only)

DATE = Day/Month (DD/MM)

TIME = Start time of call conversation

DURATION = Conversation time

ACCOUNT = Account code entered for billing purposes (maximum 8 digits, left aligned)

BR = Battery reversal detected

CMT = Comment

LNH = CO line call held by another station, later answered and released by the output station number

LNC = CO line call is invited into conference, but is released by the output station number

DISA = CO line call is established through DISA feature

ECF = CO line call is established through ECF feature

A carriage return (CR) is generated after each record output.

## Resource - SMDRX\_RATE

### Operation

1. A user at station 10 dials [555-1212] from CO Line 6 and talks 45 seconds:

CO LINE 6	00:45
-----------	-------

2. Press the [CLEAR] button or go on hook and disconnect the CO line call. A call record is generated. The following call record will be printed out if the connected printer is ready:

```
10 06 5551212          01/02 11:09:43 00:00:45          $
```

### Conditions

- The system will retain 44 records in the event the external device (printer) becomes inoperative. These records will print the moment the device is reconnected.
- CO line calls must exceed 10 seconds for an SMDR record to be generated.
- Data format is no parity, 8 data bits, 1 stop bit. Baud rate is adjustable.
- In the last 2 lines of the SMDR record sample (Extension 21 used), caller identification SMDR records are illustrated.



*The SMDR RS232C serial port default setting is 9600 baud.*

## Speed Dialing

### Description

Speed Dialing allows you to store frequently dialed numbers. These numbers are selected for dialing by the appropriate bin number. The feature code and bin number may be stored on any feature button for instant, one-button operation.

Each station may store 20 personal (station) speed numbers in memory (bins 00-19) consisting of up to 16 digits each. There are also 80 Speed Dial bins allocated for system-wide use (bins 20-99). System Speed Dial is programmed via Attendant Administration or System Programming. Speed bin 99 is used for external call forwarding.

### Operation

#### *Basic and Enhanced Telephones*

To store a telephone number in a personal Speed Dial bin:

1. Press [FEAT]
2. Dial [#] + [1]
3. Dial the bin number (00-19) in which to store the telephone number.
4. Dial the telephone number.
5. Press [HOLD]. You will hear confirmation tone.



*Speed bins may be chained. Pauses and Flashes may be stored in Speed Dial. Chaining Pauses and Flashes each occupy one character position: Pause = [feat] + [7] + [0] = P; Flash = [feat] + [3]*

To erase the contents of a Speed Dial bin:

1. Press [FEAT]
2. Dial [#] + [1]
3. Dial the bin number (00-19) to erase.
4. Press [HOLD]. You will hear confirmation tone.

### ***Executive Key Telephone***

To store a telephone number in a personal Speed Dial bin:

1. Press [FEAT]
2. Dial [#] + [1]. The display shows:

```
SPEED NO  : __
bksp  show  chg
```

3. Dial the bin number (00-19) where you want to store the telephone number. (You can press [bksp] and [chg] to correct errors.)
4. Press [show]. The display shows the current contents of that bin:

```
EMPTY
                chg
```

5. Press [chg]. The display shows:

```
__
bksp  save  chg
```

6. Dial the telephone number to be stored (up to 16 digits).
7. Press [save]

To continue storing telephone numbers in additional bins:

1. Repeat Steps 3 through 5 (for basic and enhanced telephones) and 3 through 7 (for executive telephones).

To erase the contents of a Speed Dial bin:

1. Press [save] instead of dialing a number in Step 4 (basic/enhanced) and Step 6 (executive).

To exit speed dial programming:

1. Press [CLEAR]

To chain together Speed Dial bins:

1. Enter [FEAT] + [1] + [BIN #] as part of the number in any speed bin to dial that bin contents, after the contents of the current bin.

```
16025551212 @ 00
                chg
```

To dial a number stored in Speed Dial:



*You may choose to first press an idle [CO line] or you may let the system automatically select the line.*

1. Press [FEAT].
2. Dial [1]. At an Executive Key Telephone, the display shows the following:

```
SPEED NO : __
```

3. Dial the desired bin number (00-99).

### Conditions

- Only an Executive Key Telephone can program System Speed Dial bins using Attendant Administration.
- System Speed Bin 99 is used for External Call Forward. (*DHS* requires the optional module.)
- If you access an empty bin, the display will show SPEED NO IS EMPTY.

---

## Station Feature Status Check

### Description

The Executive Key Telephone user can quickly determine the status of all user-controlled features. This feature is useful for the technician as well as the user since some feature conditions may not be evident if they are not programmed on an available programmable feature button. The current status can be observed using the soft interactive buttons.

### Operation

1. Press [FEAT]
2. Dial [#] + [8]. The display shows the contents of the Last Number Redial memory.

```
5551212
  LNR  next
```

3. Press [next]. The display shows the contents of the Save Dialed Number memory.

```
51800551212
  SDN  next
```

4. Continue pressing [next] to display the status of the remaining features:
  - User Saved Number
  - Day COS
  - Night COS
  - Auto Hold

- 
- 
- Phone Lock
  - Voice Announce
  - Call Wait Setting
  - Page Receive
  - Night Station

---

## Station Groups

### Description

The system provides eight Station Groups for partitioning the system into separate departments or related features. Members of a Station Group have the ability to pick up incoming or transferred calls from other associated members in the same group, via the Call Pickup Group code [FEAT] + [5] + [4]. Unlike Directed Call Pickup, you do not have to know or remember the ringing station's intercom number.

As a Station Group member, you also receive Internal Zone Pages directed to your Station Group. Station Groups are assigned in system programming.

### Default

All Stations default to Station Group 1.

---

## Station Numbering Plan

### Description

All stations on the *DHS* receive a 2-digit ICM number for inside calling. The 2-digit directory ranges from (10-81). All stations on the *DHS-E* receive a 3-digit ICM number for inside calling. The 3-digit directory ranges from (100-195). Before a station can be assigned a directory number already in use, the other station must be re-assigned to a new vacant number.

---

## System Time

### Description

The system provides a built-in clock to track System Time for certain features such as System Night Service Mode Change, SMDR Call Message Recording, Alarm Clock Check, etc. This clock is battery protected from power failure by a battery provided inside the KSU. System Time can be changed at any Executive Key Telephone using the attendant password or system programming.

---

---

## Toll Restriction

### Description

The *DHS* provides sophisticated monitoring of digits dialed on CO lines. If a digit or range of digits dialed on a CO line does not correlate with the Allow Digit Interval table, the CO line is released immediately. On any non-allowed call, the station user will receive error tone and the CO line button LED will extinguish. At an Executive Key Telephone, the user will see Call Restricted on the LCD. The Toll Restriction Allow Digit Interval table may be constructed in a matrix format and associated to any of the COS. Stations may be assigned a separate COS for Day System Mode operation and Night System Mode operation.

---

## Tone Detector

The system provides one shared tone detector which is used for certain features to detect the call status of the CO line call in progress. Those features which use the tone detector include DISA, External Call Forward, Last Number Redial and Save Dialed Number, Automatic Busy Redial and Dial Tone Detection.



*The DHS requires the Option Module to support this capability.*

The logical rules for sharing the tone detector are described below:

- Only one station is allowed to wait for the tone detector to become available.
- When the tone detector is currently assigned to a station, the maximum allowed time to wait for CO dial tone is 6 seconds (default).
- If no CO dial tone is detected within 6 seconds, the tone detector will be returned to idle, or assigned to another waiting station. The telephone number, if entered, will then be dialed.
- In the unlikely event that more than one station requests a tone detector at exactly the same moment, those stations will hear internal busy tone immediately, although a tone detector may be available.

---

## Tone/Inter-Digit Duration

### Description

Depending on the type of CO, and the customer specialized dialing requirements, the DTMF ON time and INTER-DIGIT time may be modified for manually-dialed or system automatically-dialed digits. Typically, no modification of tone/inter-digit duration is required. However, in some installations where line conditions are poor, tone duration and/or inter-digit duration timing may be increased to offset poor conditions. Tone duration and inter-digit duration may be assigned any value (50 to 150 ms).

---

---

### Conditions

- ❑ A longer tone duration or inter-digit duration time will cause a slower output of manual or automatic system-dialed numbers.
- ❑ A longer DTMF ON time and/or inter-digit tone time can be used to ensure more reliable interaction with remote voice mail and similar remote DTMF dial pad actuated devices.
- ❑ Users may experience a delayed DTMF confirmation tone if the tone/inter-digit duration is lengthened.
- ❑ Default DTMF duration is 70 ms.

---

## Transfer

### Description

There are three types of transfer you may use: screened, un-screened, and one-button. When you conduct a transfer, the outside line is placed on Exclusive Hold and can only be retrieved at your telephone or the telephone where you transferred the call. A screened transfer occurs when you announce the call to the person to whom you are transferring the call.

### Operation

To perform an Unscreened CO line or intercom call transfer:

1. Press [HOLD]
2. Dial the station/Hunt Group number where you want to transfer the call.
3. Press [TRANS] to transfer the call unscreened.

To perform a Screened CO line or intercom call transfer:

1. Press [HOLD]
2. Dial the station/Hunt Group number where you want to transfer the call.
3. Wait for the person you called to answer.
4. Press [TRANS] to complete the call transfer.

To perform a One-button transfer:

1. Press the DSS button of the desired target station.
2. Hang up to complete the transfer.

To transfer to Voice Mail:

1. Press the [Voice Mail] button.
2. Dial the 2-digit station number of the target mailbox.
3. Hang up to complete the transfer.



*Do not press the [CLEAR] button when processing an incoming call. This will disconnect the call. The telephone will return to the idle condition following the transfer operation.*



---

---

### Conditions

- ❑ Ring transfer recall time for any CO line call is programmable, between 16, 30, 60, 90, and 120 seconds.
- ❑ When a transferred CO line recalls, the line number and station number where the call was transferred will be displayed.
- ❑ Once the outside line changes from Hold to Transfer status, the outside party will hear Music-on-Hold change to a system-provided Ring Back tone.
- ❑ Intercom calls that are transferred, follow the Intercom Selection mode at the destination station (Voice Announce Hands-Free/Private or Tone Ring).
- ❑ In screened transfer, if the person that you transferred the call to answers your intercom call in Voice Announce Hands-Free mode, and does not go off-hook to connect with you on an intercom channel, the CO line will transfer ring when the transfer is completed.
- ❑ With voice mail transfers, if no VM mailbox digits are entered for transfers, no digits are sent to the VM system.
- ❑ If VM mailbox digits are entered for transfers to voice mail, the following digits are sent: XFR prefix, VM mailbox and XFR suffix.

---

## User Name Programming

### Description

An alphanumeric, seven-character user name may be assigned to each station in the system. This name will be displayed on Executive Key Telephones in place of the standard STATION message. Station user names are entered in system programming. The names may consist of upper and lower case letters.

---

## User Saved Number Redial (USNR)

### Description

When on a CO Call, the user can enter the User Saved Number Redial (USNR) feature code, allowing the entry of any other number (telephone number, FAX number, or even bank account number), as a scratch pad entry for future use. When the station is idle, the user can enter either the SDN ([feat] + [5] + [1]) and/or USNR feature codes to make a CO call and dial the number stored.

### Operation

To store a USNR number while on a call:

1. Press [FEAT].
2. Dial [5] + [\*]. At an Executive Key Telephone, the display shows:

SAVE USNR NUM

3. Enter the desired number to be stored.
4. Press [SAVE].

**To Dial:**

1. Press [FEAT].
2. Dial [5] + [\*].

**Conditions**

- The USNR is a maximum of sixteen (16) digits.
- If the USNR is empty, the display will show NO SAVED NUMBER.
- Station COS is applied a the time of use.



*The USNR feature code may be stored on any feature button for one-button storing or dialing operation.*

---

## Voice Announce (Hands-Free or Privacy)

**Description**

The Enhanced and Executive key telephone models provide the ability to receive incoming intercom calls in Voice Announce Hands-Free mode (VA-HF). When your telephone is in this mode, you can reply to an intercom call by using the speakerphone.

You may also choose to place your telephone in VA Privacy mode. In this mode, you can hear the person intercom calling you but your telephone's microphone remains muted so the person calling cannot hear you; therefore, calls may be announced to your station while maintaining a private environment.

**Table 4-12: Voice Announce**

<b>MODE</b>	<b>BUTTON LAMP</b>	<b>DISPLAY</b>	<b>TONE HEARD</b>
Voice Announce Hands-Free	Green	VA-HF Mode	Long steady
Voice Announce Private	Red	VA-Privacy Mode	Single burst
Tone Ring	No lamp lit	Tone Ring Mode	Double burst

## Operation

When your telephone is set for VA-HF mode:

1. The call is automatically connected and your display shows:

STA	14	CALL
-----	----	------

2. The display at the calling station reads:

VOICE	CALL	11
-------	------	----



*In VA-Privacy mode, the call can come in with mute on. Turn off mute to use the speakerphone or then lift the handset.*

## Conditions

- The (SPKR) button lamp will light during hands-free operation.
- To receive intercom calls with Hands-Free Answer Back, the feature must be enabled.

## Voice Mail Button

Voice Mail button is used to retrieve voice mail messages, and will flash an LED indicator when there are messages.

### Operation

1. Press [feat] + [#] + [3]
2. Press soft button you wish to program for the message waiting indicator.
3. Press [chg]
4. Press [feat] + [6] + [4]
5. Press [save]

## Voice Mail Integration

### Description

An ancillary voice mail device may be connected to the system, and you can program a button for access to this feature. In addition, the button provides an indication of voice messages waiting.

---

---

## Operation

When the Voice Mail system has messages for any station, the Voice Mail button will flash. The display at Executive Key Telephones will show:

VM FROM MAILBOX REPLY
--------------------------

To retrieve a voice mail message:

1. Press the [Voice Mail] button or press the [reply] button on an Executive Key Telephone model. The system will dial the appropriate numbers (according to programming) to the Voice Mail system.
2. Dial your password.

You may forward calls to the Voice Mail system using Call Forward and the Voice Mail Hunt Group number. Calls that you forward to Voice Mail will be forwarded to your mailbox. The person calling will hear your greeting and be prompted to leave a message. Once a message is left, the Voice Mail system will light the Voice Mail button. The Voice Mail system must be programmed to light Voice Mail buttons as follows.

To turn ON the lamp:

1. Dial [#] + [9] + [6].
2. Dial station number.

To turn OFF the lamp:

1. Dial [#] + [\*] + [9] + [6].
2. Dial station number.

## Conditions

- For proper operation of the Voice Mail button, it must be programmed (refer to [Chapter 5, SLT Features and Operation, "Message Waiting"](#), and [Table 5-1: SLT Feature Access Codes](#), in ).
- When an answering machine is connected to the system via a 2 Port Analog Adapter and In-Band (DTMF/Touch Tone) digits must be sent to the answering machine to control its functions, the SLT port must be programmed as type VM.
- If no Voice Mail button is programmed, it will default to flex button 20 on your telephone.

---

## Voice Mail Monitor

### Description

Similar to a basic answering machine, you can monitor your forwarded calls at the telephone where they were forwarded during the first few seconds after they are answered by a voice mail port.

When you forward calls to voice mail, your telephone will alert you when a call is being answered at the voice mail.

### Operation

When you hear the alert tone (double beep) while on a call:

1. Press [HOLD] or disconnect [CLEAR].
2. Press [FEAT]
3. Dial [6] + [4]. An Executive Telephone will display:

MONITOR	VM	CALL
yes		no

4. Press [yes] to monitor the caller leaving a message or [no] to return to idle.



*When [yes] or [no] is selected, the caller continues to leave a message, unaware of the monitor feature operation.*

5. If [yes] is selected, the display changes to:

MONITOR	MODE
answer	exit

6. Monitor mode is established. You may then:
  - Retrieve the caller from Voice Mail by pressing [answer].
  - Return to idle and allow the caller to continue leaving a message by pressing [exit].

### ***Basic and Enhanced Telephones***

To enable monitoring:

1. Dial [1]. The MUTE lamp will light.
2. Dial [3] to allow the caller to exit.
3. Dial [1] to be connected to the call.

To disable monitoring:

1. Dial [3]. The telephone returns to an idle condition.



*The feature code may be programmed on a programmable feature button. The green lamp will flash fast to indicate that the Voice Mail Monitor feature is ready.*

---

---

## Conditions

- You may press [MUTE] while monitoring a call to be connected to the caller.
- When you answer a call the programmed Disconnect Digits Table digits are sent to the voice mail port.
- You will hear the alert tone regardless of whether your telephone is idle or busy or in speakerphone or handset mode.
- When the new timer VM MON TIME expires the opportunity to invoke the feature has past.
- The new timer VM MON TIME is added to the Call Handling category of programming and will allow (10/20/30/40/60) second duration to be programmed.
- When you use the VM Monitor feature, a conference is established between yourself, the voice mail port associated to the call, and the caller leaving the voice mail message.
- If you are on a call when the VM Monitor alert tone signals you, you may place the call on hold to enable the VM Monitor feature.
- You may exit the VM Monitor mode by hanging up the handset, pressing [SPKR], or pressing [CLEAR].
- You may monitor only one call at a time.

---

## Voice Over Busy

### Description

If your telephone is busy you may still receive a voice announcement from a calling station. For instance, while you are on the telephone speaking with person (A), a person at another telephone on the system person (B) may call you and be heard. Person (A) will not hear person (B) voice announcement to you. Upon receiving the Voice Over Busy, you may choose to speak with person (B) or reject the Voice Over Busy request.

### Operation

#### *Basic and Enhanced Telephones*

To place a Voice Over Busy:

1. After dialing a busy station and listening to busy tone, press [FEAT].
2. Dial [5] + [6]

To reject a Voice Over Busy:

1. Press [FEAT]
2. Dial [5] + [6]

### ***Executive Telephones***

To place a Voice Over Busy:

1. Call any busy telephone. You will hear busy tone and your telephone displays:

STA	xx	BUSY
cbck	msg	next

2. Press [next]. The display shows:

STA	xx	BUSY
camp	voice	

3. Press [voice]. The display shows:

VOICE TO STA	xx
--------------	----

4. If the Voice Over Busy is rejected, the display will read VOICE REJECTED.

To accept a Voice Over Busy:

1. If while listening to the calling party, you wish to speak to the Voice Over Busy initiator, press [MUTE] (Use [MUTE] to switch your transmitter between the original call and the Voice Over Busy initiator).

To reject a Voice Over Busy:

1. The display shows:

STA	xx	VOICE
	reject	

2. Press [reject]. The display shows:

REJECT	VOICE
--------	-------

To allow Voice Over Busy calls:

1. Press [FEAT].
2. Dial [9] + [\*].

To deny Voice Over Busy calls:

1. Press [FEAT].
2. Dial [\*] + [9] + [\*].



*The Voice Over Busy feature code may be programmed on a programmable feature button.*

### **Conditions**

- Voice Over Busy is not possible when the Call Waiting, Busy Forward or Busy No Answer Forward features are enabled.
- Voice Over Busy may be allowed or denied at any station.
- If you are on a line and have Mute activated, the line will remain muted until the Voice Over Busy is complete.

---

## Voice Recorder

### Description

If you have an integrated voice mail system, this feature will allow you to record internal and external conversations. When the Voice Recorder is activated, a conference is established between the call and the system voice mail group. The conversation is recorded in your voice mail box when the feature is enabled.

### Operation

During a conversation:

1. Press [FEAT].
2. Dial [7] +[2]. An Executive telephone will display:



RECORDER SETUP

3. Once the Voice Recorder connection is established, the display will show:



RECORDING

4. Disable the feature at any time by Steps 1 and 2 above or by pressing a [programmed feature button].



*Use of this feature may be interpreted as a violation of federal, state or local laws, and an invasion of privacy. Check applicable laws in your area before using this feature.*



*You may program a button for this feature. During the set-up, the associated lamp for that button will light steady red. When the connection is established, the lamp will light steady green.*

- You must program this feature in [Chapter 6, System Programming](#).

---

## Volume Control

### Description

You can adjust the volume levels for five functions: Background Music, Ringing, Handset, Speaker and Headset. You adjust the volume while the function is in use. The telephone remembers the volume level selected for the next time that function is used. The ringer



---

volume adjustment allows for four volume levels. All other modes allow for eight volume levels.



*You may adjust the ringing volume while the telephone is not in use or while it is ringing. If you adjust the volume while the telephone is idle, you will hear a single ring burst to confirm your selection.*

### Conditions

- The Volume Control affects the receive loudness only. The person to whom you are speaking will not detect an increase in volume.

---

## Warning Tone

### Description

A system Warning Tone may be heard repeatedly on specific stations that have exceeded a preset time limit on outgoing calls. This feature is useful in a lobby or retail environment where lengthy outgoing calls are discouraged.

### Operation

If a station is set for a 3-minute Warning Tone, the user will hear Warning Tone when 3 minutes has elapsed. The tone will repeat every 10 seconds until the call is disconnected.



*Not recommended as a TOLL SAVER option (for specific application use). Warning Tone is only delivered on outgoing CO line calls.*

---

---

# 5

## SLT Features and Operation

The System and Single Line Telephone Features of the *STARPLUS® DHS/DHS-E™* Systems are listed and described in alphabetical order. Features described here pertain to Single Line Telephones and Analog devices (FAX, modem, cordless phone, etc.) connected to the *DHS/DHS-E* via the 2-Port Analog Adapter and 2-Port Analog Expander. An abbreviated feature index is provided; refer to [Table 5-1: SLT Feature Access Codes](#).



**Table 5-1: SLT Feature Access Codes**

FEATURE	DHS	DHS-E
Authority Code	#55+ SS +PPPP	#55 + SSS+ PPPP
Call Back	#91	#91
Cancel	#*91	#*91
Call Brokering	F	F
Call Forward		
Busy	#21 + SS	#21 + SSS
Busy/No Answer	#25 + SS* + T <sup>†</sup>	#25 + SS + T
Cancel	#2	#2
Direct (all modes)	#22 + SS	#22 + SSS
Follow Me Forward	#23 + SS + PPPP <sup>‡</sup>	#23 + SSS + PPPP
Idle	#20 + SS	#20 + SSS
No Answer	#24 + SS + T	#24 + SSS + T
Call—Hunt Group	82-89	800-807
Call Operator	0	0
Call Park Answer by CO Line	#73 + 0 + C	#73 + 0 + CCC
Call Pickup		
Direct	#53 + SS	#53 + SSS
Group	#54	#54
Camp On		
Busy Station	2	2
CO Line	#93	#93
□ Cancel	#*93	#*93
CO Line Access	9	9
Line Group	*4 + (g)**	*4 + (g)
Specific Line	*3 + C <sup>††</sup>	*3 + C

**Table 5-1: SLT Feature Access Codes**

<b>FEATURE</b>	<b>DHS</b>	<b>DHS-E</b>
Do Not Disturb (Set/Clear)	#4	#4
Hold	F + wait	F + wait
Retrieve	*6	*6
Retrieve from Another Station	*7 + SS	*7 + SSS
Hot Line		
Cancel	##4	##4
CO Line	##4 + T + *3 + n	##4 + T + nnn (nnn = 700-717)
External Page	##4 + T + #501	##4 + T + #501
Internal All Call Page	##4 + T + #500	##4 + T + #500
Internal Station Group Page	##4 + T + #503 + g	##4 + T + #503 + g
Line Group	##4 + T + *4 + n	##4 + T + nnn (nnn = 200-207)
Speed Bin	##4 + T + *1 + nn	##4 + T + *1 + nn
Station	##4 + T + SS	##4 + T + SSS
System All Call Page	##4 + T + #502	##4 + T + #502
Intercom Call (two or three digits)	10-81	100-195
Last Number Redial	#8	#8
Line Flash CO/PBX	F + #3	F + #3
Message Waiting		
Cancel	*96 + SS	*96 + SSS
Send	#96 + SS	#96 + SSS
Page		
Page All Internal	#500	#500
External—Paging Speakers	#501	#501
Meet Me Answer (Meet Me Page)	#59	#59
Station Group	#503 + g	#503 + g
System All Call	#502	#502

**Table 5-1: SLT Feature Access Codes**

FEATURE	DHS	DHS-E
Speed Dial		
Dialing	*1 + bb	*1 + bb
Storing	#1 + bb <sup>‡‡</sup> + n <sup>***</sup> + F	#1 + bb + n + F
Station Alarm		
Cancel	*92	*92
Set	#92 + hhmm	#92 + hhmm
Station Lock	#97 + PPPP + #	#97 + PPPP + #
Password Change	#97 + PPPP + pppp <sup>†††</sup>	#97 + PPPP + pppp
Unlock	#97 + PPPP + *	#97 + PPPP + *
Voice Mail	#64	#64
Transfer	F <sup>†††</sup> + SS	F + SSS
Voice Over Busy Originate	#56	#56

- \*   SS(S) = Station  
 †   T = Time  
 ‡   PPPP = Password  
 \*\*   g = Group  
 ††   C(CC) = Central Office  
 ‡‡   bb = Bin Number  
 \*\*\*   n = Number  
 †††   pppp = New Password  
 ‡‡‡   F = Flash

---

---

## Authority Code

### Description

Any station user may use his own station Class of Service using another station for CO line dialing.



[ss] = XX for DHS or XXX for DHS-E.

### Operation

1. Lift handset
2. Dial [#] + [5] + [5] + [ss] + [pppp]

Where:

ss = the station with the desired authority)

pppp = that station's password

---

## Call Back

### Description

When the SLT user calls another system station that is busy he may leave a Call Back request at the station. When the Call Back request is invoked, the SLT station will ring when the busy station goes on hook. Once the SLT answers the Call Back ringing, a new intercom call is placed to the station previously dialed.

### Operation

When listening to Busy Tone after dialing a station number:

1. Dial [#] + [9] + [1]

### *Cancel*

1. Lift handset
2. Dial [#] + [\*] + [9] + [1]

---

---

## Call Brokering

### Description

Single Line Telephone (SLT) station users may connect to a second party and alternate between connections. This feature is desirable when an SLT user wants to maintain the connection of the parties and at the same time keep them separate from each other.

### Operation

While engaged on an intercom or CO line call:

1. Press Hook Flash. The original conversation party is placed on hold.
2. Dial the next station or CO line call.

When the new party answers:

1. Press Hook Flash to be connected to the first party and place the new call on hold.

---

## Call Forward

### Description

The SLT user may forward telephone calls to another station, VM or Hunt Group using 4 call type criteria. The SLT user may also use Follow Me Forward to extend calls at another station to this station.



*The user at the forwarded station will hear special Intercom Reminder tone signifying that Call Forward is activated.*

### Operation

Calls to this station will follow the forward scheme selected.

To setup Call Forward modes:

1. Lift handset

### *Busy*

1. Dial [#] + [2] + [1] + [xx]

Where:

xx = destination desired

### *Busy/No Answer*

1. Dial [#] + [2] + [5] + [xx] + [t]

Where:

xx = destination desired

t = time to ring before forwarding in the no answer scenario: 0 = 10 seconds, 1=20 seconds, 2=30 seconds, 3=40 seconds and 4=50 seconds.



*Cancel*

1. Lift handset
2. Dial [#] + [2]

*Direct (All Call)*

1. Dial [#] + [2] + [2] + [xx]  
Where:  
xx = destination desired

*Follow Me Forward*

1. Dial [#] + [2] + [3] + [ss] + [pppp]  
Where:  
ss = station number to forward to this location  
pppp = password of the station to forward

*Idle*

1. Dial [#] + [2] + [0] + [xx]  
Where:  
xx = destination desired

*No Answer*

1. Dial [#] + [2] + [4] + [xx] + [t]  
Where:  
xx = destination desired  
t = time to ring before forwarding; 0 = 10 seconds, 1 = 20 seconds, 2 = 30 seconds, 3 = 40 seconds and 4 = 50 seconds).

**Call Operator (Call Attendant)****Description**

The system Attendant station may be easily called by one dialed digit code. At default, this code is 0.

**Operation**

1. Lift handset
2. Dial [0]

**Conditions**

- The code dialed for the system attendant (0 or 9) is dependent on Database Programming of Operator Code. If 9 is programmed, that is the code that must be used to call the system attendant.
- The Operator access code (0 or 9) is mutually exclusive with the outside CO line access code.

---

---

## Call Park Answer

### Description

SLT users can retrieve calls that have been placed into Call Park status, by dialing the Call Park Answer Feature Code plus the station number or the CO Line number.

### Operation

1. Lift handset
2. Dial [#] + [7] + [3] + [0] + [c]

OR

1. Lift handset
2. Dial [#] + [7] + [3] + [sn]

Where:

sn = Station Number.

c = CO line number/code for the desired CO line: (1-9) = CO lines (1-9), 0 = CO line 10, [\*] = CO line 11 and (#) = CO line 12.

---

## Call Pickup

### *Direct*

### Description

Ringing calls at unattended stations may be retrieved using the Direct Pickup code.

### Operation

1. Lift handset
2. Dial [#] + [5] + [3] + [sn]

Where:

sn = Station Number 10-81

### *Group*

### Description

Ringing calls at unattended stations may be retrieved via the Group Pickup code, assuming that the station invoking the feature is in the same Station Group as the ringing station.

### Operation

1. Lift handset
2. Dial [#] + [5] + [4]

## Camp On

### *Busy Station*

#### **Description**

An SLT station may Camp On to a busy station. While listening to busy tone after dialing the station number, the SLT user dials the Camp On feature code.

#### **Operation**

When the called station is busy:

1. Dial [2] while listening to the Busy Tone.

### *Busy CO Line*

#### **Description**

An SLT station may Camp On to a busy CO line.

#### **Operation**

When a CO line access attempt results in Busy Tone:

1. Dial [#] + [9] + [3] while listening to busy.

#### **Cancel**

1. Lift handset
2. Dial [#] + [\*] + [9] + [3]

---

## CO Line Access

#### **Description**

CO line access is simplified at an SLT by dialing a CO line access code. The code may be 9 or 0, depending on Database Programming. CO line group access codes are also available (system must be set to PBX). Unused CO ports must be programmed as open.

#### **Operation**

To access any idle CO line:

1. Lift handset
2. Dial [9]

### *Line Group*

To access any idle CO Line in a specific CO Line group:

1. Lift handset
2. Dial [\*]+ [4] + [g]

Where:

g = CO Line Group number desired, Groups are (0 - 4), and Group 0 is any group.

---

---

## Specific Line

To access a specific CO Line:

1. Lift handset
2. Dial [\*] + [3] + [c]

Where c = the CO line number/code for the desired CO line: 1-9 = CO lines (1-9),  
0 = CO line 10, [\*] = CO line 11 and # = CO line 12.

### Conditions

- An SLT station may dial access any CO line that has been allowed in database programming.
- The dial codes 9 and 0 are mutually exclusive. When one or the other is programmed as the Operator Code the remaining is assigned for out dialing at SLT stations. Dial access 9/0 will access the highest available line regardless of line groups.
- The CO line(s) permitted for outgoing selection in any CO line Group, or individually, are dependent on the station programming for CO line access. Refer to [“Call Operator \(Call Attendant\)”](#).

---

## Do Not Disturb (DND)

### Description

SLT stations may place their telephones in DND mode to avert incoming calls.

### Operation

To set DND:

1. Lift handset.
2. Dial [#] + [4].

To cancel:

1. Lift handset.
2. Dial [#] + [4].



*Calls to a station in DND will hear DND Tone.*

### Conditions

- Reminder Tone is heard each time the user goes off hook to make calls when DND is active to remind the user of the DND condition.
- When an SLT is in DND mode, DSS button LEDs at other stations will flash, (Refer to [Chapter 4, Keystation Features and Operation, “DND Override”](#)).

---

## Flash

### Description

This feature allows CO/PBX line users working behind a Centrex or PBX line to generate a hook-flash over that line to access features or transfer calls.



*It is recommended that SLT stations installed be equipped with a TAP or FLASH button and the guaranteed disconnect feature. (Many SLT models offer these features.) These features will greatly enhance. If the SLT station user stays on-hook for any time exceeding the END time programmed, the previous call will be disconnected.*

### Operation

While connected to a CO/PBX line:

1. Press flash
2. Dial [#] + [3]

---

## Hold

### *Flash*

### Description

CO line calls and ICM calls may be placed on Hold.

### Operation

While connected to a CO Line:

1. Press Hook Flash
2. After a 5 second delay, dial tone is heard, and the party is placed on hold.
3. Hang up

While connected to an intercom call:

1. Press Hook Flash
2. Dial tone is heard, and the party is placed on hold.
3. Hang up

### Conditions

- When an intercom/CO line call is placed on Hold and the holding party hangs up, after the Hold Reminder time is elapsed, the system will ring the hold activating station with internal or external ring signal. If Hold Reminder is disabled, 30 seconds after the call is placed on hold, the system will give the holding party recall ring (internal ring for held ICM call and external ring for held CO Line call). Refer to [Chapter 4, Keystation Features and Operation, "Reminder Time"](#).
- If Call Abandon is set and properly functioning, calls placed on hold will be released if the outside party disconnects.

- To answer Hold Recall at an SLT, lift the handset (refer to [Chapter 4, Keystation Features and Operation, "Transfer"](#)).
- This feature may need to be adjusted on some telephones for proper operation (refer to [Chapter 6, System Programming, "Call Handling Configuration"](#)).

## *Retrieve*

### **Description**

Since multiple calls may be placed simultaneously at an SLT, the Call Hold Receive feature may be used to access a call previously placed on Hold.

### **Operation**

When the SLT user wishes to retrieve a held call:

1. Lift the handset, ICM dial tone is heard.
2. Dial [\*] + [6]
3. Talk with the original held party.

If no intercom/CO line call has been placed on hold by the user or if the line on hold has been picked up elsewhere:

1. Lift handset, an ICM dial tone is heard.
2. Dial [\*] + [6], an error tone is heard.

## *Retrieve from Another Station*

### **Description**

This feature is used to access CO lines that are placed on hold at other stations.

### **Operation**

To pick up a held call at another station:

1. Lift handset
2. Dial [\*] + [7]
3. Dial station number where call is holding.



*If no CO Line call is holding at that station, error tone is heard.*

## Hot Line (Ring Down)

### Description

This feature allows you to use the associated single line telephone (SLT) port for automatic signaling to a predetermined destination. When the feature is enabled, the destination will be signaled whenever that SLT goes off-hook. You may hook-flash at the SLT where the feature is enabled so that you can request intercom dial tone to perform other functions and change or disable the feature when no delay time is programmed. You can set up the Hot Line feature to call another Telephone, Hunt/Voice Mail Group, Paging Zone, CO line or CO line Group.

### Operation

To program the Hot Line feature (*DHS*):

1. Lift the handset
2. Dial [#] + [#] + [4]
3. Dial the delay time (1-9) seconds.
4. Dial the destination code. You may choose from the following:
  - [#] + [500] (Internal All Call Paging)
  - [#] + [501] (External Paging)
  - [#] + [502] (System All Call Paging)
  - [#] + [503] + [n] (Internal Paging by station group where n = station group 1-8)
  - [\*] + [1] + [nn] (nn = speed dial bin 00-99)
  - [\*] + [3] + [n] (n = the CO line number (1-9), 0, [\*], [#])
  - [\*] + [4] + [n] (n = the CO line group number or 0 if any group)
  - DHS* [10-89] (Station/Hunt Group number)

To program the Hot Line feature (*DHS-E*):

1. Lift the handset
2. Dial [#] + [#] + [4]
3. Dial the delay time (0-9) seconds.
4. Dial the destination code. You may choose from the following:
  - [#] + [500] (Internal All Call Paging)
  - [#] + [501] (External Paging)
  - [#] + [502] (System All Call Paging)
  - [#] + [503] + [n] (Internal Paging by station group where n = station group 1-8)
  - [\*] + [1] + [nn] (nn = speed dial bin 00-99)
  - [\*] + [3] + [nnn] (nnn = the CO line number (1-9), 0, [\*], [#])
  - [\*] + [4] + [nnn] (nnn = the CO line group number or 0 if any group)
  - DHS-E* [800-807] (Station/Hunt Group number)

---

---

## *Cancel*

1. Lift the handset
2. Dial [#] + [#] + [4]

### **Operation**

1. Go off-hook
2. Wait for the delay time to expire.

### **Conditions**

- Operation of Hot Line to a Station, Speed Dial Bin or CO line, that is not valid or programmed, results in an error tone.
- If the programming parameter SYSTEM TYPE is set to KEY, you will hear an error tone if the Hot Line feature is set for a CO line group.
- If the SYSTEM TYPE was set to PBX but later changed to KEY, operation of Hot Line to a CO line group will not be allowed when you setup CO line group operation.
- If used for 911 (emergency), it must be tested regularly to verify proper operation.

---

## **Intercom Call**

### **Description**

The SLT user can make Intercom Calls by going off-hook (intercom dial tone) and dialing the Intercom Station Number of the desired station.

### **Operation**

1. Lift handset
2. Dial the desired station, Hunt Group or VM Group number.

---

## **Last Number Redial (LNR)**

### **Description**

The Last Number Redial (LNR) feature automatically dials the last number dialed from that telephone. A maximum of 16 digits can be stored in the LNR buffer for every station.

### **Operation**

1. Lift handset
2. Dial [#] + [8]



## Message Waiting

### Description

The user is able to send messages to a station and return messages left at their station by dialing a feature code.



*When there is a message waiting, the user will hear special Intercom Reminder tone signifying that there is a message.*

### Operation

#### *Cancel*

1. Lift the handset
2. Dial [#] + [\*] + [96] + [ss]

#### *Send*

1. Lift the handset
2. Dial [#] + [9] + [6] + [ss]

Where:

ss = Station number (10-81) where the message is to be left

## Paging

### Description

SLT stations can access through the use of feature codes (Internal, External, and All Call Paging services) on the *DHS/DHS-E* Systems.

### Operation

- All Call Internal - Lift handset and dial [#] + [500]
- External Paging Only - Lift handset and dial [#] + [501]
- System All Call Paging - Lift handset and dial [#] + [502]
- Group Paging (Zones) - Lift handset and dial [#] + [503] + [g]
- Where g = Station Group 1-8

#### *Meet Me Answer (Meet Me Page)*

### Description

Any user hearing an Internal or External Page can answer the Page by dialing the Meet Me Page feature code.

## Operation

When a page announcement is heard:

1. Lift the handset
2. Dial [#] + [5] + [9]

---

## Port Numbering

### Description

Adding SLT stations to the *DHS/DHS-E* has the significant advantage of port-gain. When the SLT interfaces are installed (2-Port Analog Adapter and 2-Port SLT Expansion), the station numbering and available station ports are expanded at a ratio of 2-to-1. When analog adapters and expansions are installed, the port numbering is as follows:

**Table 5-2: SLT Port Numbering (DHS)**

Card 1			Card 2			Card 3		
Digital Port	B1 Sta Number	B2 Sta Number	Digital Port	B1 Sta Number	B2 Sta Number	Digital Port	B1 Sta Number	B2 Sta Number
01	10	58	09	18	66	17	26	74
02	11	59	10	19	67	18	27	75
03	12	60	11	20	68	19	28	76
04	13	61	12	21	69	20	29	77
05	14	62	13	22	70	21	30	78
06	15	63	14	23	71	22	31	79
07	16	64	15	24	72	23	32	80
08	17	65	16	25	73	24	33	81

Table 5-3: SLT Port Numbering (DHS-E)

Card 1			Card 2			Card 3		
Digital Port	B1 Sta Number	B2 Sta Number	Digital Port	B1 Sta Number	B2 Sta Number	Digital Port	B1 Sta Number	B2 Sta Number
01	100	148	09	108	156	17	116	164
02	101	149	10	109	157	18	117	165
03	102	150	11	110	158	19	118	166
04	103	151	12	111	159	20	119	167
05	104	152	13	112	160	21	120	168
06	105	153	14	113	161	22	121	169
07	106	154	15	114	162	23	122	170
08	107	155	16	115	163	24	123	171

Card 4			Card 5			Card 6		
Digital Port	B1 Sta Number	B2 Sta Number	Digital Port	B1 Sta Number	B2 Sta Number	Digital Port	B1 Sta Number	B2 Sta Number
25	124	172	33	132	180	41	140	188
26	125	173	34	133	181	42	141	189
27	126	174	35	134	182	43	142	190
28	127	175	36	135	183	44	143	191
29	128	176	37	136	184	45	144	192
30	129	177	38	137	185	46	145	193
31	130	178	39	138	186	47	146	194
32	131	179	40	139	187	48	147	195

### Operation

When setting or changing feature status, the single line telephone (SLT) will hear confirmation tone, which is a long uninterrupted tone indicating successful operation. The user must go on hook and back off hook before attempting other call processing or feature status changes.

- ❑ When setting the feature status, the SLT will receive error tone if the feature access code combination is incorrect.
- ❑ When error tone is heard, the SLT must hang up and lift the handset again to attempt any further operation.
- ❑ SLT features DND, Call Forward, and Message Waiting (when a Message Waiting indication has been left at the SLT) alert the SLT user that the feature is active by an interrupted (stutter) dial tone.

## *2-port Analog Adapter*

### **Description**

A 2-Port Analog Adapter is provided for connection of standard 2-wire analog telephone equipment to the digital network of the *DHS/DHS-E*. Common uses of the 2-Port Analog Adapter are voice mail, facsimile machines, modems, and single line analog telephones. The 2-Port Analog Adapter is a self-contained, system-powered apparatus that creates 2 separate analog station ports from one system 2B+D digital key telephone port. The housing accommodates the electrical components of the 2-Port Analog Adapter and the 2-Port Analog Expansion. The 2-Port Analog Expansion PCB is exactly the same PCB and function as the 2-Port Analog Adapter PCB function. (One 2-Port Analog Expansion may be added to the 2-Port Analog Adapter housing.) The 2-Port Analog Adapter and 2-Port Analog Expansion each provide 2 dedicated DTMF receivers for decoding the dialed digits from the connected device. (Each analog port has a dedicated DTMF receiver.) To place calls, the analog telephone must provide DTMF tone signaling which is decoded by the adapter for call processing instructions. Twenty-five cycle (frequency) ringing is provided by each analog adapter for the attached analog device. Since each 2-port adapter provides dedicated DTMF receivers and ringing generators, and because the system has a non-blocking digital ICM bus, the single line telephones (SLT) are not traffic sensitive and do not require special traffic balancing.



*Directory Numbers are changed in system programming.*

### **Conditions**

- ❑ Any single line (2500 type) telephone equipment can be connected to the system using the 2-Port Analog Adapter and 2-Port Analog Expansion.
- ❑ Directory Numbers *DHS* (58-81) and *DHS-E* (148-195) are assigned to B2 channels for SLT use at default.
- ❑ When 2-port analog adapter is installed, the first single line extension number from that adapter is the same as the digital port extension number into which it is plugged. The second analog extension number is the first number plus 48 (example: 100 and 148, 101 and 149). Refer to [Chapter 6, SLT Features and Operation: Table 5-2: SLT Port Numbering \(DHS\)](#), and [Table 5-3: SLT Port Numbering \(DHS-E\)](#).
- ❑ Some modems are not compatible with 2-port analog adapters.

---

---

## Speed Dialing

### Description

Speed Dialing (SPD) allows SLT users to store frequently dialed numbers. These numbers can easily be selected by dialing the Features Access Code plus the Bin Number desired. Each station can store twenty (20) Station SPD Numbers in memory Bins (00-19). Each SPD Bin may contain up to sixteen (16) digits.

### Operation

#### *Dialing*

1. Lift handset
2. Dial [\*] + [1]
3. Dial SPD bin number.

#### *Storing*

1. Lift handset
2. Dial [#] + [1]
3. Dial SPD bin for programming. Station Speed Dial bins range from (00-19).
4. Enter the desired outside phone number.
5. Press Hook Flash, and a confirmation Tone is heard.



*Use of System speed dial numbers is based on the SLT Class of Service assignment. When speed dialing, either private speed dial number or system speed dial number is allowed.*

---

## Station Alarm

### Description

An SLT may instruct the system to ring the telephone at a predetermined time for use as a reminder.

### Operation

#### *Set*

1. Lift handset
2. Dial [#] + [9] + [2] + [hh] + [mm]  
Where:  
hh = hour in military format  
mm = minute

---

---

## Cancel

1. Lift handset
2. Dial [#] + [\*] + [9] + [2]



*Station Alarm setting is cancelled after each use.*

---

## Station Lock

### Description

The Station Lock/Unlock feature is used to prevent unauthorized outside calling from a station that is unattended. The feature code [#97] is also used to program the station's private 4-digit password.



*Use of the Station Lock feature 97 will restrict access to 911.*

### Operation

To lock station:

1. Lift handset
2. Dial [#] + [9] + [7] + [pppp] + [#]

Where:

pppp = current password

### Password Change

1. Lift handset
2. Dial [#] + [9] + [7] + [pppp] + [new four digit password]

Where:

pppp = current password

### Unlock

1. Lift handset
2. Dial [#] + [9] + [7] + [pppp] + [\*]

Where:

pppp = current password

---

---

## Transfer

### Description

Transfer a call from your station to another station while connected to current call.

### Operation

While on a CO Line call:

1. Press Hook Flash
2. Dial Station number within 5 seconds (call will be disconnected after 5 seconds have elapsed if station number is not entered).
3. Hang up to complete the transfer.

While on an intecom call:

1. Press Hook Flash
2. Dial Station number
3. Hang up to complete the transfer.

### Conditions

- When a CO line call is transferred, the system rings the new station with external ring signal.
- When transferring a call, the held internal party becomes the new calling party and hears Ring Back tone.
- CO Line Call Transfer is allowed for idle or busy transfers.
- An SLT cannot transfer a CO line call to a station that is in DND mode.

---

---

# 6

## System Programming

It is very important to load default customer data when a system is first installed, when upgrading software feature packages or when severe power disturbances cause reason to doubt the customer database integrity. If any of these conditions exist, please use the [Power Up Initialization](#) information in [Chapters 2 and 3, DHS and DHS-E Description and Installation](#), before proceeding with any customer specific programming.



*Customer Database programming is protected from loss during power interruptions by an internal Nicad or Nimh battery. This battery will maintain customer database programming for up to 300 hours when fully charged. For a battery to become fully charged, the system must be powered continuously for 14 hours.*





---

---

## PC Programming

The Feature Package 3 software allows the service technician to program the *STARPLUS*<sup>®</sup> *DHS/DHS-E*<sup>™</sup> system using an external, PC-based, Windows<sup>™</sup> software programming tool. The Windows<sup>™</sup> software tool streamlines programming and allows for database printout and reserve storage. Operation of the Windows<sup>™</sup> software is not covered in this text. There are two versions of Windows DBA: one for *DHS* and one for *DHS-E*. On-line help is provided within the software tool to assist the adept user. Those unfamiliar with PC operation and the Windows<sup>™</sup> environment should rely on the following (all encompassing) built-in Database Administration facility. The *DHS* system requires the Option Module to be installed to provide a serial port for connecting the PC to the system.

---

## Keypad Programming

Three LCD interactive soft buttons are instrumental in the database programming process. Programming must be performed at an Executive model key telephone.

### *Soft Button Prompts*



LCD display menu prompts encountered during programming are:

**bksp:** When the new programming data entry is not desired, the station user may press the backspace [bksp] button to erase the last data entered and return to the immediately preceding prompt.

**save:** When the new data is entered, the system will check the entered data automatically. If the entry is invalid, the prompt will be refreshed. The station user must press the store [save] button to confirm entry and continue with the next prompt item.

**chg:** Press the change [chg] button to modify the current prompted item. If the data/message to be changed is generated by the system itself, the current programming item will be replaced by new data (toggled between YES and NO, or cycled through several data/messages) when the user presses the [chg] button.

**next:** Repeated depressions of the [next] button will present the next selection or the next programmable item within the current category.

**back:** Repeated depressions of the [back] button operate similarly to the [next] button where the previous programming category is selected, or the previous programming item within the current category is selected.

**show:** Press the display [show] button to enter into detailed item feature programming of a specific category, or to display current programmed content of the feature.

**clear:** The [clear] button can be used at anytime in system programming. Depressing this button aborts any programming in progress and returns the Executive Key Telephone to an idle state.

---



---

## Program Mode Entry

To make changes in the customer database, you must enter Database Programming from an idle Executive (display model) Key Telephone. (Any Executive Key Telephone connected to any station port will serve as the programming entry terminal). Depending on initial setup, the system may operate only as a Key system and utilize the Key system (KF) FCC Registration Number, or as a hybrid PBX system which requires a different unique FCC (MF) Registration Number. The selection of KEY or PBX operation is made by the installing company and requires proper notification to the Telephone Company regarding the type of service to be provided by the local exchange carrier.

To enter the programming mode:

1. From an idle station, press the [FEAT] button. The display changes as seen below:

```
F
```

2. Dial [#] + [\*] on the keypad. The display prompts for the database password. The default password is 000000.

```
DB PSWD : __
bksp show chg
```

3. Press the center Soft button corresponding to the [show] seen on the display. The display shows the first customer database-programming category System Type. There are two choices in this category, PBX or KEY.



*The FCC Registration number that is provided to the telephone operating company servicing this equipment is directly related to the programming of this category (Refer to [Chapter 1, Introduction](#)).*

```
SYSTEM TYPE:  PBX
back  next  chg
```

Press the right Soft Button [chg]. The value stored for the System Type is changed from one of the available choices to the other with each depression.

```
SYSTEM TYPE:  KEY
back  next  chg
```

At the moment the [chg] button is pressed and the value displayed, that operation becomes functional. This is true for any database field where the [chg] button selects from the available data field values. In other areas of programming where data is entered from the dial key pad, the [save] Soft Button must be pressed to save that entered data.



*If customer changes system type from PBX to KEY system, the contents in programmable feature keys where CO line group number had been programmed before will not be affected or changed. Consequently, depression of those feature keys associated with KEY type mode will not operate. When checking those feature keys via key inquiry function, depression of soft button [show] during verification will generate warning message of CODE UNAVAILABLE.*

4. When the center Soft Button [next] is pressed, the next sequential programming category is displayed.

1. STATION  
back    next    show

Or, if the left Soft Button [back] is pressed, the last programming category is displayed.

6. SYS APPLICAT.  
back    next    show

The two Soft Buttons (left and center) [back] and [next] can be pressed repeatedly to move through the programming categories in a menu fashion. The programming categories and associated displays are as follows:

1. STATION  
back    next    show

2. CO LINE  
back    next    show

3. CALL HANDLING.  
back    next    show

4. RESOURCE  
back    next    show

5. RESTRICTION  
back    next    show

6. SYS APPLICAT.  
back    next    show

## Conditions

- ❑ Only one Executive key telephone can be used at a time to perform system programming or attendant administration. Otherwise, a warning message will be received.
- ❑ System Type appears following DB Programming entry and the DB Programming password. Pressing [back] and [next] will not re-display this category.

Table 6-1 is a complete list of the programming default values for the *DHS/DHS-E*.

**Table 6-1: Database Programming Table**

FEATURES	RANGE	DEFAULT
SYSTEM-STATION PROGRAMMING		
System Type	PBX-KEY	PBX
STATION PARAMETERS	10-81 100-195	(none)
Day Class of Service	0-7	0
Night Class of Service	0-7	0
CO Line Assign	1-12 Y-N 700-717 Y-N	all Y
Receive Assign	1-12 Y-N 700-717 Y-N	all Y
(*) Ring Assign	1-12 700-717 day nite both none	Sta 10 Sta 100
Account Code Forced	Y/N	N
Station Group	1-8	1
Warning Tone	Y/N	N
Drop Time-out	Y/N	N
Station Position	10-81 100-195	B1=10-33 B2=58-81 B1=100-147 B2=148-195
Voice Mail Port	Y/N	N
DSS Owner {FP3}	10-23	(none)
CO LINE ATTRIBUTES		
CO LINE PARAMETERS	01-12 700-717	
Dialing Type Selection	Tone/Pulse	Tone

**Table 6-1: Database Programming Table (Continued)**

FEATURES	RANGE	DEFAULT
Call Abandon	Y/N	Y
CO Line Type	CO/PBX/OPN	CO
Loud Bell	Y/N	N
CO Line Group	1-4	1
Private To	10-81 100-195	Empty
Toll Override	Y/N	N
Distinct Tone	0-4	0 (None)
ICLID Port	0-12 0-18	0 (None)
<b>CALL HANDLING ATTRIBUTES</b>		
Privacy RLS (Release)	Y/N	N
Privacy Release Tone	Y/N	Y
Exclusive Hold Time	0-8 min	4 min
Flash Time	0.1-1.5 sec	0.7 sec (700 msec)
Remind Time	0/10/30/60/90 sec	30 sec
Park Remind	0/10/30/60/90 sec	30 sec
Pause Time	0/10/30/60/90 sec	2 sec
PBX Code	0-9	9
PBX Auto Pause	1-9 sec	1 sec
Dialing Ratio	Tone/ INT_DGTtime 50-150 msec	Tone/70 msec
VM Dialing Ratio	Tone/INT_DGTtime 50-150 msec	Tone/120 msec
Warning Time	1-8 min	3 min
Recall Time	16/30/60/90/120 sec	30 sec
SLT Hook Flash		300 - 1500 ms
DISA (Direct Inward System Access)		None

**Table 6-1: Database Programming Table (Continued)**

FEATURES	RANGE	DEFAULT
External Call Forward		None
Unsupervised Conference	Y/N	Y
Operator Code	0/9	0
Unsupervised Conference Time	1/2/3/5/15 min	1 min
Auto Busy Redial		10
Call Abandon Time		600 sec
Ring Alt Position	30/60/90/120/180 sec	30 sec
CO Line Preset Call Forward		None
Wait ICLID	3.5/4.0/...7.0 sec	6.0 sec
VM Monitor Time	10/20/30/40/60 sec	30 sec
<b>RESOURCE ATTRIBUTES</b>		
Ring Scheme	1/2/3/4	2
Letter Type	0/1/2/3/4/5	0
Attendant	10–81 100–195	10/100
Alternate (Attendant)	10–81 100–195	Empty
System Alarm	00:00–23:59	Empty
Nite Start	00:00–23:59	1700
Nite End	00:00–23:59	0800
Database Password	XXXXXXXX (x=0–9)	000000
User Password	XXXX (X=0–9)	0000
User Names	7 Alphanumeric	Empty
Pre-Programmed Messages	7 Alphanumeric	
System Speed Numbers	Bins 20–99	Empty
Background Music	Y/N	N
CO Line Copy	N/A	N/A

**Table 6-1: Database Programming Table (Continued)**

FEATURES	RANGE	DEFAULT
Station Copy	N/A	N/A
Feature Button Copy	N/A	N/A
System Time		Default date
Account Code Table		
Data Link	Manual/Auto	N/A
Directory Dial		N/A
Distinctive Ring	1-4	1
RMT X_Rate	110/300/...19200	9600 bps
SMDR X_Rate	110/300/...19200	9600 bps
Hour Mode	12/24 Hr	12 Hr
Dial Tone Detect	Y/N	N
Dial Wait Time	0-8	0
KSU Revision	N/A	KXXU VX.FXX
Modem Port Number (DHSE only)	N/A	199
RESTRICTION ATTRIBUTES		
CO Line Call Discrimination		0-9
APPLICATIONS ATTRIBUTES		
Station Hunt Groups	See Detail	See Detail
Voice Mail	See Detail	See Detail
Numbering Plan	See Detail	See Detail



### *Database Programming Procedural Flow*

The flowchart on the following pages can be used as a guide when performing database programming. There are six programming functions as shown in [Figure 6-1: Database Programming Functions—Station and CO Line](#). Details of these programming functions are shown in the subsequent figures. Please note the following conventions used in the flowchart, similar to the soft buttons previously listed:

- back: returns to the previous item within the programming function.
- next: moves to the next item within the programming function.
- hold: returns to the beginning of the programming function unless otherwise noted.
- show: moves to the first item within the programming function.

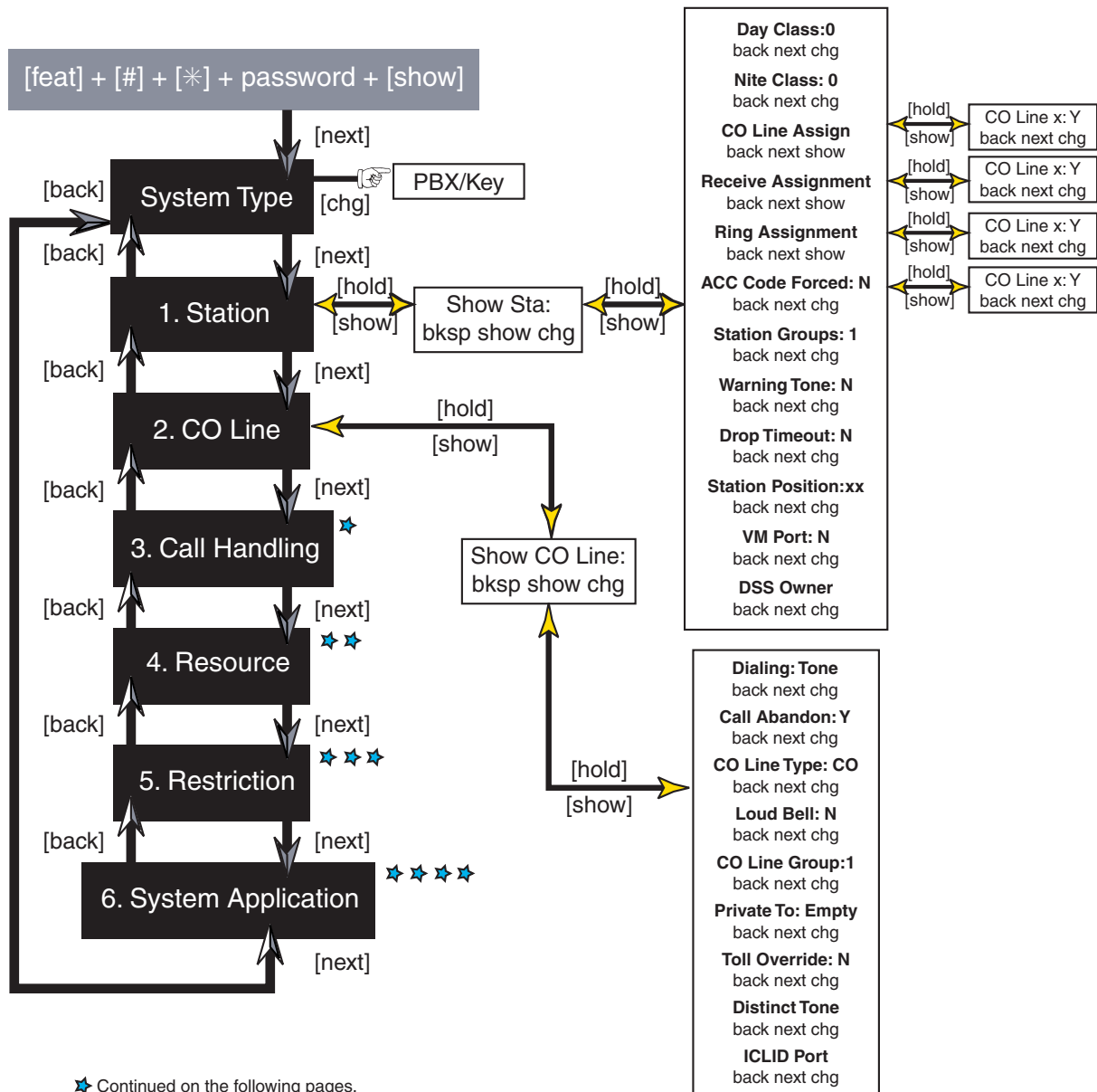


Figure 6-1: Database Programming Functions—Station and CO Line

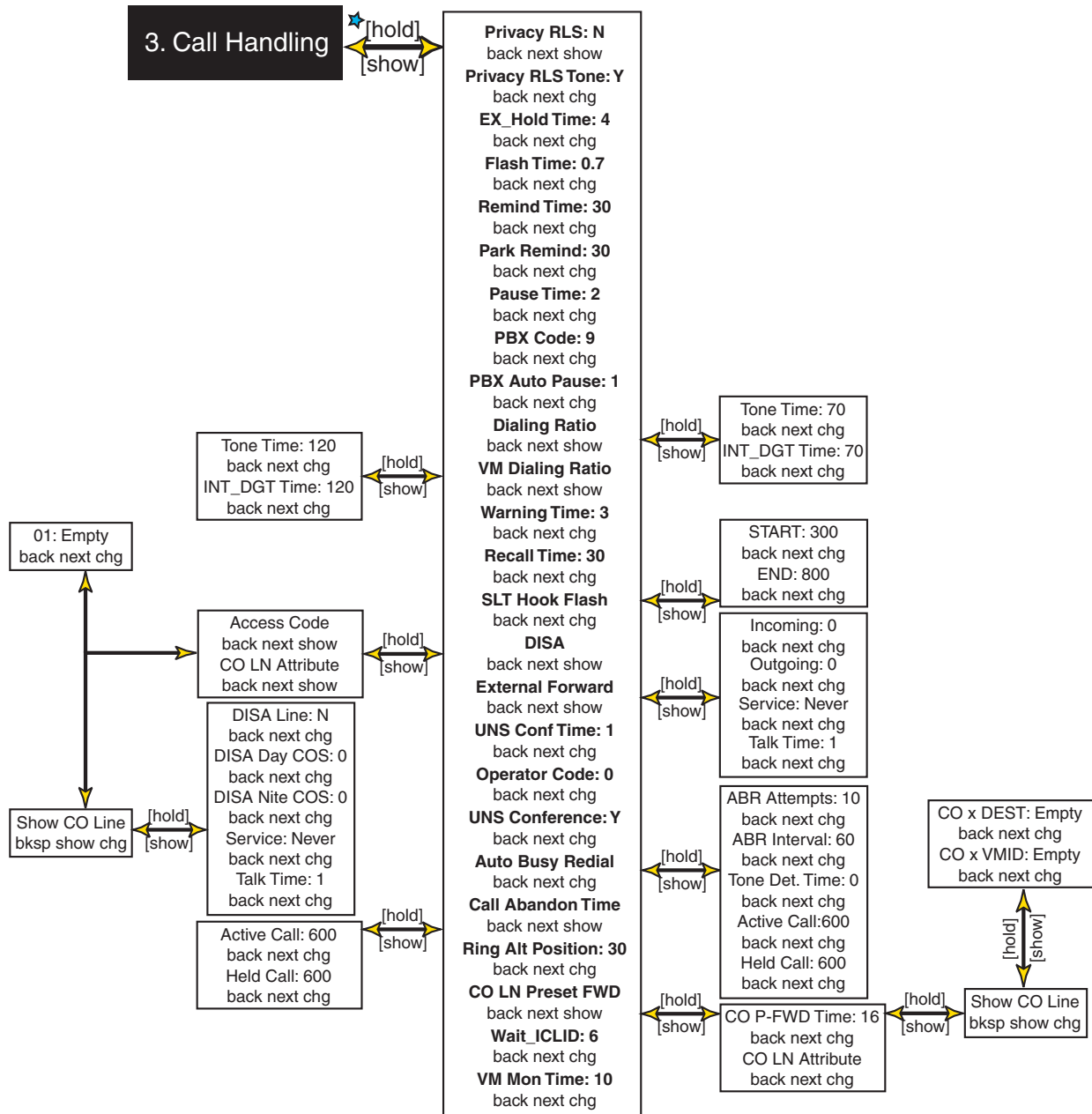


Figure 6-2: Database Programming Functions—Call Handling

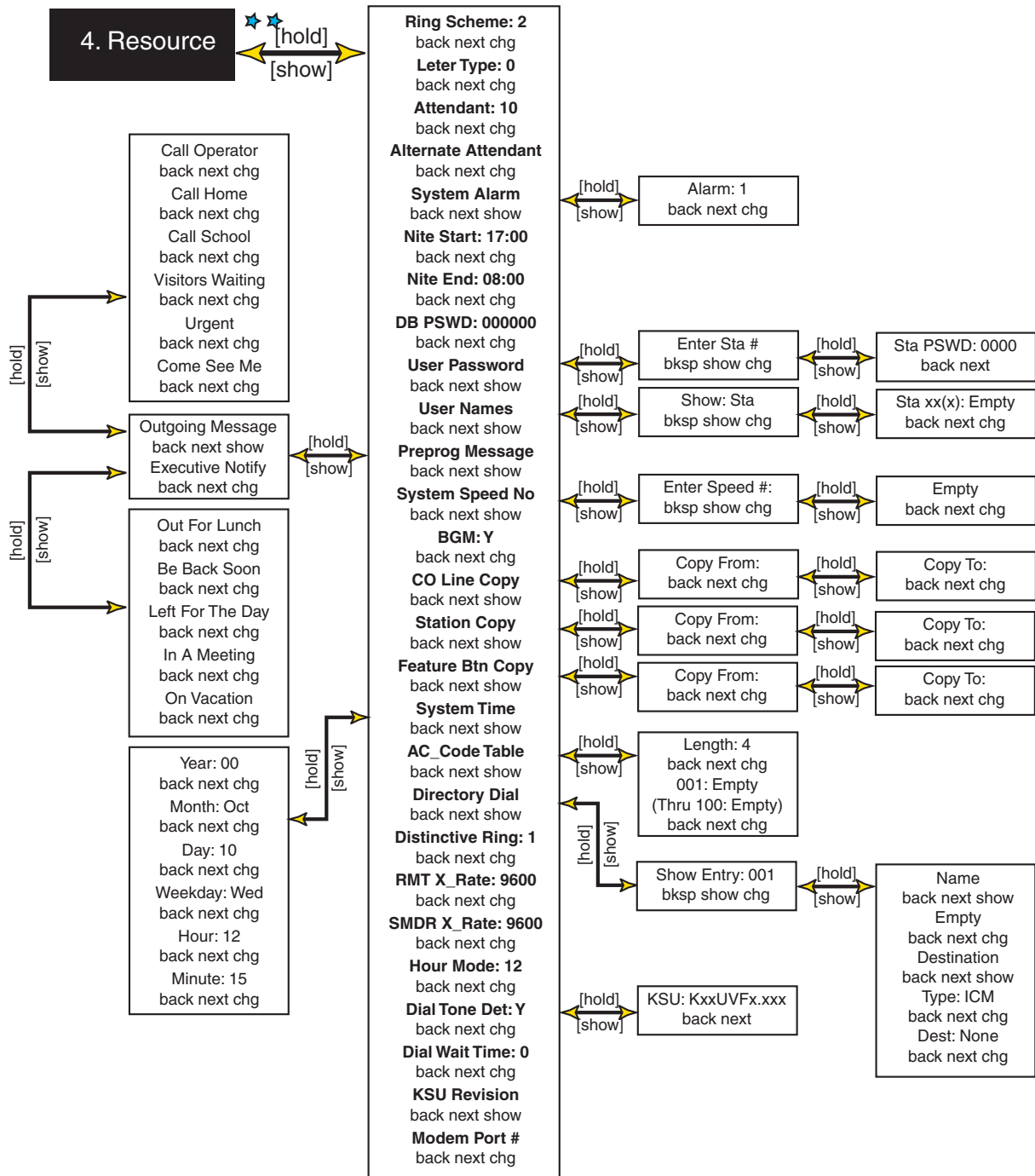
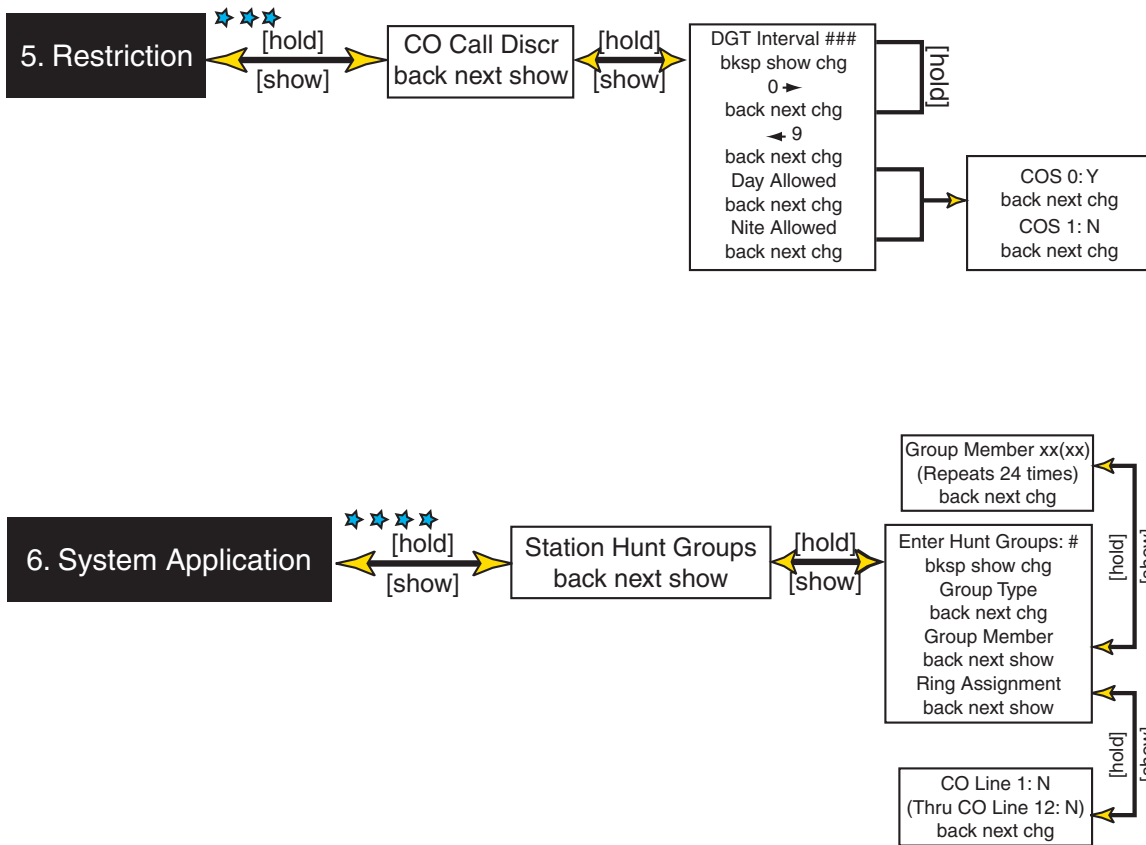


Figure 6-3: Database Programming Functions—Resource



**Figure 6-4: Database Programming Functions—Restriction and System Application**

---

---

## Station Programming

If the system is in the programming mode, continue using the [back] and [next] Soft Buttons to scroll to the desired programming field. If starting to program here, enter the programming mode.

Refer to “Program Mode Entry”. Also refer to [Table 6-1: Database Programming Table](#) for the complete list of programmable features and their default values.

### *System Type*



*The moment the [chg] button is pressed and the value displayed, that operation becomes functional. This is true for any field where the [chg] button selects from the available data field values. In other areas of programming where data is entered from the dial keypad, the [save] Soft Button must be pressed to save that entered data.*

The system may be programmed for compliance to the appropriate CO line access functionality corresponding to the FCC registration number provided to the servicing telephone company. When the MF registration number is used, CO lines may be accessed by any system means (direct CO line button access or Pooled CO line access). This type of operation is referred to as PBX operation. When the KF registration number is used, CO lines may only be accessed by a direct button assignment. That is, no Pooled CO line access function will operate when this mode is selected. Single Line Telephones must use specific CO line access codes when dialing out. This type of operation is referred to as KEY operation. Local tariffs vary from one vendor to another, specific rules concerning CO Line access should be derived from the serving telephone company. Check with your telephone company provider for more details.

#### **Default**

The **DHS/DHS-E** System Type is set for KEY, and can be toggled from KEY/PBX.

### *Station Parameters*

When the SHOW STATION prompt is displayed, the programmer should enter the two-digit or three-digit Station number on the dial pad. Once entered, the center Soft Button [show] is pressed to enter into Station Programming Parameters for that station number.

#### **Default**

The **DHS** station range is from 10-81, and the **DHS-E** station range is from 100-195.

### *Day Class of Service (COS)*

Each station may be assigned one Class Of Service (COS) for the Day system mode of operation. This COS is directly referenced in the Restriction, CO Line Call Discrimination, Digit Interval Table programming. COS also dictates which stations will be given the privilege of Overriding DND and joining an existing CO line conversation via the Privacy

Release feature. COS 0 is considered the highest level where COS 7 is the lowest. COS also dictates the stations ability to use System Speed Dial.

**Default**

*DHS/DHS-E* station Day Class of Service is set to [0], and the range is 0-7.

**Related Programming**

Refer to [“Privacy Release”](#), [“CO Call Discrimination”](#), and [“System Speed Dialing”](#).

### *Night COS*

Night COS specifically allows the programmer to assign a different mode of operation to any station for System Night Mode operation.

**Default**

*DHS/DHS-E* Station Night Class of Service is set to [0], and the range is from 0-7.

**Related Programming**

Refer to [“Privacy Release”](#), [“CO Call Discrimination”](#), and [“System Speed Dialing”](#).

### *CO Line Assign*

CO Line Assignment allows complete flexibility of CO line access privileges. Each station in the system may be programmed to be allowed or denied access of any of the CO lines.

**Default**

All stations have access to CO Lines Y (YES). The *DHS* CO range is from 1-12 (Y/N), and the *DHS-E* CO range is from 700-717 (Y/N).

### *Receive Assign*

Receive Assignment allows flexibility of CO line incoming signaling. Stations in the system may be programmed to follow CO line ringing condition of any of the CO lines. This is not a ring assignment; rather a means of restricting certain stations from accessing CO lines that are ringing. When set to Y the station CO line button (if programmed on the telephone) will flash incoming ring flash while calls come into the system on that CO line.

**Default**

All *DHS* stations have access to incoming ringing CO Lines 1-12 (Y), and *DHS-E* has access to CO Lines 700-705 (Y). The *DHS* CO range is from 1-12 (Y/N), and the *DHS-E* CO range is from 700-717.

### *Ring Assign*

Ring Assignment allows flexibility of CO line Incoming Ring Signaling. Each station may be programmed to ring on any of the CO lines. Programming for each CO line may be configured to ring at any station for the associated mode of system operation:

Day, Night, Both (Day and Night), or None (no ringing)



Receive Assignment must also be set to Y for a station to answer a ringing CO.

### Default

**DHS** CO Lines (1-12) DAY ring for Station 10 only, all others are NONE, and **DHS-E** CO Lines (700-705) BOTH ring for Station 100 only, all others are NONE. **DHS** CO range is 1-12 (D/N/B/NONE). **DHS-E** CO range is 700-717 (D/N/B/NONE).

## Account Code Forced

Any station in the system may be forced to use an Account Code when outgoing calls are made. When this parameter is set to Y there must also be valid account codes programmed into the Account Code Table. The Account Code entered at a station that is Account Code - Forced will be verified against the table for a match. If a match is found the outgoing call attempt is allowed, if not the call attempt is denied.

### Default

**DHS/DHS-E** Account Code Forced is set to N (NO) for all stations.

### Related Programming

Refer to [Table 4-1: Feature Access Codes](#).

## Station Groups

Stations may be assigned to one of eight available Station Groups. Station Groups dictate what station page group and pick up group to which the station belongs.

### Default

All **DHS/DHS-E** stations are assigned to Station Group 1, and the Station Group range is from 1-8.

## Warning Tone

Warning Tone may be applied to any station where outgoing call length is to be limited. When set to Y this station will receive a warning tone over the connected voice path when the Warning Time (refer to [Call Handling Configuration](#)) has expired. Once engaged, the tone will be heard every 10 sec until the CO line call is terminated.

### Default

**DHS/DHS-E** Warning Tone is set to N (NO) for all stations.

### Related Programming

Refer to ["Warning Time"](#), in the [Call Handling Configuration](#) section of this Chapter.



### *Drop Time-Out*

Similar to Warning Tone above, Drop Time-Out may be applied to any station where outgoing call length is to be restricted. When set to Y this station will receive a warning tone over the connected voice path when the Warning Time (refer to [Call Handling Configuration](#)) has expired, and 10 sec later the current call will be terminated.

#### **Default**

*DHS/DHS-E* Drop Time-Out is set to N (NO) for all stations.

#### **Related Programming**

Refer to “[Warning Time](#)” in the [Call Handling Configuration](#) section of this Chapter.

### *Station Position*

Station numbering can be changed for any Station Port between the system allowable range. If the current assigned station number is not desired or must be changed, the programmer may select any of the available station directory numbers to reassign this port.

#### **Default**

For *DHS* ports (1-24) the B1 channel is 10-33, and the B2 channel is 58-81. For *DHS-E* ports (1-48) the B1 channel is 100-147, and the B2 channel is 148-195. The *DHS* range is from 10-81, and the *DHS-E* range is from 100-195.

### *Voice Mail Port*

Single Line Telephone ports that are to be used for connection to a Voice Mail system must be assigned type VM to provide longer DTMF tones. This identifies the port to the system software for special handling.

#### **Default**

*DHS/DHS-E* Single Line Telephone ports are set to N (NO), not assigned as a VM port.

### *DSS Owner*

When programming a DSS owner, enter programming mode for the station where the DSS console resides. Then specify the key telephone station that will serve as its owner.

#### **Default**

The *DHS* station range is from 10-81, and the *DHS-E* station range is from 100-195.

---

---

## CO Line Configuration

If the system is in the programming mode, continue using the [back] and [next] Soft Buttons to scroll to the desired programming field. If starting to program here, enter the programming mode.

Refer to [Program Mode Entry](#). Also, refer to [Table 6-1: Database Programming Table](#) for the complete list of programmable features and their default values.

### *CO Line Parameters*

This section allows the programming of various CO Line Attributes so that the system may be customized to meet the clients needs.

#### **Default**

The *DHS* CO range is from 01-12, and the *DHS-E* CO range is from 700-717.



*The moment the [chg] button is pressed and the value displayed, that operation becomes functional (this is true for any database field where the [chg] button selects from the available data field values). In other areas of programming where data is entered from the dial pad, the [save] Soft Button must be pressed to save that entered data.*

### *Dialing Type Selection*

Dialing type is a selection of either Tone (DTMF) dialing or Pulse (Rotary) dialing.

#### **Default**

The *DHS/DHS-E* Dialing Type is set for Tone (DTMF) Dialing, and can be toggled from Tone /Pulse.

### *Call Abandon*

Call Abandon is a CO line setting that monitors the CO line for distant party hang up. When set to Y the *DHS/DHS-E* will monitor that CO line throughout the call duration for interruption in loop current. When an interruption occurs that is at least as long as the programmed Call Abandon Time, the system recognizes that interruption as distant party disconnect and forces the CO line on-hook.

#### **Default**

*DHS/DHS-E* Call Abandon is set to Y for all CO Lines, and can be toggled from Y/N.



*This feature is especially useful with Voice Mail operation because the system will send disconnect digits to a VM port when loop current interruption is detected.*

---

---

## *CO Line Type Assignment*

A CO Line Type is selected to identify specific CO lines. Type CO designates a typical CO line connection. Type PBX designates a CO line position that is connected to a PBX line (an extension off of another telephone system). This designation will cause system software to search the PBX code entry of digits dialed on a line marked PBX so that toll restriction may be applied following the PBX code. In addition, Last Number Redial, Auto Busy Redial and the Saved Dialed Number features will reference the programmed PBX code to insert a Pause between the PBX code and the remaining dialed digits.

A third CO Line Type OPN is made available so that the programmer can mark CO line positions equipped in the system but not connected to any telephone company CO line facility. This instructs the system software to bypass this CO line for any automatic or pooled (group) access of CO lines.

### **Default**

The *DHS/DHS-E* CO Line Type Assignment is set for CO, and can be changed to type PBX/OPN/CO.

## *Loud Bell Control*

When set to Y the Loud Bell Contact will operate ring cadenced closure while this CO line is ringing. The ring cadence of the Loud Bell contact follows the Ring Scheme programmed in Resource.

### **Default**

The *DHS/DHS-E* Loud Bell Contact is set to Y (YES), and can be toggled from Y/N.

### **Related Programming**

Refer to “[Ring Scheme](#)” in the [Resource Configuration](#) section of this Chapter.

## *CO Line Group Assignment*

There are four CO line group assignments that may be assigned to CO lines. Grouping is usually done to segment CO lines into group types (i.e., CO, PBX, WATS, FX, etc.). CO line grouping allows system users to dial access to a particular CO line type by group access codes.

When CO line groups are accessed the higher number idle CO line is selected as the first choice. For example, if CO lines (4-6) are in the group dialed for access the group is searched for an idle CO line from CO line 6, then CO line 5, etc.

### **Default**

The *DHS/DHS-E* CO Line Group Assignment is Group 1, and the available Group range is from 1-4.

---

---

## Private To

Private To is a programming time saver. This parameter allows the programmer to assign a specific CO to one station for their personal exclusive use. This setting over-rides CO Line Assignment programming. When a station is assigned as the Private To station of a CO line, that station exclusively receives ringing and access privileges to that CO line.

### Default

The *DHS/DHS-E* Private To is Empty (not assigned to any stations). The *DHS* Station range is from 10-81, and the *DHS-E* Station range is from 100-195.

## Toll Override

Any CO line may be marked Toll Override Y. When set to Y a restricted station may access that CO line and dial out.

### Default

The *DHS/DHS-E* Toll Override is marked N (NO).

## Distinct Tone <FP3>

Distinctive Tones can be used to identify a particular CO line while ringing. There are five distinctive tones that can be programmed. The default setting 0 indicates that there is no distinct tone programmed. CO distinctive tone settings override station distinctive ringing.

### Default

The *DHS/DHS-E* has no Distinctive Tone programmed, and the Distinctive Tone setting is programmable from 0/1/2/3/4.

## ICLID Port

When Incoming Caller ID is provided by the servicing telephone company, the caller data may be retrieved at the CO line interface and delivered to the Starplus *DHS/DHS-E* KSU via an external Caller ID device connected to the Option Module ICLID/PC Programming RS232 port. This external (optional) device must be configured in the *DHS/DHS-E* to associate the line circuit number from the unit to the *DHS/DHS-E* line position to be used with the caller ID line. Each *DHS/DHS-E* CO line circuit that is to be used with telephone company caller ID must be programmed with an associated ICLID device port number. The default value 0 indicates that no caller ID will be received on this CO line.



*Wait\_ICLID* time in Call Handling must also be programmed to allow the *DHS/DHS-E* systems to collect the caller ID data before ringing any system telephones. In addition, ICLID requires Telephone Company service and an (SP7081-00) ICLID Cable.

*ICLID* use on the *DHS* requires the Option Module.

### Default

The *DHS* CO Lines (1-12), and *DHS-E* CO Lines (700-717) are set for [0] not associated with an ICLID Port number.

### Related Programming

Refer to "Wait (ICLID)" and "RMT X\_RATE".

---

---

## Call Handling Configuration

If the system is in the programming mode, continue using the [back] and [next] Soft Buttons to scroll to the desired programming field. If starting to program here, enter the programming mode.

Refer to “[Program Mode Entry](#)”. Also, refer to [Table 6-1: Database Programming Table](#) for the complete list of programmable features and their default values.

### *Privacy Release*

Privacy Release is a system wide setting that affects how the privacy feature functions at stations busy on CO line conversations. When set to Y the Privacy feature is effectively removed for stations with a lower level COS when a station with a higher or equal COS wants to join the CO line conversation in-progress. To join a CO line conversation in-progress a station with higher or equal COS simply presses the busy CO line button. Refer to the description under Day Class for more details on rules of joining calls in progress. When set to N, no station will be able to join an existing CO line conversation by simply pressing the busy CO line button.

Privacy Release will only function by pressing a CO line button. Group access (Pool) buttons cannot be used to invoke Privacy Release.



*Disabling of the Privacy feature may be limited by federal, state or local law, so check the relevant laws in your area before disabling Privacy Tone.*

#### **Default**

The *DHS/DHS-E* Privacy Release is set to N (NO), and can be toggled Y/N.

#### **Related Programming**

Refer to “[Day Class of Service \(COS\)](#)” in the Restriction Configuration section of this Chapter.

### *Privacy Release Tone*

When set to Y a tone will be heard on the voice path of the in-progress call when a station joins a conversation via Privacy Release. When set to N, no tone is heard. Disabling the tone can be useful for monitoring of call group employees and training requirements.

#### **Default**

*DHS/DHS-E* Privacy Release Tone is set to Y.



*Disabling of the Privacy feature may be limited by federal, state or local law, so check the relevant laws in your area before disabling Privacy Tone.*

#### **Related Programming**

Refer to “[Privacy Release](#)”.

---

---

## *Exclusive Hold Time*

Calls placed on Exclusive Hold will remain on Exclusive Hold for the duration of this timer. When the timer expires the holding line will change from Exclusive Hold flash to Recall Flash and alert the station user with one tone ring over the telephone speaker. When the timer expires a second time and the CO line remains on hold the station will receive a second alert tone and the CO line holding condition will change to System Hold so that any station may access the holding line.

### **Default**

The *DHS/DHS-E* Exclusive Hold Time is set to four minutes, and is variable from 0-8 minutes (where 0 is infinite).

## *Flash Time*

Flash is typically used on CO lines that are equipped with special features from the telephone company such as Call Waiting. Flash may also be used on CO lines connected to a PBX or to Centrex lines for call transfer on those lines. The Flash time must be set to coincide with the required timing parameter of the connected line to operate correctly. Typically a value from 600 to 800 msec is used for these features. A higher flash time may be set to allow the user to invoke flash to restore dial tone on the connected CO line. This setting is typically 1.5 sec (1500 msec).

### **Default**

The *DHS/DHS-E* Flash Time' is set for 0.7 sec (700 msec), and is variable from 0.1 sec (100 msec) to 1.5 sec (1500 msec).

## *Reminder Time*

The Remind Time can be programmed to alert stations of calls that have been placed on System Hold at their station. The station that placed a call on System Hold will hear a reminder tone over the key telephone speaker once each time the Remind Time expires until the CO Line is answered, or the call is disconnected.

### **Default**

The *DHS/DHS-E* Remind Time is set for 30 sec, and is variable from 0/10/30/60/90 sec.

## *Park Remind*

Similar to Remind Time, Park Remind will alert stations of CO lines parked at their location once each time the Park Remind time expires.

### **Default**

The *DHS/DHS-E* Park Remind is set for 30 sec, and is variable at 30/60/90/120/150/180 sec.

## *Pause Time*

Whenever the system Pause code is manually dialed while connected to a CO line or when it is programmed into a speed dial bin, the system will pause dialing digits for the length of time programmed here.

### **Default**

The *DHS/DHS-E* Pause Time is set for 2.0 sec, and is variable from 1.5/2/3.5/5 sec.

## *PBX Code*

One PBX Code may be assigned in the system. This code will be referenced each time a user accesses a CO line marked type PBX. The first digit dialed on a PBX line will be monitored for a match against this digit. If the first dialed digit and the programmed PBX Code digit match, restriction is applied on all digits following this digit. The PBX Code is usually the digit dialed on a PBX line to access a PBX trunk for out dialing. In addition, Last Number Redial, Auto Busy Redial and the Saved Number Redial functions use this programming to automatically insert a pause between the PBX Code dialed and any subsequent dialed digits to allow the PBX time to generate outside (trunk) dial tone before sending digits to dial on the trunk.

### **Default**

The *DHS/DHS-E* PBX Code is set to [9], and the programmable range is from 00-99.

## *PBX Auto Pause*

Used in association with the PBX Code programmed above, when the system detects a PBX code dialed on a PBX type line, the Pause Time programmed here is inserted between the dialed PBX code and any remaining digits.

### **Default**

The *DHS/DHS-E* PBX Auto Pause is set to 1sec, and programmable range is from 1-9 sec.

## *Dialing Ratio*

Timing can be adjusted such that dialing automatically emulates slow, methodical depressions of the dial pad keys. Note: increasing the digit duration and inter-digit time may also be desirable for applications where the user must dial into an off-site voice mail system or other dial pad key operated device that does not respond well to faster dialing modes. There are two Dialing Ratio parameters that may be programmed; TONE TIME and INT\_DGT TIME. Tone Time is the actual duration of DTMF tone that the system will send for each dial pad key pressed while connected to a CO line. Int\_Dgt Time is the minimum actual time between DTMF digits that the system will wait before sending the next dialed digit DTMF tone.

### **Default**

The *DHS/DHS-E* TONE TIME and INT\_DGT TIME are set at 70 msec, and the adjustable range is from 50 - 150 msec.

---

---

## *VM Dialing Ratio*

There are two VM Dialing Ratio parameters that may be programmed; TONE TIME and INT\_DGT TIME.

### **Default**

The *DHS/DHS-E* TONE TIME and INT\_DGT TIME are set at 120 msec, and the adjustable range is from 60 - 150 msec.

### **Related Programming**

Refer to *"Voice Mail"* in the *System Applications* section of this Chapter.

## *Warning Time*

Warning Time is directly related to Warning Tone and Drop Time-out. When the Warning Time has expired, stations subject to Warning Tone and Drop Time-out will receive the associated tone/disconnect.

### **Default**

The *DHS/DHS-E* Warning Time is set for 3 minutes, and is variable from 1-8 minutes.

### **Related Programming**

Refer to *"Drop Time-Out"*, in the *Station Programming* section of this Chapter.

## *Recall Time*

Recall Time is associated to CO Line Transfer. When the Recall Time expires the CO line will begin ringing at the station that initially transferred the call.

### **Default**

The *DHS/DHS-E* Recall Time is set for 30 sec, and is variable from 16/30/60/90/120 sec.

## *SLT Hook Flash*

Single Line Telephone operation requires that the user of a SLT hook flash to invoke call routing features such as Hold and Call Transfer. The *DHS/DHS-E* must monitor the timing of a hook flash at a SLT to distinguish a hook flash request from a hang up request. A hook flash request is typically any depression of the hook switch lasting less than 0.8 sec (800 msec), however users may also use the hook switch to disconnect the current call and request dial tone for a second call.

SLT Hook Flash is divided into two programmable data fields; START and END. The START field entry determines the minimum on-hook duration that will be accepted as a hook flash. The END data field entry determines the maximum on-hook duration that will be accepted as a hook flash.



*The system software will always maintain a hook flash time of 100 msec minimum. It is not possible to program a hook flash time that provides no hook flash operation time.*



### Default

The *DHS/DHS-E* START field is set for 300 msec, and the END field is set for 800 msec. The programmable range for the START field is:

100/200/300/400/500/600/700/800/900/1000/1100/1200/1300/1400

The programmable range for the END field is:

400/500/600/700/800/900/1000/1100/1200/1300/1400/1500

## Direct Inward System Access (DISA)

### Description

Any CO line(s) may be programmed as DISA lines. Calls ringing into the system on CO lines designated as DISA lines will be automatically answered by the system and allowed to access system resources (stations and CO lines). A special DISA code must be entered to allow access of CO lines for out going calling. Restrictions are imposed on DISA CO lines according to the COS assigned the DISA CO line. There are six data fields associated to DISA programming; ACCESS CODE, DISA LINE, DISA DAY COS, DISA NITE COS, SERVICE and TALK TIME.

- DISA ACCESS CODE – 24 codes may be entered to check for out dialing privileges.
- DISA LINE – Set to Y or N for any of the CO lines indicating its use as a DISA CO line.
- DISA DAY/NITE COS – Assigned per CO line and assigns a restriction level to callers using DISA for out going calls.
- SERVICE – Allows the programmer to set the DISA operation to actuate during specific system modes.
- TALK TIME – Sets the preset time limit of any DISA call. This time limit may be extended during operation if the user dials a [0]+ [\*], or [0] + [#] to terminate. Doing so will allow the conversation to continue for a second period of time equal to the TALK TIME setting.



*DHS requires the Option Module, for correct operation of this Feature.*

### Default

The *DHS/DHS-E* default settings of associated DISA data fields are:

- ACCESS CODE = Empty
- DISA LINES = N (none assigned)
- DISA DAY COS = 0
- DISA NITE COS = 0
- SERVICE = Never
- TALK TIME = 1

***Programmable Range***

DISA data fields:

- ACCESS CODE = Range 1-24
- DISA Lines *DHS* = 1-12 programmable range
- DISA Lines *DHS-E* = 1-18 programmable range
- DISA DAY COS = Range 0-7
- DISA NITE COS = Range 0-7
- SERVICE = Never/day/nite/always
- TALK TIME = 1/2/3/5/10/15 minutes

***EXT Call Forward (ECF)*****Description**

One CO line in the system may be designated as the External Call Forward (ECF) CO line. When this CO line rings it is automatically answered by the system and routed to another CO line where a predetermined telephone number is dialed. These two lines are connected together in a conference and allowed to remain connected for the duration of the TALK TIME. ECF programming has four data fields:

- INCOMING – Is the CO line to be answered by the system.
- OUTGOING – The CO line to be used by the system for the outgoing call.
- SERVICE – Setting that allows the feature to operate only during certain system modes of operation.
- TALK TIME – The preset time limit of the ECF call. ECF may be disconnected prior to the expiration of the TALK TIME by the remote party by dialing [0] + [#] at any time during the ECF call, or [0] + [\*] to extend it.



*DHS requires the Option Module for correct operation of this Feature.*

**Default**

The *DHS/DHS-E* default settings of associated ECF data fields are:

- INCOMING *DHS* = None
- INCOMING *DHS-E* = None
- SERVICE = Never
- TALK TIME = 1

***Programmable Range***

ECF data fields:

- INCOMING *DHS* = 0-12
- INCOMING *DHS-E* = 700-718
- SERVICE = Never/day/nite/always
- TALK TIME = 1/2/3/5/10/15 minutes.

## Related Programming

Refer to ["System Speed Dialing"](#).



*System Speed Dial bin 99 must be programmed with a telephone number that will be used as the ECF destination number for this feature to operate.*

## UNS Conference Time

CO lines that are left unattended in conference (Unsupervised Conference) will be allowed to remain in this status for the duration of the Unsupervised Conference Time. Users that are familiar with the conference operation can extend this time during operation by dialing [0] + [\*], or [0] + [#] to disconnect.

### Default

The *DHS/DHS-E* Unsupervised Conference Time is set for 1 minute, and is variable from 1/2/3/4/10/15 minutes.

## Operator Code

The *DHS/DHS-E* Operator Code may be changed from 0 to 9 to meet special application needs.

### Default

The *DHS/DHS-E* Operator Code is [0], and the programmable value can be toggled either 0 or 9.

## UNS Conference

Station users may leave two CO line connected parties in conference unsupervised. That is, the station user does not have to remain connected to the CO lines to maintain the conference connection. This setting allows or disallows this function.

### Default

The *DHS/DHS-E* Unsupervised Conference is allowed Y, and the programmable value can be toggled either Y or N.



*Unsupervised Conference requires the Option Module for operation. Single Line Telephones (SLT) cannot conference.*

## Auto Busy Redial

The Auto Busy Redial function will attempt to Redial a specified number of times. Three data fields are programmed for ABR operation:

- ABR Attempts
- ABR INTERVAL
- TONE DET. TIME

---

---

The ABR ATTEMPTS determines how many attempts will be made to reach a busy number before the system aborts the feature. The ABR INTERVAL determines how often attempts are made (time between attempts).

### Default

The default settings for the *DHS/DHS-E* three ABR data fields are listed below:

- ABR Attempts = 10 (no attempt = 0)
- ABR Interval = 16 sec
- TONE DET. TIME = 4

The programmable range of ABR data fields are listed below:

- ABR Attempts = 0-10
- ABR Interval=16/30/60/90/120 sec
- TONE DET. TIME = 0-9

## Call Abandon Time

Call Abandon Time is set for 2 modes ACTIVE CALL and HELD CALL. This time represents the minimum interruption in loop current during these modes of operation that must be detected to force a CO line on-hook. Any CO line marked Call Abandon Y will follow the associated timer programming.

### Default

The *DHS/DHS-E* ACTIVE CALL and HELD CALL fields are both set for 600 msec, and the variable range for both is 50 - 2500 msec.

## Ring ALT Position

One station may be assigned as the alternate attendant position. CO calls that go unanswered at the attendant assigned telephone will ring at the Alternate Position following expiration of this timer.

### Default

The *DHS/DHS-E* Ring Alternate Position Timer is set for 30 sec, and is variable from 30/60/90/120/150/180 sec.

### Related Programming

Refer to "[Alternate Attendant](#)" in the [Resource Configuration](#) section of this Chapter.

## CO Line Preset Forward

### Description

Each CO line in the system may be pre-programmed for a specific forward destination. CO Line Preset Call Forward is similar to No Answer forward operation in that a timer (CO P-FWD TIME) is preset for all CO lines marked for this forward. When a CO line rings into the system the timer is started, if the timer expires before the call is answered the designated preset forward destination begins to ring in addition to other programmed ringing locations.

There are three data fields associated to CO Line Preset Call Forward

- ❑ CO P-FWD TIME—One timer referenced by all CO lines set for Preset Forward.
- ❑ COxx DEST—Destination set for the CO line being programmed.
- ❑ COxx VMID—A 6-digit field that can be programmed with a digit string used when the forward destination is a VM type Hunt Group. This digit string can be used to divert the CO caller to the correct voice mail menu prompt. There is a COxx VMID field for each CO line.

### Default

The *DHS/DHS-E* default settings of associated CO Line Preset Call Forward data fields are listed below:

- ❑ CO P-FWD TIME = 16
- ❑ CO XX DEST = Empty
- ❑ CO XX VMID = Empty

### Programmable Range

CO Line Preset Forward data fields:

- ❑ CO P-FWD TIME = 6/10/16/22/30/40 sec
- ❑ *DHS* CO XX DEST = 10-81 stations, 82-89 Hunt / VM Groups
- ❑ *DHS-E* CO XXX DEST = 100-195 stations, 800-807 Hunt / VM Groups
- ❑ CO XX VMID = 000000-999999

## Wait (ICLID)

This timer is required to ensure that data sent from the phone company is received before the phone system starts ringing.

### Default

The *DHS/DHS-E* Wait ICLID timer is set for 4.0 sec, and is variable from 3.5/4/4.5...7.0 sec.



*If you are not consistently getting caller ID data, set this timer to 7.0 sec.*

## VM Monitor Time

The *DHS/DHS-E* enables the user of any *DHS/DHS-E* key telephone to monitor callers leaving a message in their voice mail box. When a caller is routed from a ringing telephone to a user voice mail box, an alert is presented to advise the user that the feature can be invoked.

### Default

The *DHS/DHS-E* VM Monitor Time is set for 6 sec, and is variable at 10/20/30/40/50/60 sec.

---



---

## Resource Configuration

If the system is in the programming mode, continue using the [back] and [next] Soft Buttons to scroll to the desired programming field. If starting to program here, enter the programming mode.

Refer to “[Program Mode Entry](#)”. Also, refer to [Table 6-1: Database Programming Table](#) for the complete list of programmable features and their default values.

### Ring Scheme

The system may be set to three different ringing schemes. In Scheme 0 and 2, ringing is differentiated by cadence so that a user is aware of the type of call ringing at his station by the tone cadence. In Scheme 1, ringing of both intercom calls and CO line calls is the same. This option is provided when the application requires that ringing adhere to RS-478 ring cadence specifications.

**Table 6-2: System Ring Scheme**

	<b>SCHEME 0</b>	<b>SCHEME 1*</b>	<b>SCHEME 2</b>
ICM Tone Ringing	1s ON, 3s OFF	1s ON, 3s OFF	300ms ON, 400ms OFF, 300ms ON, 4s OFF
CO Line Ringing	300ms ON, 400ms OFF, 300ms ON, 4s OFF	1s ON, 3s OFF	1s ON, 3s OFF

\* *Recommended for Voice Mail.*

### Default

The *DHS/DHS-E* defaults to Ring Scheme 1.

### Letter Type

The displayed characters for the messaging features and the Name in Display feature can be adjusted to accommodate special character requirements. When programming display messages the [1] button on the dial pad is pressed to insert special characters. One of six possible Letter Types may be selected for use when dial pad key [1] is pressed multiple times. Use the chart at the left to determine which Lettering Type Scheme is desired for this installation.

**Table 6-3: Letter Type**

Character for n <sup>th</sup> depressions of dial key "1".						
	1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>	5 <sup>th</sup>	6 <sup>th</sup>
Scheme 0	Æ	Æ	Ø	Ø	à	À
Scheme 1	Ç	Ā	Ō	Ń	Á	Ä
Scheme 2	ò	é	é	è	à	ù
Scheme 3	č	ð	é	ñ	ó	ř
Scheme 4	á	é	ó	ú	ú	
Scheme 5	Ł	Ż	Ŕ	Ŗ		

**Default**

The *DHS/DHS-E* Letter Scheme is [0] and has a programmable range of 0/1/2/3/4/5.

*Attendant*

One station may be assigned the attendant station. This station will receive all recall indications and calls not properly routed.

**Default**

The *DHS/DHS-E* default settings and Station Attendant ranges are:

- Attendant Station *DHS* = 10
- Attendant Station *DHS-E* = 100

**Programmable range:**

- Attendant *DHS* = 10-81
- Attendant *DHS-E* = 100-195

*Alternate Attendant*

One station may be assigned the Alternate Position. This station will receive all CO ringing in over-flow fashion from the attendant station. When calls ring longer than the Ring Alternate Position Time, these calls will begin to ring at the Alternate station.

**Default**

The *DHS/DHS-E* default settings and Alternate Attendant ranges are:

- Alternate Atd *DHS/DHS-E* = Empty

Programmable range:

- Alternate Attd *DHS* = 10-81
- Alternate Attd *DHS-E* = 100-195

### Related Programming

Refer to “*Ring ALT Position*” in the *Call Handling Configuration* section of this Chapter.

## System Alarm

The alert signals may be scheduled. When an alert time is reached all system stations will receive BGM over the telephone speaker for one minute. This feature can be useful in schedule sensitive applications. If the station is listening to BGM, no alert is heard. Time must be entered in 24 hour time format.



*The system must be equipped with a customer-supplied music source.*

### Default

The *DHS/DHS-E* System Alarm Time for all eight signals is EMPTY, and the programmable range is 00:00-23:59.

## Nite Start

The system may be set to automatically change the Service Mode from Day to Night Mode and back again. The designated Nite Start time will switch the system into Night Mode.

### Default

The *DHS/DHS-E* Nite Start is set for 17:00, and the programmable range is 00:00-23:59.

## Nite End

Nite End works in conjunction with Nite Start. The Nite End time entry designates when the system is to begin Day Mode operation.

### Default

The *DHS/DHS-E* Nite End is set for 08:00, and the programmable range is 00:00-23:59.

## Database Password

The default Database Programming Password may be changed from 000000 to any other 6-digit numeral sequence.

### Default

The *DHS/DHS-E* Database Password is 000000, and has a programmable range from 000000-999999.



## User Password

Each station in the system is assigned a default password of 0000. This may be changed if the associated security feature operation (Phone Lock, Remote COS, etc.) is required. This allows the password to be viewed but not modified.

### Default

The *DHS/DHS-E* User Password is 0000, and has a programmable range from 0000-9999.

## User Names

A User Name may be assigned to each station in the system. This can be useful as an administrative aid as well as providing a user friendly prompt at display telephones while idle and during call processing. If not programmed, the display at Executive Key Telephones will display STATION. Multiple depressions of the dial pad keys cause alphabet characters to appear. Use the following chart when programming User Names:

**Table 6-4: User Name Programming**

Key	1st Depression	2ndDepression	3rd Depression
1	Special Characters		
2	A	B	C
3	D	E	F
4	G	H	I
5	J	K	L
6	M	N	O
7	P	R	S
8	T	U	V
9	W	X	Y
[	Before pressing a number key = insert a numeral instead of a letter After a letter selected = force lower case		
0	Q	Z	_and moves to the next position.
#	(space) and moves to the next position		

---

---

## Preprogrammed Messages

Two types of Preprogrammed Messages; OUTGOING MESSAGE and EXECUTIVE NOTIFY. The OUTGOING MESSAGE works with Message Wait and allows the Executive Key Telephone user to leave a text message at another Executive Key Telephone.

EXECUTIVE NOTIFY is a message that may be enabled to notify other Executive Key Telephone callers of the users status. This message will be displayed whenever another Executive Key Telephone user calls the Executive station with this feature enabled.

The first message prompted at the Executive Telephone for both OUTGOING MESSAGE and EXECUTIVE NOTIFY can be customized by the user during setup. The remaining messages can be pre-programmed here.



*Messages may be up to 16 characters.*

### Default

The *DHS/DHS-E* OUTGOING and EXECUTIVE NOTIFY messages are:

- OUTGOING—
  - CALL OPERATOR
  - CALL HOME
  - CALL SCHOOL
  - VISITORS WAITING
  - URGENT
  - COME SEE ME
- EXECUTIVE NOTIFY—
  - OUT FOR LUNCH
  - BE BACK SOON
  - LEFT FOR THE DAY
  - IN A MEETING
  - OUT OF OFFICE
  - ON VACATION

## System Speed Dialing

There are 80 System Speed Dial Numbers that can be programmed for access by stations according to COS assignments. Stations with COS (0-5) can access all eighty System Speed Dial Numbers. Stations with COS 6 can access only System Speed Dial Numbers (20-39). Stations with COS 7 cannot use System Speed Dial Numbers.



*System Speed Dial bin 99 is used for External Call Forward when that feature is used.*

## Default

By default, all *DHS/DHS-E* System Speed Bins are EMPTY, and the allowable programmable digits are: Digits (0-9) [\*], [#], pause (F + [7] +[0])Flash (F + [3]), and (F + [1]+ nn) for chaining (up to 16 characters).

## Background Music (BGM)

A second music source may be connected to the system for listening at key telephone stations. If this source is not used it may be desirable to disable that BGM channel. When BGM is set to N the second music source will not be connected to a station that has toggled the BGM code [F52], only the first music channel source, such as Music on Hold (MOH), will be toggled at the telephone. When set to Y both music channels will be toggled by successive operations of the BGM code [F52].



The *DHS* requires the Option Module to support a second background music channel.

## Default

By default, the *DHS/DHS-E* BGM is set to N.

## CO Line Copy

CO Line Copy is provided to assist in programming multiple CO lines with the same data. Follow the displayed instructions to copy one CO line data field to another.

CO Line range:

- DHS* = 1-12
- DHS-E* = 700-717

## Station Copy

Station Copy is provided to assist in programming multiple stations with the same data. Follow the displayed instructions to copy one station data fields to another.

Station Number range:

- DHS* = 10-81
- DHS-E* = 100-195

## Feature Button Copy

Feature Button Copy is provided to assist in programming multiple stations with the same button programming. Once a station's feature buttons are programmed using the station feature Programmable Feature Buttons [F#3] that station's button programming may be copied to other system stations in this database programming function. Follow the displayed instructions to copy one station's button data to another.

Station Number range:

- DHS* = 10-81
- DHS-E* = 100-195

---

---

## System Time

Provided to set system time and date information. Use the prompts displayed to set the fields:

- YEAR
- MONTH
- DAY
- WEEKDAY
- HOUR
- MINUTE



*System Time can be set through Attendant Administration using the Attendant Station password.*

## Account Code Table

When a station is Forced Account Code (must enter an account code to dial any outside telephone number), the account code entered is verified against the entries in this table. Up to 100 entries may be made in the Account Code Table. The account code length may be 4-8 digits in length to increase the security of valid Account Code Entry.

### Default

The *DHS/DHS-E* Account Code length is 4 digits, and Bins (001-100) are EMPTY. The Account Code data field ranges are:

- Length = 4-8 digits
- allowable number entries = 0000-99999999

## Directory Dial <FP3>

The DHS system provides locations for up to 200 names each consisting of a maximum of 12 characters. Directory Dial also enables users to program a name along with a speed dial bin for use in later locating a speed dial number. The system displays the name associated with a speed dial number on the LCD display so that when the desired name is shown, the user may then have the system dial the number.

### Default

Each name entered into Directory Dial can be up to 12 characters. Directory Dial will accept up to 200 names.

## Distinctive Ringing <FP3>

You may choose from four distinctive ringing tones to signal incoming calls. This allows you to easily distinguish your calls from calls ringing at other stations near you.

### Default

Defaults to the first of four distinctive ringing tones.

---

---

## Data Link

The *DHS/DHS-E* Data Link programming option is not implemented at this time. This is a future CTI function.

## RMT X\_RATE

The DB-9-pin RS232 port labeled ICLID/PC PROGRAMMING can be connected to a modem or directly to a Personal Computer to use the PC based Database Programming software. RMT X\_RATE is the baud rate setting of this port.

### Default

The *DHS/DHS-E* RMT X\_RATE is 9600 baud, and the range is programmable from 110/300/600/1200/2400/4800/9600/19200.



The *DHS* system requires the Option Module to be installed for this capability.

Vodavi only guarantees a connection at 9600 baud.

## SMDR X\_RATE

The DB-9 RS232 port labeled SMDR can be connected to a serial printer, personal computer or other call accounting collection device to collect Station Message Detail Recording.



The *DHS* system requires the Option Module to be installed for this capability.

CO calls must be in progress for a minimum of 10 sec for an SMDR record to be generated for that call.

### Default

The *DHS/DHS-E* SMDR X\_RATE baud rate is 9600 baud, and the range is programmable from 110/300/600/1200/2400/4800/9600/19200.

## Hour Mode Selection

The displayed hour format at Executive Key Telephones may be selected for 24-hour or 12-hour format.

### Default

The *DHS/DHS-E* Hour Mode Selection is in the 12-Hour Format.

## Dial Tone Detect

The system Tone Detectors on the Optional Module may be used to detect the presence of dial tone before dialing begins. This function will affect both automated features and manual dialing. When engaged, the function has the effect of delayed dialed digits when manually dialing. It is recommended that this feature only be used in cases where dialing problems persist.

### Default

The *DHS/DHS-E* Dial Tone Detect is set to (N) disabled, and can be toggled from (Y/N).



*Dial Tone Detect requires the Option Module on the DHS to function. However, if CO dial tone is slow and dialed digits are being sent before CO dial tone is ready, the Dial Wait Time may be used to eliminate the problem by imposing a fixed wait period before digits are sent.*

### Related Programming

Refer to “[Dial Wait Time](#)” in the *Call Handling Configuration* section of this Chapter.

### *Dial Wait Time*

Similar to the Dial Tone Detect feature, Dial Wait Time can be used to delay out dialing based on a timer instead of a Tone Detector for applications where the provided dial tone cannot be properly detected by the built-in Tone Detectors. This feature should only be used in cases where dialing problems persist.

### Default

The *DHS/DHS-E* Dial Wait Time is set to zero (no delay), and the range is programmable from 0-8.

### *KSU Revision*

This data parameter is provided as a convenience to easily determine the KSU software version installed. KSU revision displays as: KXXU VX.FXX

### *Modem Port Number (DHS-E Only)*

The *DHS-E* includes a built-in 2400-baud modem on the MPB board. This modem is used for remote system administration. The modem is located at Station 199 on the system. Calls must be transferred by the Attendant, or at another station.

---

## Restriction Configuration

If the system is in the programming mode, continue using the [back] and [next] Soft Buttons to scroll to the desired programming field. If starting to program here, enter the programming mode.

Refer to “[Program Mode Entry](#)”. Also, refer to [Table 6-1: Database Programming Table](#) for the complete list of programmable features and their default values.

### *CO Call Discrimination*

#### Description

The system provides 100 digit interval tables to apply call restrictions. Each table is comprised of four data fields: From, To, DAY ALLOWED and NITE ALLOWED. The From and To data fields allow the programmer to enter a range of allowed digits up to 10 digits each in length. This flexibility allows the programmer to enter only the digits significant to the dialing restriction desired.



The words *From* and *To* are not displayed, rather the *From* table is denoted with a ">" symbol following the table entry and the *To* table is denoted with a > symbol preceding the table entry.

Consider the default entry in Table bin 001 where the *From* entry is 0 and the *To* entry is 9 (refer to [Table 6-5](#)). In this case, (default) stations assigned a COS corresponding to the table (default) can dial any telephone number so long as the first dialed digit is a 0-9.



All stations are restricted from dialing a [\*] or [#] as the first dialed digit.

To allow [\*] and [#] as the 1st digit, change the entry from 0-9 to 0-[\*].

A specific number may be allowed for any COS by using a table entry with a constricted range. Consider a table programmed as: *From* 1800 *To* 1800. This table entry allows the user assigned the associated COS to dial only numbers beginning with 1800.

**Table 6-5: Restriction Data (Example)**

CO Call Discrimination Interval (default shown)	FROM (10 digits max)	TO (10 digits max)	Day Allowed (COS)							Night Allowed (COS)								
			0	1	2	3	4	5	6	7	0	1	2	3	4	5	6	7
001	0	9	Y	N	N	N	N	N	N	N	Y	N	N	N	N	N	N	N
002																		
003																		
004																		
005																		

**Default**

The *DHS/DHS-E* default settings of associated CO Line Call Discrimination Digit Interval data fields are:

- TABLE BIN: 001 (0-9)
- COS 0 = Y
- COS 1-7 = N

**Programmable Range**

- Table Bins: = Range 001-100
- Digits (allowable) = 0000000000-9999999999,#####,\*~\*~\*~\*~\*~\*~\*~\*~\*~\*
- DAY/NITE COS = Range 0-7 (Y/N)

---

---

## System Applications

If the system is in the programming mode, continue using the [back] and [next] Soft Buttons to scroll to the desired programming field. If starting to program here, enter the programming mode.

Refer to “[Program Mode Entry](#)”. Also, refer to [Table 6-1: Database Programming Table](#) for the complete list of programmable features and their default values.

### *Station Hunt Groups*

#### **Description**

Up to eight hunt groups may be assigned. Hunting is always in a linear fashion. Each Hunt Group can contain 24 members. Hunt Group directory numbers for the DHS are 82-89, and 800-807 on the DHS-E. One Hunt Group may be assigned as a Voice Mail type Hunt Group for System voice mail integrated operation. There are three data fields in hunt group programming; GROUP TYPE, GROUP MEMBER and RING ASSIGNMENT.

- ❑ GROUP TYPE—Available settings are; HUNT, VM and ALLRG.
- ❑ HUNT—A Hunt Group assigned as type HUNT will perform a search for the first available, idle telephone member of the hunt group according to the order of programmed entry.
- ❑ VOICE MAIL TYPE—A Hunt Group assigned as type VM will integrate voice mail control digits for calls placed to the hunt group. Only one VM type Hunt Group is allowed per system. The members of this Hunt Group should only be SLT ports, and those ports should also be marked as VM type in Station programming.
- ❑ ALLRG—A Hunt Group assigned as type ALLRG will ring all telephone members simultaneously when the Hunt Group number is dialed.
- ❑ GROUP MEMBER—This field is to program the station members of the Hunt Group.
- ❑ RING ASSIGNMENT—This field is used to assign ringing of CO lines to a Hunt Group. Ringing may be programmed individually for each of the CO lines and each of the 8 Hunt Groups. Ringing is available for the various modes of operation (Day, Night or Both).

#### **Default**

The *DHS/DHS-E* default settings of associated Hunt Group data fields are:

- ❑ GROUP TYPE = Hunt
- ❑ RING ASSIGNMENT = None
- ❑ GROUP MEMBER = Empty

#### ***Programmable Range***

- ❑ GROUP TYPE = Hunt, Voice Mail (VM), Allrg
- ❑ GROUP MEMBERS = *DHS* (10-81), and *DHS-E* (100-195).
- ❑ GROUP PILOT NUMBERS 1-8 = *DHS* (82-89), and *DHS-E* (800-807).
- ❑ RING ASSIGNMENT = None, Day, Nite, or Both.





*Call Forward—Busy No Answer may affect operation of this feature.*

*Group members in a Voice Mail Hunt Group must be set to Voice Mail-type “Yes”.*

## Related Programming

Refer to “[Voice Mail Port](#)” in the [Station Programming](#) section of this Chapter.

## Voice Mail

### Description

When a voice mail system is connected to the *DHS/DHS-E* via SLT ports the operation of the voice mail system can be greatly enhanced by preprogramming digit code strings that allow the caller entering voice mail to be diverted to the appropriate menu level. The code that must be entered may be different depending on the call type (CO transfer to VM, intercom call to VM, etc.). The *DHS/DHS-E* provides six code strings fields; ICM PREFIX, XFR PREFIX, RECORD DGT, ICM SUFFIX, XFR SUFFIX and DIS DGT. The *DHS/DHS-E* always sends the station directory number to the voice mail system for calls that are forwarded to VM from a station. These digits are either preceded or appended with the digits programmed into the six fields.

- ICM PREFIX (Intercom Prefix)—Digits that must proceed the station directory number when a station user calls VM to retrieve messages. The Intercom Prefix may be up to four digits in length.
- XFR PREFIX (Transfer Prefix)—Digits that must proceed the station directory number when a CO line call is transferred to VM. The Transfer Prefix may be up to four digits in length.
- RECORD DGT (Record Digits)—Digits are used only with the Voice Recorder feature. The RECORD DGT digits are sent to the VM system after the voice mail box digits to skip the user’s introduction and begin recording.
- ICM SUFFIX (Intercom Suffix)—Digits are applied to intercom calls placed to the VM system as an aid to direct the caller to his or her personal greeting where they are required to enter only a password to retrieve messages. Digits programmed as Suffix Digits will be appended to the station directory number. That is, after the station directory number is sent to the VM system the Suffix Digits will then be sent. The Suffix may be up to two digits in length.
- XFR SUFFIX (Transfer Suffix)—Digits that are applied to calls that are transferred to the VM system. Digits programmed as Transfer Suffix digits will be appended to the station directory number. That is, after the station directory number is sent to the VM system the Suffix Digits will then be sent. The Suffix may be up to two digits in length.
- DIS DGT (Disconnect Digits)—Digits that will be sent to the voice mail system whenever a station user disconnects or when a CO line caller hangs up. The purpose of the Disconnect Digits is to make the voice mail port available to new voice mail callers quickly. Disconnect Digits may be up to eight digits in length.

---

---

## Default

The *DHS/DHS-E* default settings of associated (Voice Mail Integration) data fields are listed below:

- ICM PREFIX = Empty
- RECORD DGT= Empty
- ICM SUFFIX = Empty
- XFR SUFFIX = Empty
- DIS DGT = Empty

## *Programmable Range*

The programmable range for the *DHS/DHS-E* Voice Mail Integration fields are listed below:

- ICM PREFIX = 0000-9999,####,\*\*\*\*\*
- XFR PREFIX = 0000-9999,####,\*\*\*\*\*
- ICM PREFIX = 0000-9999,####,\*\*\*\*\*
- ICM SUFFIX = 00-99,##,\*\*\*
- XFR SUFFIX= 00-99,##,\*\*\*
- DIS DGT= 00000000-99999999,#####,\*\*\*\*\*
- PAUSE = FEAT + [7] + [0] (displays P)

## *Programmable Range*

The programmable range for the AVP/Dispatch Voice Mail Integration fields are listed below:

- ICM PREFIX = P7 (FEAT + [7] + [0] + [7] save)
- ICM SUFFIX = \*
- XFR PREFIX = P7 (FEAT + [7] + [0] + [7] save)
- RECORD DIGIT = 5P
- DIS DGT = #9999999

---

---

## *Numbering Plan (DHS-E Only)*

The Installer can customize the Numbering Plan. The default Ranges for each Item are 1-8. As each subsequent item is reviewed, the scrollable options available will be the one currently selected for that Item plus any unassigned codes. By default, 1, 2, 7 and 8 are used which leaves 3, 4, 5, and 6, plus the number currently assigned to that Item in the scroll list.

### **Default**

By default, the *DHS/DHS-E* default settings of associated Numbering Plan data fields are listed below:

- STATION = 1
- GROUP TYPE = Hunt
- CO LINE = 7
- CO LINE GROUP = 2
- HUNT GROUP = 8



*Use this feature only at initial installation. Changing this feature after initial installation requires the reprogramming of flexible buttons. Use of the leading digit 7 for stations or groups may cause conflicts with AVP/Dispatch Voice Mail.*

### ***Programmable Range***

The programmable range values for the *DHS/DHS-E* Numbering Plan are listed below:

- STATION = 1-6
- CO LINE = 1-8
- CO LINE GROUP = 1-8
- HUNT GROUP = 1-8

---

---

# 7

## **Maintenance/ Troubleshooting**

The System troubleshooting procedures is a logical approach to fault identification, analysis, and correction. The key system may generate symptoms of problems that actually occur outside of the office environment.



---

---

## Introduction

Maintaining the *STARPLUS*<sup>®</sup> *DHS/DHS-E*<sup>™</sup> digital telephone system is a combination of customer database changes, facilities and apparatus moves, adds and changes. These requirements are handled properly by practicing the techniques, illustrations and step-by-step instructions listed in the previous sections of this manual.

When installed properly the *DHS/DHS-E* performs relatively maintenance-free. From time to time the digital telephone instruments may become dirty or dusty and require cleaning. We suggest the use of a clean, dry cotton (or other soft, absorbent) cloth to wipe the instrument clean. Use of chemicals to clean the telephone plastics is NOT recommended since some chemicals can cause permanent damage to the telephone finish. If deep soiling conditions exist for the telephone to be cleaned, use of specialized telephony cleaning solutions may give satisfactory results. When trying any cleaner for the first time we suggest that it be applied to the telephone instrument underside in a small sample area to assure that the desired results are obtained before proceeding.

Problems such as system restarts (from temporary AC power interruption), fading (from the long distance carrier), or dropped calls (caused by internal user randomly pressing holding CO Line buttons) all are common situations that are not the result of a system component or software failure.

The System Troubleshooting Section attempts to provide the service technician with some quick, and reliable, tools to diagnose installation related or service related problem reports.

---

## KSU


Component failures at the KSU are limited to power distribution (fuses), improper or shorted wiring, CO or station interface failure, or auxiliary circuit problems.

---


## CPU/Power LED

The CPU/Power heartbeat LED is located on the front of the *DHS* KSU adjacent to the power switch, and on the Right Side of the KSU panel of the *DHS-E*. If the AC input and DC output power circuits are operating, the LED will be on steady. If the CPU is running, not locked up or failed, the LED should be flashing at a fast rate. The Initialization switch should be in the right (ON) position.

**Table 7-1: Central Processor Unit (CPU)**

SYMPTOM	DIAGNOSTIC AID	CAUSE	CORRECTIVE ACTION
No system operation	CPU	No AC input	Check commercial AC outlet.
LCD telephones have no display	Heartbeat/Power	KSU Cord	Verify that both ends of AC cord are plugged in.
No LED's lit at any telephones	LED Not Lit	Power On Switch	Switch the KSU AC power switch to the ON position.
		AC Fuse	Inspect and replace KSU exterior AC input fuse.
		DC Fuse	Inspect and replace system DC output fuse.
No system operation	CPU	Initialization Switch	1. Verify initialization switch operated to the ON position.
LCD telephones may have data frozen on displays	Heartbeat/Power		<input type="checkbox"/> If the Initialization switch is not in the ON position at the time the KSU is powered, the Power Up Initialization sequence at the end of <i>Chapters 2 and 3</i> should be followed.
No LED's lit at any telephones or intermittent	LED Lit		<input type="checkbox"/> If the system was properly initialized, proceed to step 2.
CPU is locked up			2. Power down/up and observe system recovery. ( <i>The system power should remain off for a least 5 seconds for this test</i> ). If no heartbeat is seen proceed to step 3.
			3. Power down, remove KSU cover, detach all station cabling (25 pairs), and power up. ( <i>The system power should remain off for a least 5 seconds for this test</i> ). If no heartbeat is seen proceed to step 4.
			4. Power down, inspect for the following:
			<input type="checkbox"/> Loose or unplugged 3x8 Expansion Module, 6 Port CO Module or Option Module ribbon cables.
			<input type="checkbox"/> Improperly aligned ribbon cables.
			<input type="checkbox"/> Improper installation of the system software EPROM, located in socket U9 CPU Module.
EMERGENCY ACTION			1. Operate the initialization switch to the OFF position.
 <p>Since the unique battery protected customer database will be erased and the system will boot up with default programming.</p>			2. Return the initialization switch to the ON position.
			3. IF CPU/POWER LED is still not flashing, replace the KSU.
			4. Initialize and test according to the Power Up Initialization sequence.

**Table 7-2: Key Telephone / SLT Telephones Dead**

SYMPTOM	DIAGNOSTIC AID	CAUSE	CORRECTIVE ACTION
Telephones/station apparatus dead.	CPU Heartbeat / Power LED Lit	Shorted Station Pair(s)	<ol style="list-style-type: none"> <li>1. At MDF, remove cross connect (jumper) wires at the punch-down (66M1-50) block going to all affected stations.</li> <li>2. Reconnect stations one by one verifying that each power up correctly.</li> </ol>
	Key Telephone	Bad Key Telephone	<p>When one is found that will not power up:</p> <ol style="list-style-type: none"> <li>1. Disconnect the telephone at the user location.</li> <li>2. replace with a <i>known working</i> telephone. <ul style="list-style-type: none"> <li><input type="checkbox"/> If the new station power up is normal, replace the first connected key telephone.</li> <li><input type="checkbox"/> If the new station also does not power up, follow the remaining steps for the individual station.</li> <li><input type="checkbox"/> If none power up; remove all cross connect wiring that run between the 3x8 Module 66 block and the station cable 66 block.</li> </ul> </li> <li>3. Connect one station directly to the 3x8 Module 66 block station pair.</li> </ol>
		Shorted station cable	If the key telephone power up is normal: inspect, repair or replace the station cable.
		Shorted KSU-MDF cable	<p>If the key telephone does not power up: inspect, repair or replace the 25 pair cable from the 3x8 Module to the MDF.</p> <p>Once the 25 pair cable from the 3x8 Module to the MDF is inspected, repaired or replaced; connect the <i>known working</i> telephone directly to the 3x8 Module 66 block station pair.</p>
		3x8 Module ribbon cable not properly aligned during installation	If the telephone still will not properly power up, power down the system and inspect the 3x8 Module ribbon cable for properly aligned installation. If any problem exists here correct it and power up the system.
		3x8 Module bad	If no problems can be found at the ribbon cable connector, replace the 3x8 Module.
		CPU Module bad	If the problem persists, replace the KSU.
	<p>The key telephones use only one twisted cable pair for power, data control and voice communications. There are no fuses for station interface protection. Instead, a current sensing poly-switch limits excessive current going to each station. If a station cable pair is shorted or a telephone's DC power supply is damaged, the poly-switch will <u>temporarily</u> open to protect the KSU 3x8 Module circuitry.</p>		



**Table 7-3: Erratic Key Telephone Operation**

<b>SYMPTOM</b>	<b>DIAGNOSTIC AID</b>	<b>CAUSE</b>	<b>CORRECTIVE ACTION</b>
Erratic operation: LCD Display and LEDs  Faint data noise during background conversation	Digital Volt/OHM meter	Cable distance is too long for gauge of cable used.  Non-standard telephone cable being used or multiple digital stations fed from one common cable.	If a key telephone is not receiving clear 2B+D signal from KSU, test as follows: <input type="checkbox"/> Test cable with a known good keyset. <input type="checkbox"/> Check wiring, cables, and connectors. <input type="checkbox"/> Replace card. <input type="checkbox"/> Check AC voltage.

**Table 7-4: Key Telephone (cannot be heard)**

<b>SYMPTOM</b>	<b>DIAGNOSTIC AID</b>	<b>CAUSE</b>	<b>CORRECTIVE ACTION</b>
Other party cannot hear you. (handset)	Key Telephone (other station)	Component failure	<ol style="list-style-type: none"> <li>1. Verify MUTE Btn LED is not lit.</li> <li>2. Lift handset, dial another station. Talk.</li> <li>3. Replace handset assembly and repeat Step 1.</li> <li>4. Replace handset cord and repeat Step 1.</li> <li>5. If still no transmit, the key telephone will need to be replaced.</li> </ol>

**Table 7-5: Key Telephone (cannot hear)**

<b>SYMPTOM</b>	<b>DIAGNOSTIC AID</b>	<b>CAUSE</b>	<b>CORRECTIVE ACTION</b>
Cannot hear (handset)	Key Telephone	Component Failure	<ol style="list-style-type: none"> <li>1. Verify MUTE is not lit.</li> <li>2. Lift handset, ICM tone should be heard over the handset.</li> <li>3. Press [SPKR] key, observe red LED and place handset on hook. <ul style="list-style-type: none"> <li><input type="checkbox"/> If ICM tone is heard over the loudspeaker, but was not heard through the handset in Step 1, exchange handset assembly with another known working unit.</li> <li><input type="checkbox"/> If ICM tone is still not heard after repeating the test in Step 1, replace the coiled handset cord. If the cord is defective, the original handset is probably okay.</li> <li><input type="checkbox"/> If ICM dial tone still cannot be heard, replace key telephone.</li> </ul> </li> </ol>

**Table 7-6: Speakerphone (cannot be heard**

<b>SYMPTOM</b>	<b>DIAGNOSTIC AID</b>	<b>CAUSE</b>	<b>CORRECTIVE ACTION</b>
Other party cannot hear you on your speaker phone	Key telephone (other station)	Connections, component failures	<ol style="list-style-type: none"> <li>1. Verify MUTE is not lit.</li> <li>2. Press [SPKR] and listen for tone over the speaker.</li> <li>3. Call a known good working station. <i>(The distant party should be using the handset).</i></li> <li>4. If the other party cannot hear you, lift handset and verify proper handset operation.</li> </ol>

**Table 7-7: No Sound From Speaker**

<b>SYMPTOM</b>	<b>DIAGNOSTIC AID</b>	<b>CAUSE</b>	<b>CORRECTIVE ACTION</b>
No sound over speaker	Key telephone	Connections, component failure	<ol style="list-style-type: none"> <li>1. Press [SPEAKER] button (red LED).</li> <li>2. If you can hear ICM tone over the handset, but not the speaker, replace the key telephone.</li> </ol>

**Table 7-8: Static/Noise During Conversation**

SYMPTOM	DIAGNOSTIC AID	CAUSE	CORRECTIVE ACTION
Static and/or noise can be heard during a conversation	Logic of elimination		<p>If you can hear the static, is it on intercom handset to handset calls?</p> <p>If yes, do you hear the static when you call any other ICM stations? (<i>The problem may be the telephone called or calling you</i>).</p>
		Station cable wiring	If static on ICM and CO line calls, verify wall jack connection and MDF connections. Correct any problems found.
		Bad component	If noise persists, replace handset cord.
		Telco problem	<ul style="list-style-type: none"> <li><input type="checkbox"/> If static only on outside CO calls, do other stations hear similar static noise?</li> <li><input type="checkbox"/> If other stations hear static, is it only on one CO line? Which one?</li> <li><input type="checkbox"/> If on several CO lines, the Telco may have a wet cable. Disconnect the CO line from the KSU, and using a dial test handset (buttset), place a call and listen for static. If noise is present, contact the Telco.</li> </ul>
		KSU-MDF wiring	If noise is present only when the KSU is connected to the CO lines, inspect, repair or replace the CO line feeder cables that plug into the KSU interface modules (3x8 and 6-Port CO).
		Possible module problem	<ul style="list-style-type: none"> <li><input type="checkbox"/> If noise is still present on a certain CO line, and CO incoming line cord has been exchanged, move this cord (CO line) to another KSU line position. If noise is now removed on the new CO line interface, something is bad with the KSU input jack.</li> <li><input type="checkbox"/> Call Customer Service.</li> </ul>

**Table 7-9: CO Line Problems**

<b>SYMPTOM</b>	<b>DIAGNOSTIC AID</b>	<b>CAUSE</b>	<b>CORRECTIVE ACTION</b>
Lines on Hold, no one there.	System Programming		If the customer complains of seeing many holding lines, and when accessed no one is on the other end, calls may be left in an abandoned state.
		Outside caller abandons call	If the serving Central Office (Telco) provides disconnect supervision: <ul style="list-style-type: none"> <li><input type="checkbox"/> The KSU should be programmed (on a per CO line basis) to recognize an abandoned call (default).</li> <li><input type="checkbox"/> When the outside holding party hangs up, the CO line interface detects change in CO voltage for the associated line.</li> <li><input type="checkbox"/> The KSU then removes the inside Hold indication at all telephones and restores the line to idle.</li> </ul>
		User error	Auto Hold Allow may be enabled at a station that is unsure of the proper operation of this feature. <ul style="list-style-type: none"> <li><input type="checkbox"/> If so, insure that inside users do not accidentally place calls on Hold while skipping from one CO line to another, refer to the Key telephone User Guide.</li> <li><input type="checkbox"/> By programming Auto Hold Deny (code F94) at the abusing stations, incoming CO lines will not be accidentally placed on Hold.</li> </ul>

**Table 7-10: Lines Stay Busy**

<b>SYMPTOM</b>	<b>DIAGNOSTIC AID</b>	<b>CAUSE</b>	<b>CORRECTIVE ACTION</b>
Lines sometimes show busy even though no one else is in the office, or no one is using the line.	System Programming	Customer confusion or Programming error	Verify CO line programming for DISA, External Call Forwarding, and Day/Nite Service.  (The system will hold up certain trunk-to-trunk calls until a forced disconnect interval time is reached.)

**Table 7-11: Btn Programming is Lost/Changed at Key Telephone**

SYMPTOM	DIAGNOSTIC AID	CAUSE	CORRECTIVE ACTION
Previously programmed feature buttons now do not work or have different features assigned.	Executive Key Telephone Display	Unauthorized customer reprogramming	<ol style="list-style-type: none"> <li>1. See if customer has a User Guide and understands feature button programming.</li> <li>2. Compare the current system database and station feature button programming with the completed programming worksheets.</li> </ol> <p>Feature button program memory is retained at the KSU. The memory is protected by a Ni-Cad or Nickel Metal Hydride battery.</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> If system power is removed for longer than seven (7) days, all system database programming may be lost and default database is loaded.</li> <li><input type="checkbox"/> Loss of power will also affect other customer unique system programming along with all other key telephones feature button programming.</li> </ul>
SLT users cannot access CO lines by dialing [9] and cannot access an idle trunk in a Trunk Group when dialing [*] + [4] + [N]. Key telephone users cannot program a Trunk Group to appear under one feature key.	Executive Key Telephone	Improper database programming. If the system configuration is determined to be a key system, then according to FCC Rules and local Telco tariffs, dial or button access of trunks by Trunk Group is not allowed.	If system configuration desired is PBX (or hybrid operation) and the local Telco is notified of the appropriate MF hybrid/ PBX FCC Registration Number, then change system operation type in database programming to PBX.

---

---

# A

# Database Programming Forms

Use the following forms to complete the customer specific programming applications prior to actual system programming. For several database fields some forms do not provide an entry area for all possible programming, since the majority of installation applications will not require changes to all data in all program fields.



---

## Programming Work Sheets

You may photocopy these forms to use as actual programming work sheets.

**Table A-1: System Type**

<b>DATA PARAMETER</b>	<b>FORMAT</b>	<b>CUSTOMER DATA</b>	<b>DEFAULT</b>
System Type	PBX/KEY		PBX

**Table A-2: System Application Numbering Plan (DHS-E only)**

<b>DATA PARAMETER</b>	<b>FORMAT</b>	<b>CUSTOMER DATA</b>	<b>DEFAULT</b>
Station	100-195 (1-8)		1
CO Line	700-717 (1-8)		7
CO Line Group	200-203 (1-4)		2
Hunt Group	800-807 (1-8)		8















**Table A-6: Call Handling Data**

<b>DATA PARAMETER</b>	<b>FORMAT</b>	<b>CUSTOMER DATA</b>	<b>DEFAULT</b>
Privacy Release	Y/N		Y
Privacy Release Tone	Y/N		Y
Exclusive Hold Time	0-8 minutes		4 min
Flash Time	0.1-1.5		0.7
Remind Time	0/10/30/60/90		30
Park Remind	30/60/90/120/150/180		30
Pause Time	1.5/2/3.5/5		2
PBX Code	0-9		9
PBX Auto Pause	1-9		1
Dialing Ratio Tone Time	50/60/70...150		70
Dialing Ratio Inter-Digit Time	50/60/70...150		70
VM Dialing Ratio Tone Time	60/90/120/150		120
VM Dialing Ratio Inter-Digit Time	60/90/120/150		120
Warning Time	1-8		3
Recall Time	16/30/60/90/120		30
SLT Hook Flash Start	60/100/200/300...1400		300
SLT Hook Flash End	100/200/300...1500		800
Wait ICLID	3.5/4/4.5/5/5.5/6/6.5/7		4.0
VM Mon Time	12/20/30/40/50/60		30





**Table A-9: External Call Forward - Auto Busy Redial Parameters**

DATA FIELD		RANGE	CUSTOMER DATA	DEFAULT
External Call Forward	Incoming	0 (None) DHS 1-12 DHS-E 700-717		None
	Outgoing	0 (None) DHS 1-12 DHS-E 700-717		None
	Service	never/day/ night/always		Never
	Talk Time	1-15		1
Unsupervised Conference Time		1-15		1
Operator Code		0/9		0
Unsupervised Conference		Y/N		Y
Auto Busy Redial	ABR Attempts	0-10		10
	ABR Interval	16/30/60/90/120		16
	Tone Detect. Time	0-9		4
Call Abandon	Active Call	50-2500		600
	Held Call	50-2500		600
Ring Alt Position Timer		30/60/90/120/150/180		30

**Table A-10: System Application Data**

DATA FIELD		RANGE	NEW DATA	DEFAULT
Station Hunt Group	Hunt Group	Group Type	Hunt/VM/AllRing	Hunt
	Group Member	1	10-81 / 100-195	Empty
		2	10-81 / 100-195	Empty
		3	10-81 / 100-195	Empty
		4	10-81 / 100-195	Empty
		5	10-81 / 100-195	Empty
		6	10-81 / 100-195	Empty
		7	10-81 / 100-195	Empty
		8	10-81 / 100-195	Empty
		9	10-81 / 100-195	Empty
		10	10-81 / 100-195	Empty
		11	10-81 / 100-195	Empty
		12	10-81 / 100-195	Empty
		13	10-81 / 100-195	Empty
		14	10-81 / 100-195	Empty
		15	10-81 / 100-195	Empty
		16	10-81 / 100-195	Empty
		17	10-81 / 100-195	Empty
		18	10-81 / 100-195	Empty
		19	10-81 / 100-195	Empty
		20	10-81 / 100-195	Empty
		21	10-81 / 100-195	Empty
		22	10-81 / 100-195	Empty
		23	10-81 / 100-195	Empty
	24	10-81 / 100-195	Empty	

**Table A-10: System Application Data**

DATA FIELD				RANGE	NEW DATA	DEFAULT	
Station Hunt Group	Hunt Group	Ring Assignment	1	700	day/night/both/none		None
			2	701	Y/N		N
			3	702	Y/N		N
			4	703	Y/N		N
			5	704	Y/N		N
			6	705	Y/N		N
			7	706	Y/N		N
			8	707	Y/N		N
			9	708	Y/N		N
			10	709	Y/N		N
			11	710	Y/N		N
			12	711	Y/N		N
				712	Y/N		N
				713	Y/N		N
				714	Y/N		N
				715	Y/N		N
				716	Y/N		N
	717	Y/N		N			
Voice Mail	ICM Prefix	0000-9999,P,S,#				Empty	
	XFR Prefix					Empty	
	Record DGT					Empty	
	ICM Suffix	00-99,P,S,#				Empty	
	XFR Suffix					Empty	
	Disc Digits	00000000-99999999,P,S,#				Empty	









**Table A-12: Resource Data**

DATA PARAMETER		RANGE	CUSTOMER DATA	DEFAULT
Ring Scheme		1/2/3/4		2
Letter Type		0/1/2/3/4/5		0
Attendant		DHS (10-81) DHS-E (100-195)		10 100
Alternate		DHS (10-81) DHS-E (100-195)		Empty
System Alarm	1	00:00-23:59		Empty
	2	00:00-23:59		Empty
	3	00:00-23:59		Empty
	4	00:00-23:59		Empty
	5	00:00-23:59		Empty
	6	00:00-23:59		Empty
	7	00:00-23:59		Empty
	8	00:00-23:59		Empty
Night Start		00:00-23:59		17:00
Night End		00:00-23:59		08:00
DB Programming Password		xxxxxx x=(0-9)		000000



**Table A-12: Resource Data (Continued)**

DATA PARAMETER		RANGE	CUSTOMER DATA	DEFAULT
User Password	10	100	xxxx x=(0-9)	0000
	11	101	xxxx x=(0-9)	0000
	12	102	xxxx x=(0-9)	0000
	13	103	xxxx x=(0-9)	0000
	14	104	xxxx x=(0-9)	0000
	15	105	xxxx x=(0-9)	0000
	16	106	xxxx x=(0-9)	0000
	17	107	xxxx x=(0-9)	0000
	18	108	xxxx x=(0-9)	0000
	19	109	xxxx x=(0-9)	0000
	20	110	xxxx x=(0-9)	0000
	21	111	xxxx x=(0-9)	0000
	22	112	xxxx x=(0-9)	0000
	23	113	xxxx x=(0-9)	0000
	24	114	xxxx x=(0-9)	0000
	25	115	xxxx x=(0-9)	0000
26	116	xxxx x=(0-9)	0000	

**Table A-12: Resource Data (Continued)**

DATA PARAMETER		RANGE	CUSTOMER DATA	DEFAULT
User Names	10	100	7 Alphanumeric	Empty
	11	101	7 Alphanumeric	Empty
	12	102	7 Alphanumeric	Empty
	13	103	7 Alphanumeric	Empty
	14	104	7 Alphanumeric	Empty
	15	105	7 Alphanumeric	Empty
	16	106	7 Alphanumeric	Empty
	17	107	7 Alphanumeric	Empty
	18	108	7 Alphanumeric	Empty
	19	109	7 Alphanumeric	Empty
	20	110	7 Alphanumeric	Empty
	21	111	7 Alphanumeric	Empty
	22	112	7 Alphanumeric	Empty
	23	113	7 Alphanumeric	Empty
	24	114	7 Alphanumeric	Empty
	25	115	7 Alphanumeric	Empty
26	116	7 Alphanumeric	Empty	
Programmed Msgs Outgoing		16 Alphanumeric		Call Operator
		16 Alphanumeric		Call Home
		16 Alphanumeric		Call School
		16 Alphanumeric		Visitors Waiting
		16 Alphanumeric		Urgent
		16 Alphanumeric		Come See Me

**Table A-12: Resource Data (Continued)**

DATA PARAMETER	RANGE	CUSTOMER DATA	DEFAULT
Executive Notify	16 Alphanumeric		Out For Lunch
	16 Alphanumeric		Be Back Soon
	16 Alphanumeric		Left For The Day
	16 Alphanumeric		In a Meeting
	16 Alphanumeric		Out Of Office
	16 Alphanumeric		On Vacation
BGM	Y/N		N
Data Link	<i>(For Future Use)</i>	N/A	N/A
RMT X_rate PC	110/300/600/1200/2400		9600
Program Port BPS	4800/9600/19200		
SMDRx_rate	110/300/600/1200/2400		9600
SMDR Port BPS	4800/9600/19200		
Hour Mode	12/24		12
Dial Tone Detect	Y/N		N
Dial Wait Time	0-8		0
KSU Revision	Display Only		
Modem Number	199		199

**Table A-13: System Speed Dial**

<b>BIN #</b>	<b>TELEPHONE NUMBER</b>	<b>BIN #</b>	<b>TELEPHONE NUMBER</b>	<b>BIN #</b>	<b>TELEPHONE NUMBER</b>	<b>BIN #</b>	<b>TELEPHONE NUMBER</b>
20		40		60		80	
21		41		61		81	
22		42		62		82	
23		43		63		83	
24		44		64		84	
25		45		65		85	
26		46		66		86	
27		47		67		87	
28		48		68		88	
29		49		69		89	
30		50		70		90	
31		51		71		91	
32		52		72		92	
33		53		73		93	
34		54		74		94	
35		55		75		95	
36		56		76		96	
37		57		77		97	
38		58		78		98	
39		59		79		99	



*When External Call Forward is used, System Speed Dial Bin 99 is used exclusively for the number to dial when calls are routed via ECF.*

**Table A-14: Account Codes (up to 8-digits)**

<b>BIN #</b>	<b>TELEPHONE NUMBER</b>	<b>BIN #</b>	<b>TELEPHONE NUMBER</b>	<b>BIN #</b>	<b>TELEPHONE NUMBER</b>	<b>BIN #</b>	<b>TELEPHONE NUMBER</b>
001		026		051		076	
002		027		052		077	
003		028		053		078	
004		029		054		079	
005		030		055		080	
006		031		056		081	
007		032		057		082	
008		033		058		083	
009		034		059		084	
010		035		060		085	
011		036		061		086	
012		037		062		087	
013		038		063		088	
014		039		064		089	
015		040		065		090	
016		041		066		091	
017		042		067		092	
018		043		068		093	
019		044		069		094	
020		045		070		095	
021		046		071		096	
022		047		072		097	
023		048		073		098	
024		049		074		099	
025		050		075		100	

---

---

**B**

**Part Numbers**



**Table 2-1: STARPLUS® DHS/DHS-E™ Part Numbers**

<i>DHS</i> KSU	<b>SP7000-00</b>
<i>DHS-E</i> KSU	<b>SP7000-10</b>
Option Module*	SP7110-00
3 x 8 Expansion Module	SP7100-00
6-Port CO Module *	SP7100-10
2-Port Analog Adapter	SP7420-00
2-Port Analog Expansion	SP7440-00
Dark Gray-Executive Key Telephone	SP7314-71
Dark Gray-Enhanced Key Telephone	SP7312-71
Dark Gray-Basic Key Telephone	SP7311-71
Off-White-Executive Key Telephone	SP7314-08
Off-White-Enhanced Key Telephone	SP7312-08
Off-White-Basic Key Telephone	SP7311-08
DSS Console - Dark Gray	SP7310-71
DSS Console - Off White	SP7310-05
Caller ID Module - 4 port	1440-00
Caller ID Module - 8 port	1480-00
ICLID Cable	SP7081-10
BCU - Battery Charging Unit	VC61101
MOH - Standard Music on Hold Module	SP7465-00





---

---

# Index

## Numerics

- 2-Port Analog Adapter 2-11, 5-17
  - Installation 2-51
- 2-Port Analog Expander 2-12, 3-36
  - Installation 2-52
    - refer to 2-Port Analog Adapter
- 3 x 8 Module 2-4, 2-36, 3-4, 3-20, 3-22
  - Installation 2-28
    - Wiring Designations 2-37
- 6-Port CO Module 2-5, 2-37
  - Installation 2-28, 2-31

## A

- Account Code 4-8
  - Forced 6-15
  - Forced Verified 4-8
  - Table 6-35
- Additional Device Port (ADP) 2-8–2-9, 3-25, 3-27
- ADP Modular Jack 2-42, 3-27, 4-9
- Alarm
  - Cancel 5-19
  - Set 5-18
  - Station 4-9, 5-18
  - System 4-11, 6-31
- Alternate Answering Position 4-11
- Analog Device Port 4-9
- Attendant 4-12, 6-30
  - Access 4-42
  - Administration 4-12
  - Alternate 6-30
  - Call Operator 5-6
- Audible Signals 2-20
- Authority Code 5-4
  - COS 4-14
- Automatic Busy Redial 4-15, 6-26
- Automatic Line Selection 4-16

## B

- back 4-2, 6-1
- Backboard 2-25, 3-17
- Background Music (BGM) 2-6, 2-35, 2-49, 4-17, 6-34
  - Installation 2-49, 3-33
  - refer to Music on Hold (MOH)
  - Volume 4-103
- Basic Key Telephone 2-7
- Battery Backup 2-26, 3-18
  - Sizing Chart 2-27, 3-18
- bksp 4-2, 6-1
- Busy Lamp Field (BLF) 4-17

## C

- Call Abandon
  - Time 6-27
- Call Back 4-18
  - Cancel 5-4
  - SLT 5-4
- Call Brokering 5-5
- Call Forward
  - Busy 4-21, 5-5
  - Busy/No Answer 4-21, 5-5
  - Cancel 4-22, 5-6
  - CO Line Preset 6-27
  - Direct (All Call) 4-21, 5-6
  - Display 4-19
  - External (ECF) 4-53, 6-25
  - Follow Me 4-22, 5-6
  - Idle 4-21, 5-6
  - Intercom Forced 4-59
  - Modes 4-20
  - No Answer 4-21, 5-6
  - Reminder Tone 4-86
  - SLT 5-5
  - Station 4-20

- 
- Call Handling Configuration 6-20
    - Automatic Busy Redial 6-26
    - Call Abandon 6-27
    - CO Preset Forward 6-27
    - Conference 6-26
    - Dialing Ratio 6-22
    - DISA 6-24
    - Exclusive Hold Time 6-21
    - EXT Call Forward (ECF) 6-25
    - Flash Time 6-21
    - Operator Code 6-26
    - Park Remind 6-21
    - Pause Time 6-22
    - PBX 6-22
    - Privacy Release 6-20
    - Recall Time 6-23
    - Reminder Time 6-21
    - Ring ALT Position 6-27
    - SLT Hook Flash 6-23
    - VM 6-23, 6-28
    - Wait (ICLID) 6-28
    - Warning Time 6-23
  - Call Operator
    - refer to Attendant
  - Call Park 4-30
    - Answer 4-31, 5-7
    - Remind 6-21
  - Call Pickup
    - Direct 4-32, 5-7
    - Group 4-32, 5-7
  - Call Waiting 4-32
  - Caller ID
    - Installation 2-45, 3-30
    - Programming 2-46, 3-31
  - Caller Identification (ICLID) 4-24
    - Answered Call Table 4-28
    - Calling Number/Name Display 4-25–4-26
    - Calling Number/Name SMDR 4-27
    - Port 6-19
    - Review Call Information 4-29
    - Unanswered Call Table 4-29
    - Wait 6-28
  - Camp On
    - Busy CO Line 5-8
    - Busy Station 4-35, 5-8
  - Central Processor Unit (CPU) 2-4, 3-4, 7-2
    - Power LED 7-1
  - chg 4-2, 6-1
  - Class Of Service (COS)
    - Authority Code 4-14
    - Day 6-13
    - Day/Night 4-36
    - Night 4-76, 6-14
    - Privacy Release 4-84
    - Tone Detect 4-94
  - clear 4-2, 6-1
  - CO Line
    - Access 5-8
    - Assign 6-14
    - Busy 7-7
    - Call Abandon 6-17
    - Call Discrimination 6-37
    - Configuration 6-17
    - Connection 2-36, 3-22
    - Copy 6-34
    - Dialing Type Selection 6-17
    - Distinct Tone 6-19
    - Flash 5-10
    - Group 4-36, 5-8, 6-18
    - ICLID Port 6-19
    - Inter-Digit Duration 4-94
    - Loud Bell 6-18
    - Parameters 6-17
    - Pool 4-37
    - Preset Call Forward 6-27
    - Priority 4-87
    - Privacy 4-84
    - Private To 6-19
    - Problems 7-7
    - Pulse 4-85
    - Recall 4-86
    - Receive Assign 6-14
    - Ringling 4-103
    - Signaling 4-38
    - Specific Line 5-9
    - Toll Override 6-19
    - Tone Detect 4-94
    - Transfer 4-95, 6-23
    - Troubleshooting 7-7
    - Type Assignment 4-38, 6-18

- 
- Warning Tone 4-104
  - Conference
    - Supervised 4-39
    - Unsupervised 4-40, 6-26
  - D**
  - Data Link 6-36
  - Database
    - Password 6-31
    - Programming 6-4, 6-8
  - DHS
    - 2-Port Analog Adapter 2-11, 2-51
    - 2-Port Analog Expander 2-12, 2-52
    - 3 x 8 Module 2-4, 2-28
    - 6-Port CO Module 2-5, 2-31
    - Audible Signals 2-20
    - Call Handling Configuration 6-20
    - Caller ID 2-45
    - Central Processor Unit (CPU) 2-4
    - CO Line Configuration 6-17
    - Components 2-29
    - Dial Specifications 2-19
    - Digital Key Telephones 2-7, 2-40, 3-27
    - DSS 2-43
    - External Components 2-2
    - External Paging Equipment 2-47
    - FCC Registration 2-19
    - Feature Upgrade 2-54
    - General Description 2-1
    - Headset 2-53
    - Installation 2-22, 2-25
    - KSU 2-1, 2-26, 2-27-2-28, 2-44, 6-37
    - Loud Bell 2-50
    - Modular Jacks 2-42
    - MOH/BGM Module 2-6, 2-35, 2-49
    - Option Module 2-6, 2-33
    - Power Supply 2-4
    - Program Mode Entry 6-2
    - Programming 6-8
    - Resource Configuration 6-29
    - Restriction Configuration 6-37
    - Site Considerations 2-23
    - SMDR/SMDA Output Device 2-44
    - Specifications 2-13, 2-16, 2-17, 2-18
    - Station 2-39, 2-40, 6-13
    - System 2-1, 2-3, 2-13, 2-53
  - DHS-E
    - 3 x 8 Module 3-4, 3-20
    - Call Handling Configuration 6-20
    - Central Processor Unit (CPU) 3-4
    - CO Line Configuration 6-17
    - Digital Key Telephones 3-2, 3-25
    - DSS 3-28
    - External Paging Equipment 3-32
    - Headset 3-37
    - Installation 3-14, 3-17
    - KSU 3-1, 3-19, 6-37
    - Loud Bell 3-34
    - Modem 3-4, 6-37
    - MOH/BGM Module 3-33
    - Numbering Plan 6-42
    - Program Mode Entry 6-2
    - Programming 6-8
    - Resource Configuration 6-29
    - Restriction Configuration 6-37
    - Site Considerations 3-15
    - Station 3-24, 6-13
    - System 6-39
  - Dial
    - Feature Access 4-41
    - Intercom Call 4-66
    - On Hook 4-77
    - Pulse 4-85
    - Pulse to DTMF Conversion 4-41
    - Ratio 6-22
    - Save Number (SDN) 4-87
    - Specifications 2-19
    - Tone Detect 6-36
    - Wait Time 6-37
  - Digital Key Telephone
    - Troubleshooting 7-3
  - Digital Key Telephones 2-7, 3-2
    - Basic 2-7
    - Enhanced 2-8
    - Executive 2-9
    - Installation 2-40, 3-25, 3-27

Troubleshooting 7-4, 7-5  
Direct Inward System Access (DISA) 1-3, 4-42, 6-24  
    Attendant 4-42  
    Night Service 4-76  
Direct Station Selector (DSS) 4-17  
    Console 4-48  
    Installation 2-43, 3-28  
    Owner 6-16  
Directory Dial 4-44, 6-35  
Display  
    Name 4-76  
    Super Twist 2-9  
Distinct Tone 6-19  
Distinctive Ring 4-45, 6-35  
Do Not Disturb (DND) 4-46, 5-9  
    Override 4-47  
    Reminder 4-86  
Drop Time-Out 4-48, 6-16  
    Warning Time 6-23

## E

Emergency Numbers 4-52  
Emissions 1-2  
End-to-End Signaling 4-52  
Enhanced Key Telephone 2-8  
Executive Key Telephone 2-9  
    Hour Mode 6-36  
External Components 2-2

## F

Feature Button  
    Copy 6-34  
    Inquiry 4-54  
    Programming 4-55  
Feature Upgrade 2-54  
Federal Communications Commission (FCC) 1-1  
    Registration 2-19  
Flash 4-53, 5-10  
    SLT 6-23  
    Time 6-21  
Flexible Line Assignment 4-58  
Flexible Receive Assignment 4-59  
Flexible Ring Assignment 4-59  
Forced Tone Ringing 4-60

## G

General Conventions 4-1, 4-1  
General Site Considerations 2-23, 3-15  
Ground 2-26, 2-26, 3-17

## H

Hands-Free  
    refer to Voice Announce  
Headset 2-53, 3-37, 4-61  
    Volume 4-103  
Heat Dissipation 2-17, 3-19  
Hold  
    Abandon(Loop Supervision) 4-62  
    Automatic 4-63  
    Call Answer/Select 4-63  
    Exclusive 4-64, 4-95, 6-21  
    Flash 5-10  
    Private Line 4-85  
    Recall 4-86  
    Reminder Time 4-64, 6-21  
    Retrieve 5-11  
    Retrieve From Another Station 5-11  
    System 4-64  
Hot Line 5-12  
    Cancel 5-13

## I

I-Hold Indication 4-65  
Installation  
    DHS 2-25  
    DHS-E 3-17  
    Tools 2-23, 3-15  
Intercom 4-66  
    SLT 5-13  
I-Use Indication 4-66

## K

Key Service Unit (KSU) 2-3, 3-3, 7-1  
    Components 2-1, 2-35, 3-1  
    Connection 2-44  
    Grounding 2-26, 3-17  
    Installation 2-26, 2-27-??, 3-19  
        Components ??-2-28  
    Option Module 2-33

- Revision 6-37
- Key Telephones Installation
  - High Profile Mount 3-26
  - Low Profile Mount 3-27
  - Wall Mount 3-26
- L**
- Last Number Redial (LNR) 4-67
  - Pause 4-81
  - SLT 5-13
- Letter Scheme 4-69
- Letter Type 6-29
- Loud Bell 2-50, 4-69, 6-18
  - Installation 3-34
- M**
- Message
  - Cancel 5-14
  - Executive Notify 4-72
  - Outgoing 4-69, 4-70
  - Preprogrammed 6-33
  - Send 5-14
  - Waiting 4-73, 5-13
- Modem 3-4
  - Port 6-37
- Music On Hold (MOH) 2-6, 2-35, 2-49, 4-75
  - Installation 2-49, 3-33
  - Volume 4-103
  - Volume Adjustment 2-49
- Mute 4-75
  - Ringling 4-75
- N**
- next 4-2, 6-1
- O**
- Operator Code 6-26
- Option Module 2-6, 2-34
  - Installation 2-28
- P**
- Page 4-77
  - Allow/Deny 4-79
  - Answer 5-14
  - External 4-79
  - External Equipment (Optional) 2-47, 3-32
  - Meet Me 4-80, 5-14
- Password 6-31, 6-32
  - Change 5-19
- Pause 4-81, 4-81
  - Time 6-22
- PBX
  - Auto Pause 6-22
  - Code 6-22
  - Compatibility 4-81
  - Flash 5-10
- Power Supply 2-4, 3-4
- Privacy 4-84
  - refer to Voice Announce
  - Release 4-84
- Privacy Release (RLS) 6-20
  - Tone 6-20
- Private Line 4-85, 4-85
- Private To 4-85
- Programming 6-2
  - Database 6-4, 6-8
  - Soft Button Prompts 4-2, 6-1
  - Station 6-13
  - User Name 4-96
  - Using Keypad 6-1
  - Using PC 6-1, 6-36
- Pulse To Tone Switch-Over 4-85
- R**
- Radiation 1-2
- RAM Initialization switch 2-22
- Regulatory Information
  - Hearing Aid Compatibility 1-2
  - Incidence of Harm 1-1
  - Maintenance Limitations 1-2
  - Notice of Compliance 1-2
  - Telephone Company Notification 1-1
  - UL/CSA Safety Compliance 1-2
- Resource Configuration 6-29
  - Account Code 6-35
  - Alternate Attendant 6-30
  - Attendant 6-30
  - BGM 6-34
  - CO Line 6-34
  - Data Link 6-36
  - Database Password 6-31

- 
- Dial Tone Detect 6-36
  - Dial Wait Time 6-37
  - Directory Dial 6-35
  - Feature Button Copy 6-34
  - Hour Mode Selection 6-36
  - KSU Revision 6-37
  - Letter Type 6-29
  - Modem Port Number (DHS-E Only) 6-37
  - Nite End 6-31
  - Nite Start 6-31
  - Preprogrammed Message 6-33
  - Ring Scheme 6-29
  - RMT X\_Rate 6-36
  - SMDR X\_Rate 6-36
  - Speed Dial 6-33
  - Station 6-34
  - System 6-35
  - System Alarm 6-31
  - User Name 6-32
  - User Password 6-32
  - Restriction Configuration 6-37
    - CO Line 6-37
  - Ring ALT Position 6-27
  - Ring Scheme 6-29
    - refer to Resource Configuration
  - RMT X\_Rate 6-36
  - RS-232C DB-9 Connector 2-45, 3-30
  - S**
  - safety 1-2
  - save 4-2, 6-1
  - Service Mode 6-31
  - show 4-2, 6-1
  - Single Line Telephone (SLT)
    - 2-Port Analog Adapter 5-17
    - Alarm 5-18
    - Attendant 5-6
    - Authority Code 5-4
    - Call Back 5-4
    - Call Brokering 5-5
    - Call forward 5-5
    - Call Park 5-7
    - Call Pickup 5-7
    - Camp On 5-8
    - CO Line Access 5-8
    - DND 5-9
    - Feature Access 5-1
    - Flash 5-10
    - Hold 5-10
    - Hot Line 5-12
    - Intercom 5-13
    - Last Number Redial (LNR) 5-13
    - Message 5-14
    - Page 5-14
    - Port Numbering 5-15
    - Speed Dial 5-18
    - Station 5-19
    - Transfer 5-20
    - Troubleshooting 7-3
  - SLT
    - Hook Flash 6-23
    - Message 5-13
  - SMDR/SMDA (Output Device) 3-29
  - Soft Button Prompts 4-2, 6-1
  - Speaker
    - Volume 4-103
  - Specifications
    - Electrical 2-16
    - Environmental 2-17
  - Speed Dial 4-90, 5-18
    - Pause 4-81, 4-81
    - Storing 5-18
    - System 6-33
  - Standard MOH/BGM Module
    - Installation 2-28
  - Starplus DHS/DHS-E Part Numbers B-1
  - Static / Noise During Conversation 7-6
  - Station
    - Account Code 6-15
    - Alarm 5-18
    - Cable Terminations 2-40
    - Cabling 2-39, 3-24
    - Co Line Assign 6-14
    - Copy 6-34
    - COS 6-13, 6-14
    - Distinctive Ring 4-45, 6-35
    - Drop Time-Out 6-16
    - DSS 6-16

- Feature 4-92
- Group 4-93, 6-15
- Hunt Group 4-65, 6-39
- Installation 2-40
- Lock 5-19
- Lock/Unlock 4-82
- Mute Ringing 4-75
- Numbering Plan 4-93
- Parameters 6-13
- Password 5-19
- Position 6-16
- Receive Assign 6-14
- System 6-13
- Unlock 5-19
- Voice Mail 6-16
- Warning Tone 4-104, 6-15
- Station Location Cable Terminations 3-25
- Station Message Detail Recording (SMDR) 2-44, 4-88
  - Resource 4-90
  - X\_Rate 6-36
- System
  - Administration 2-3, 3-3
  - Applications 6-39
  - Check-Out 2-53
  - Components 2-1
  - Hour Mode 4-65
  - Numbering Plan (DHS-E Only) 6-42
  - Station Hunt Group 6-39
  - Technology 2-1
  - Time 6-35
  - Type 6-13
  - Voice Mail 6-40

## T

- Toll Fraud 1-3
- Toll Override 6-19
- Toll Restriction 4-94
  - COS 4-76

- Transfer 4-95, 5-20
  - Recall 4-86
- Troubleshooting
  - Button Programming 7-8
  - Central Processor Unit (CPU) 7-2
  - CO Line 7-7
  - CPU/Power LED 7-1
  - Digital Key Telephone 7-3
  - Digital Key Telephones 7-4, 7-5
  - SLT 7-3
  - Speaker 7-5

## U

- UL Compliance 2-3
- Unit Specifications 2-18
- User
  - Name 4-69, 6-32
  - Name Programming 4-96
  - Password 6-32
  - Saved Number Redial (USNR) 4-96

## V

- Voice Announce 4-97
- Voice Mail 6-40
  - Button 4-98
  - Dialing Ratio 6-23
  - Integration 4-98
  - Monitor 4-100, 6-28
  - Port 6-16
- Voice Over Busy 4-84, 4-101
- Voice Recorder 4-103
- Voltage Surge/Spike Protection 2-26, 3-17

## W

- Wall Mount 3-26
- Warning Tone 6-15
  - Warning Time 6-23
- Wiring Designations for 3 x 8 Modules 2-37







*©2000 Vodavi Technology, Inc.  
Vodavi is a registered trademark of Vodavi Technology, Inc.*