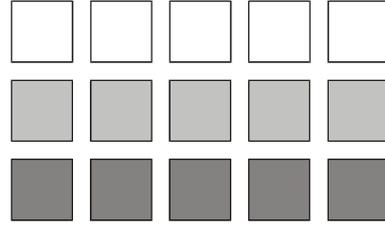
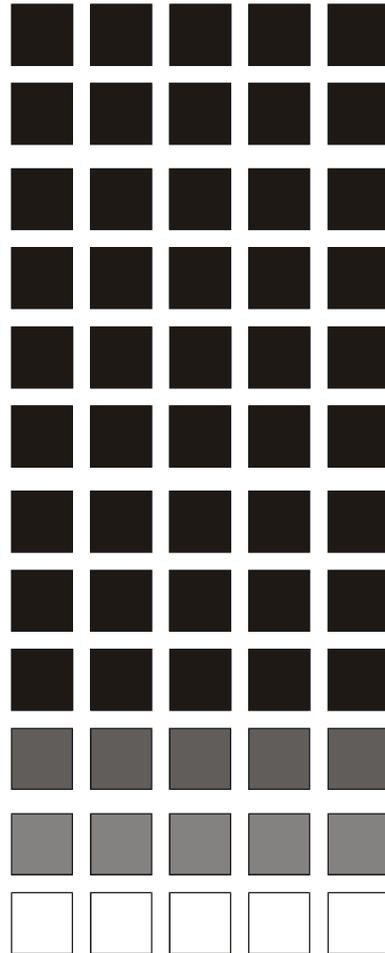


**Panasonic**<sup>®</sup>

**DBS**  
Digital Business System



Section 500  
T1  
Reference  
Manual



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# About This Manual

## Overview

This manual provides an overview of the DBS T1 Interface, along with installation and programming instructions. The following table summarizes each chapter contained in this manual.

Chapter	Title	Purpose
1	Introduction to the T1 Interface	Provides an overview of the DBS T1 Interface, plus information on pre-installation requirements.
2	Installation	Provides step-by-step instructions on installing the DBS T1 hardware.
3	Quick-Start Programming	Summarizes the programs that are essential to T1 installation.
4	Programming Reference	Contains a complete list of T1 programming commands. Each command description includes a list of the available options and the associated programming addresses.
A	CPC-EX 1.0 Updates	Provides information on feature enhancements and software corrections included with CPC-EX 1.0 version software.
B	CPC-EX 2.3.2 Updates	Provides information on feature enhancements and software corrections included with CPC-EX 2.32 version software.

## Related Documents

For general instructions on DBS hardware installation, see *Installation (Section 300)*. For an introduction to DBS programming, see *Programming Guidance (Section 400)*.



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# Chapter 1. Introduction to the T1 Interface

This chapter provides an overview of the T1 Interface. It also describes pre-installation requirements for the T1.

The following table summarizes the topics contained in this chapter.

<b>Topic</b>	<b>Page</b>
Overview	1-3
Description of the T1	1-3
Framing Options	1-3
Trunk Signaling Modes	1-4
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# Overview

## Description of the T1

The T1 Interface is a digital trunk card that provides 24 voice channels over a four-wire circuit.

T1 lines can be leased from local exchange carriers and long-distance carriers.

**Note:** The current version of the T1 supports voice communications only. Data can be transmitted only if it reaches the T1 in analog form. Examples of analog data that can be transmitted over the T1 include fax transmissions or PC files that have been converted into analog form using a modem.

## Framing Options

The T1 Interface takes an 8-bit sample from each of the 24 voice channels. These samples are grouped into 24 time slots, and each group of 24 slots is known as a T1 frame.

Since each of the 24 time slots contains 8 bits, the number of sampling bits in each frame equals 192 ( $24 \times 8 = 192$ ). In addition, a framing bit is added to the end of each frame to mark where the frame ends. The addition of the framing bit results in a 193-bit frame.

The T1 transmits these 193-bit frames at a rate of 8000 per second. The total number of frames (193) multiplied by the frame speed (8000 per second) results in a total transmission rate of 1.544 Mbps.

The T1 transmits the frames in groups of 12 or 24, depending on whether the SF or ESF framing format is used.

### ***SF or ESF Framing Formats***

The superframe (also known as SF or D4) format transmits the sampling frames in groups of 12. “Robbed bit signaling” is used to transmit signaling information for the frames. With robbed bit signaling, the eighth bit of each of the 24 samples is robbed from every sixth frame. The robbed bits transmit signaling states such as “onhook” and “offhook.”

The extended superframe (ESF) format also uses robbed bit signaling, but transmits the sampling frames in groups of 24. ESF supports monitoring and maintenance capabilities that are not available with the SF format.

## Trunk Signaling Modes

The T1 provides the following trunk signaling modes. The signaling modes can be assigned on a per-channel basis.

- Loop start
- Ground start
- E&M

## DNIS Service

The DBS T1 can be used for Dialed Number Information Service (DNIS).

DNIS is normally used when multiple 1-800 lines terminate to the same station or group. DNIS displays the last four digits of the dialed number, thereby allowing users to customize greetings for calls to different numbers.

For example, an ACD group for ABC company may receive calls for sales and service. If the 1-800 number for sales is 1-800-555-4000 and the 1-800 number for service is 1-800-555-5000, the agents will know how to answer a ringing call by viewing their phone display. For instance, calls to the 4000 number may be answered “ABC Company--Sales Information,” while calls to the 5000 number may be answered “ABC Company--Customer Service.”

DNIS can be assigned on a per-channel basis.

# Pre-Installation Requirements

Use the following guidelines to prepare your site for T1 installation.

## Ordering T1

The following guidelines describe T1 options that must be ordered from your central office or interexchange carrier. These guidelines are designed to cover almost all T1 installations. However, special requirements should be discussed with your provider.

*Table 1-1. Guidelines for ordering T1 services*

Item to be Ordered	Options
Line Type	E&M, loop start, or ground start. For DNIS, order E&M with wink start.
Trunk Signaling	Wink start or immediate start/ringdown. Immediate start/ringdown is used in most cases. However, if DNIS is used, order wink start.
Signaling Code	DS-1
Line Code	AMI or B8ZS. AMI is used in most cases.
Framing Format	D4 (Superframe) or ESF (Extended Superframe). D4 is used in most cases.
Signaling Method	In-band
Tones	Order dial tone and ringback tone if provided by the CO. <b>Note:</b> If the CO does not provide dial tone, program the DBS to generate its own dial tone. See page 4-39.
DNIS Service	Order E&M trunk emulation with wink start signaling. When the central office sends a DID/DNIS call to the DBS, it first receives a wink from the DBS before sending the digits. Once the wink is received, the central office should wait at least 200 ms before sending the digits. Be sure to request the delay when ordering DNIS. <b>Note:</b> The DBS supports four-digit DNIS service only.

## What You Must Purchase

The following items must be purchased to install T1.

### **DBS Equipment**

If you are installing the T1 in a single-cabinet system, order the equipment included in Table 1-2. For two-cabinet systems, see Table 1-3.

**Table 1-2. T1 Hardware requirements for single-cabinet systems**

<b>CPC-B 4.0</b> (VB-43411)	<b>SCC-B</b> (VB-43421)	<b>T1 Trunk Card</b> (VB-43561)	<b>T1 MDF Card</b> (VB-43562)	<b>Sync Unit</b> (VB-43563)
1 (See Note 1.)	1 (See Notes 2 and 3.)	1	1	1
<b>Notes:</b> 1. Version 1.3 of the Bus Processor Unit (BPU) chip is required for T1.  2. An MFR card is required for DID/DNIS if DTMF signaling is used. If DID/DNIS is provided through DP signaling, an MFR card is not required.  3. SCC-B with ROM 1.3 or later is required if the central office does not provide T1 dial tone.				

**Table 1-3. T1 Hardware requirements for double-cabinet systems**

<b>T1 Location</b>	<b>CPC-B V4</b> (VB-43411) (See Note 1.)	<b>SCC-B</b> (VB-43421) (See Notes 2 and 3.)	<b>T1 Trunk Card</b> (VB-43561)	<b>T1 MDF Card</b> (VB-43562)	<b>Sync Unit</b> (VB-43563)	<b>T1 Cable</b> (VB-43564)	<b>Cable Kit</b> (VB-43110) (See Note 4.)
T1 in the Master	1	1	1	1	1	0	1
T1 in the Slave	1	1	1	1	1	1	1
T1 in both Master and Slave	1	1	2	2	1	1	1
<b>Notes:</b> 1. Version 1.3 of the Bus Processor Unit (BPU) chip is required for T1.  2. An MFR card is required for DID/DNIS if DTMF signaling is used. If DID/DNIS is provided through DP signaling, an MFR card is not required.  3. SCC-B with ROM 1.3 or later is required if the central office does not provide T1 dial tone.  4. Version 1.2 of the Cable Kit is required for T1.							

## CSU Equipment

The installer must provide a Channel Service Unit (CSU) plus CSU cabling.

The CSU equipment must meet the specifications contained in Table 1-4. See page 2-12 for instructions on installing the CSU.

**Table 1-4. CSU equipment required for T1**

Item	Specifications	Vendors
CSU	<p>The Channel Service Unit (CSU) must comply with FCC Part 15 and Part 68. The CSU is installed between the DBS and the public network. The CSU provides alarm, diagnostic, and monitoring functions, as well as network protection.</p>	<p>The following CSUs have been used successfully with the DBS T1.</p> <p><b>Kentrox</b></p> <p>For the D4 framing format: Kentrox T-SERV II ®</p> <p>For the D4 or ESF framing format: Kentrox T-SMART ® (Kentrox can be contacted at 1-800-733-5511.)</p> <p><b>Premier®</b></p> <p>For the D4 or ESF format: Premier PT-3000-01 (Premier is manufactured by U.S. Sprint. Sprint can be contacted at 1-800-791-1110.)</p>
CSU Cabling	<p>Each CSU requires a network cable and an equipment cable. The network cable connects from the CSU to the network interface. The equipment cable connects from the CSU to the DBS T1 MDF card.</p> <p><b>For Kentrox CSUs</b></p> <p>The network cable requires a female DB-15 connector and an RJ48C connector. The equipment cable requires a male DB-15 connector and an RJ48C connector.</p> <p>To simplify installation, you can order the prefabricated cables shown in the “Vendors” column.</p> <p>If you fabricate your own T1 cables, you should use 24 AWG stranded cable that includes shielding for each pair. For best results, use the cable listed under “Vendors.”</p> <p><b>For Premier CSUs</b></p> <p>You must fabricate your own cables for the Premier CSU. The network cable requires two RJ48C connectors. The equipment cable connects to an RJ48C connector on the T1 MDF card and to four screw-down terminals on the CSU.</p> <p>For both cables, use 24 AWG stranded cable that includes shielding for each pair. For best results, use the cable listed under “Vendors.”</p>	<p><b>For Kentrox CSUs</b></p> <p>Kentrox offers prefabricated cables for their CSUs. For the network cable, order part number 01-93010151. For the equipment cable, order part number 01-93010121.</p> <p>If you fabricate your own cables, use 24 AWG stranded cable that includes shielding for each pair.</p> <p>Belden (Richmond, IN) offers stranded cable that complies with these specifications. Order part number 8723.</p> <p><b>For Premier CSUs</b></p> <p>Belden (Richmond, IN) offers stranded cable that complies with our specifications. Order part number 8723.</p>



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# Chapter 2. Installation

This section describes guidelines and procedures for installing the T1 Interface. Once the T1 is installed, refer to “Quick-Start Programming” on page 3-1 for programming instructions.

This chapter covers the following topics:

<b>Topic</b>	<b>Page</b>
Guidelines	2-3
Hardware Requirements	2-3
Maximums	2-3
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# Guidelines

Read the following guidelines before beginning T1 installation. Installation instructions begin on page 2-14.

## Hardware Requirements

- The system configuration determines what cards and cables must be purchased for T1. See “DBS Equipment” on page 1-6 for more information.
- The installer **must** provide a Channel Service Unit (CSU) that complies with FCC Part 15 and Part 68. The CSU is installed between the DBS and the public network. The CSU provides alarm, diagnostic, and monitoring functions, as well as network protection.

See “CSU Equipment” on page 1-7 for details on purchasing CSUs.

## Maximums

- One T1 card can be installed per cabinet; the T1 card must be installed in the “EC/TRK” slot.
- The number of T1 cards that can be installed in two-cabinet systems depends on the sizes of the connected systems. Table 2-1 shows T1 maximums for two-cabinet systems.

**Note: The DBS 72 + DBS 40 combination does not support T1.**

*Table 2-1. EC/TRK slot usage for T1*

System Size	EC/TRK Slot Usage for T1	
	Master	Slave
DBS 40 + DBS 40	No	Yes
DBS 72 + DBS 40	No	No
DBS 72 + DBS 72	No	Yes
DBS 96 + DBS 40	Yes	Yes
DBS 96 + DBS 72	Yes	Yes
DBS 96 + DBS 96	Yes	Yes

- *Fractional T1* can be used when fewer than 24 T1 trunks are needed. Fractional T1 allows you to use only a portion of the 24 channels provided on the T1 card.
- Though each T1 Interface provides 24 trunk channels, T1 trunks do not increase the overall trunk capacity of the DBS. Each T1 channel subtracts from the total number of analog trunks that can be installed. Furthermore, the number of analog trunks that can be used are always decremented in quantities of 8.

For instance, if you're installing a T1 in a DBS 96 and you only want to use 12 T1 channels, the logical number of analog trunks that would be available is 20 ( $32 - 12 = 20$ ).

However, because the number of analog trunks must be decremented in quantities of 8, the actual number of analog trunks that can be used is 16:

$(32 \text{ total trunks} - 16 \text{ (two 8-trunk increments)}) = 16.$

Tables 2-2 through 2-4 show the possible combinations of analog and digital trunks assignments based on system size.

The trunk numbering shown in these tables is determined by backplane trunk port assignments. Therefore, the numbering cannot be changed.

**Note:** Analog trunks are numbered beginning with "1." T1 trunk channels are numbered beginning with the highest trunk channel used.

## Trunk Assignments for Single-Cabinet Systems

- Programming is not required to associate trunk ports with slot locations. However, you must use programming to specify that a combination of T1 and analog trunks is installed, and you must also specify how many T1 channels are used.

*Table 2-2. T1 and analog trunk assignments, DBS 40*

Trunk Number	Fractional T1 using 16 Channels	Fractional T1 using 8 Channels
1	T1 channel 16	Analog trunk 1
↓	↓	↓
8	T1 channel 9	Analog trunk 8
9	T1 channel 8	T1 channel 8
↓	↓	↓
16	T1 channel 1	T1 channel 1
<b>Note:</b> Since the DBS 40 supports a maximum of 16 trunks, all 24 channels of the T1 cannot be used.		

*Table 2-3. T1 and analog trunk assignments, DBS 72*

Trunk Number	24-Channel T1	Fractional T1 using 16 Channels	Fractional T1 using 8 Channels
1	T1 channel 24	Analog trunk 1	Analog trunk 1
↓	↓	↓	↓
8	T1 channel 17	Analog trunk 8	Analog trunk 8
9	T1 channel 16	T1 channel 16	Analog trunk 9
↓	↓	↓	↓
16	T1 channel 9	T1 channel 9	Analog trunk 16
17	T1 channel 8	T1 channel 8	T1 channel 8
↓	↓	↓	↓
24	T1 channel 1	T1 channel 1	T1 channel 1

*Table 2-4. T1 and analog trunk assignments, DBS 96*

<b>Trunk Number</b>	<b>24-Channel T1</b>	<b>Fractional T1 using 16 Channels</b>	<b>Fractional T1 using 8 Channels</b>
1	Analog trunk 1	Analog trunk 1	Analog trunk 1
↓	↓	↓	↓
8	Analog trunk 8	Analog trunk 8	Analog trunk 8
9	T1 channel 24	Analog trunk 9	Analog trunk 9
↓	↓	↓	↓
16	T1 channel 17	Analog trunk 16	Analog trunk 16
17	T1 channel 16	T1 channel 16	Analog trunk 17
↓	↓	↓	↓
24	T1 channel 9	T1 channel 9	Analog trunk 24
25	T1 channel 8	T1 channel 8	T1 channel 8
↓	↓	↓	↓
32	T1 channel 1	T1 channel 1	T1 channel 1

## Trunk Assignments for Double-Cabinet Systems

- When T1 is used in a two-cabinet system, the number of T1 channels that can be assigned in each cabinet depends on the master/slave designation.

The following table shows the maximum number of T1 channels that can be assigned in two-cabinet systems.

*Table 2-5. Maximum T1 assignments for two-cabinet systems*

<b>System Size</b>	<b>Master</b>	<b>Slave</b>
DBS 40 + DBS 40	8 analog trunks	16 T1 trunks
DBS 72 + DBS 72	16 analog trunks	24 T1 trunks
DBS 96 + DBS 40	24 T1 trunks 8 analog trunks	16 T1 trunks
DBS 96 + DBS 72	24 T1 trunks 8 analog trunks	24 T1 trunks
DBS 96 + DBS 96	24 T1 trunks 8 analog trunks	24 T1 trunks 8 analog trunks

- Two-cabinet systems use the same trunk numbering scheme as single-cabinet systems: analog trunks are numbered from “1” upward; T1 trunk channels are numbered downward from the highest channel used.

Tables 2-6 through 2-10 show trunk numbering for two-cabinet systems using the maximum number of T1 channels.

**Table 2-6. T1 and analog trunk assignments, DBS 40 + 40 (16-channel fractional T1 in the slave)**

<b>Trunk Number</b>	<b>Master Cabinet</b>	<b>Slave Cabinet</b>
1 ↓ 8	Analog trunk 1 ↓ Analog trunk 8	N/A
9 ↓ 16	N/A	T1 channel 16 ↓ T1 channel 9
17 ↓ 24	N/A	T1 channel 8 ↓ T1 channel 1

*Table 2-7. T1 and analog trunk assignments, DBS 72 + DBS 72 (24-channel T1 in the slave)*

<b>Trunk Number</b>	<b>Master Cabinet</b>	<b>Slave Cabinet</b>
1 ↓ 8	Analog trunk 1 ↓ Analog trunk 8	N/A
9 ↓ 16	Analog trunk 9 ↓ Analog trunk 16	N/A
17 ↓ 24	N/A	T1 channel 24 ↓ T1 channel 17
33 ↓ 40	N/A	T1 channel 16 ↓ T1 channel 9
41 ↓ 48	N/A	T1 channel 8 ↓ T1 channel 1

**Table 2-8. T1 and analog trunk assignments, DBS 96 + DBS 40 (24-channel T1 in the master; 16-channel T1 in the slave)**

Trunk Number	Master Cabinet	Slave Cabinet
1 ↓ 8	Analog trunk 1 ↓ Analog trunk 8	N/A
9 ↓ 16	T1 channel 24 ↓ T1 channel 17	N/A
17 ↓ 24	T1 channel 16 ↓ T1 channel 9	N/A
25 ↓ 32	T1 channel 8 ↓ T1 channel 1	N/A
33 ↓ 40	N/A	T1 channel 16 ↓ T1 channel 9
41 ↓ 48	N/A	T1 channel 8 ↓ T1 channel 1

**Table 2-9. T1 and analog trunk assignments, DBS 96 + DBS 72 (24-channel T1 in the master; 24-channel T1 in the slave)**

Trunk Number	Master Cabinet	Slave Cabinet
1 ↓ 8	Analog trunk 1 ↓ Analog trunk 8	N/A
9 ↓ 16	T1 channel 24 ↓ T1 channel 17	N/A
17 ↓ 24	T1 channel 16 ↓ T1 channel 9	N/A
25 ↓ 32	T1 channel 8 ↓ T1 channel 1	N/A
33 ↓ 40	N/A	T1 channel 24 ↓ T1 channel 17
41 ↓ 48	N/A	T1 channel 16 ↓ T1 channel 9
49 ↓ 56	N/A	T1 channel 8 ↓ T1 channel 1

**Table 2-10. T1 and analog trunk assignments, DBS 96 + DBS 96 (24-channel T1 in the master; 24-channel T1 in the slave)**

<b>Trunk Number</b>	<b>Master Cabinet</b>	<b>Slave Cabinet</b>
1 ↓ 8	Analog trunk 1 ↓ Analog trunk 8	N/A
9 ↓ 16	T1 channel 24 ↓ T1 channel 17	N/A
17 ↓ 24	T1 channel 16 ↓ T1 channel 9	N/A
25 ↓ 32	T1 channel 8 ↓ T1 channel 1	N/A
33 ↓ 40	N/A	Analog trunk 1 ↓ Analog trunk 8
41 ↓ 48	N/A	T1 channel 24 ↓ T1 channel 17
49 ↓ 56	N/A	T1 channel 16 ↓ T1 channel 9
57 ↓ 64	N/A	T1 channel 8 ↓ T1 channel 1

# Installation Procedures

The following procedures provide step-by-step instructions for installing the CSU and the T1 Interface. The T1 procedure that you should use depends on the type of system you have and the number of T1s you are installing.

If you're installing ...	Use this procedure...
A T1 in a single cabinet	"Installing a T1 in a Single Cabinet" (page 2-14)
One T1 in a double cabinet, with the T1 located in the master	"Installing a T1 in a Single Cabinet" (page 2-14)
One T1 in a double cabinets, with the T1 located in the slave	"Installing a T1 in a Double Cabinet with the T1 in the Slave" (page 2-21)
T1s in both the master and slave	"Installing a T1 in a Double Cabinet with T1s in the Master and Slave" (page 2-21)

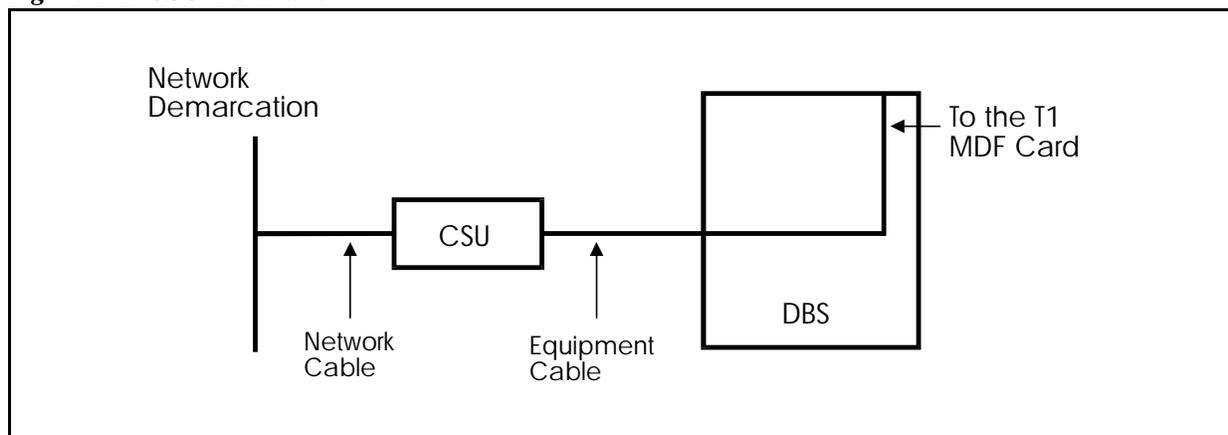
## Installing the CSU

The following instructions explain how to install the CSU. See "CSU Equipment" on page 1-7 for specifications on CSUs and CSU cabling.

**Note:** The CSU should be powered locally, not through the CO line. Also, the CSU should be connected to an Uninterruptible Power Supply (UPS) to provide battery backup in case of AC power failures.

1. Connect the equipment cable from the DBS T1 MDF card to the equipment side of the CSU, as shown in Figure 2-1.

Figure 2-1. CSU installation



2. Connect the network cable from the network side of the CSU to the network demarcation point. (The network demarcation is typically an RJ48C “smartjack.”)
3. Test the CSU cabling by performing the following steps.

**Note:** The following procedure can only be used with CSUs that provide a local loopback. When testing the CSU, be sure it is set to “local loopback,” rather than “line loopback.” Line loopback provides a loopback between the CSU and the network.

The CSU can be tested only after the following parameters have been set. For a summary of these parameters, see Chapter 3, “Quick-Start Programming.” The page numbers included in the following table reference detailed descriptions included in Chapter 4.

Parameter	Page No.
System Configuration	4-3
Sync Source	4-4 to 4-6
Trunk Configuration	4-18
Frame Format	4-19
T1 Trunk Type	4-35

- a. Remove the jumper from CN4 on the Sync Card (Figure 2-3 on page 2-15).
- b. Put the CSU in the local loopback mode.
- c. Check the CFA LED on the T1 card. If the LED is dark, the cabling between the CSU and DBS is okay. If the LED is lit, go to the next step.
- d. Check the cabling from the DBS to the CSU.
- e. If you don't find cabling errors, take the CSU out of local loopback mode and reinstall the jumper on CN4 of the Sync Card.
- f. If the CFA LED remains lit, check the cabling from the CSU to the network demarcation point.

## Installing a T1 in a Single Cabinet

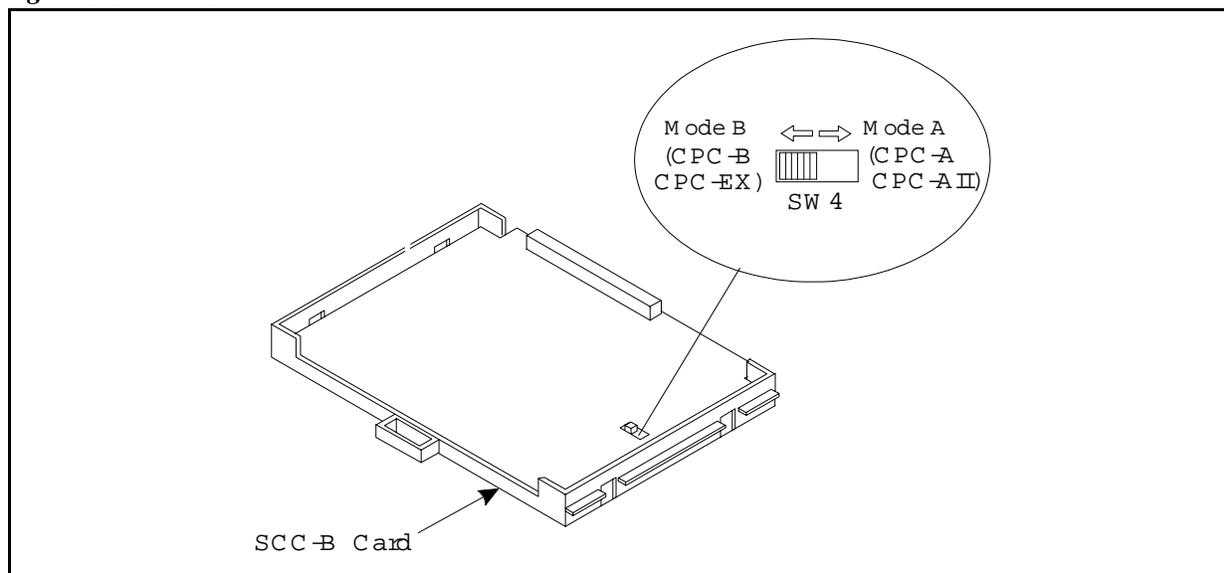
The following instructions explain how to install a T1 in a single-cabinet system. These instructions also apply when a T1 is installed in only the master cabinet of a two cabinet system.

If only one T1 is installed in a two-cabinet system, it must be installed in the cabinet specified in Table 2-1 on page 2-3.

**Note:** For systems consisting of a DBS 72 connected to a DBS 40, the T1 Interface cannot be used.

1. Before beginning T1 installation, perform the “New Function Reset” command (FF1 8# 1# 1#). ***This command must be issued before the T1 can be installed properly.***
2. Check SW4 on the SCC-B card. Be sure it is set to “Mode B.”

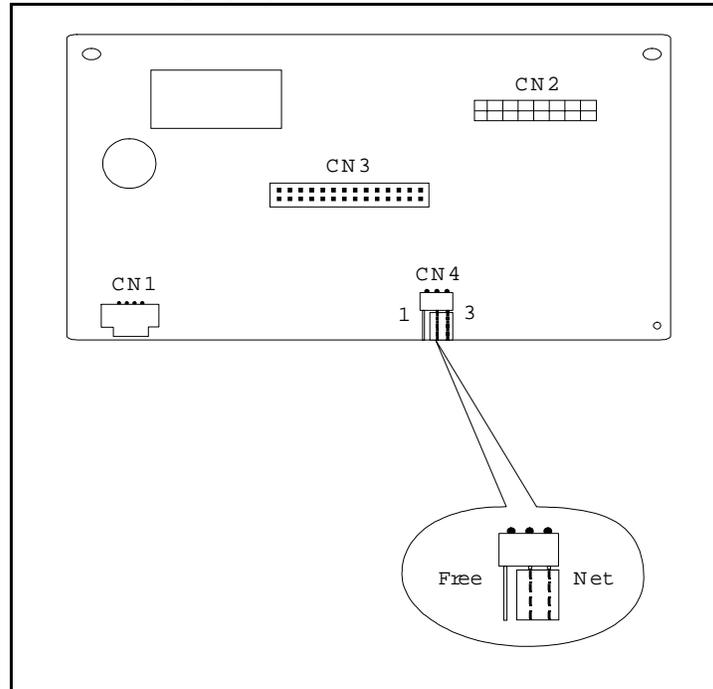
**Figure 2-2. SCC-B Switch 4**



3. Check connector 4 (CN4) on the Sync Unit (VB-43563). Make sure that Pins 2 and 3 are strapped. (See Figure 2-3.)

When Pins 2 and 3 are strapped, the Sync Unit synchronizes the DBS T1 card with the signaling provided by the public network.

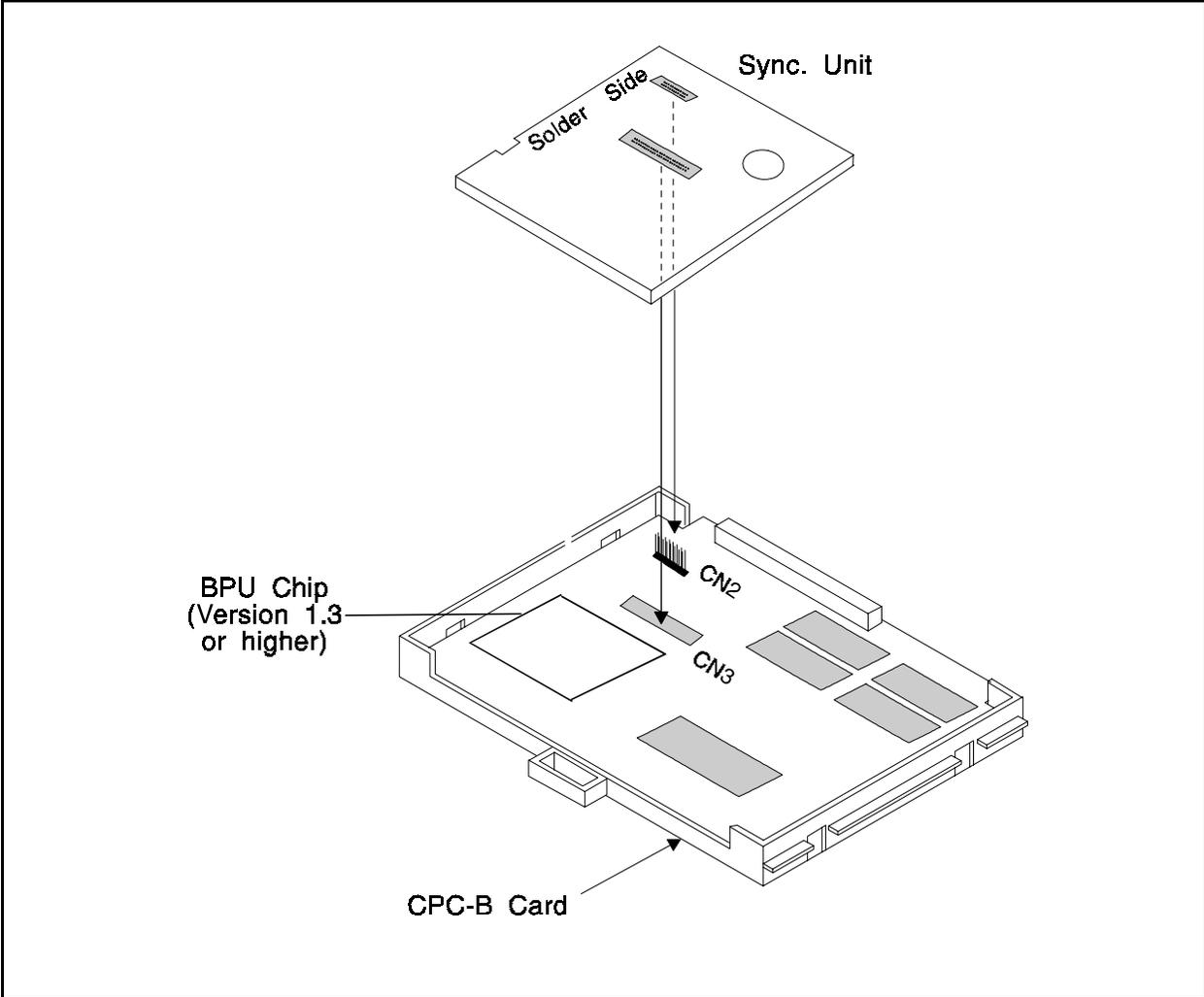
*Figure 2-3. Connector 4 (CN4) strapping, Sync Unit*



4. Attach the Sync Unit to the CPC-B card.

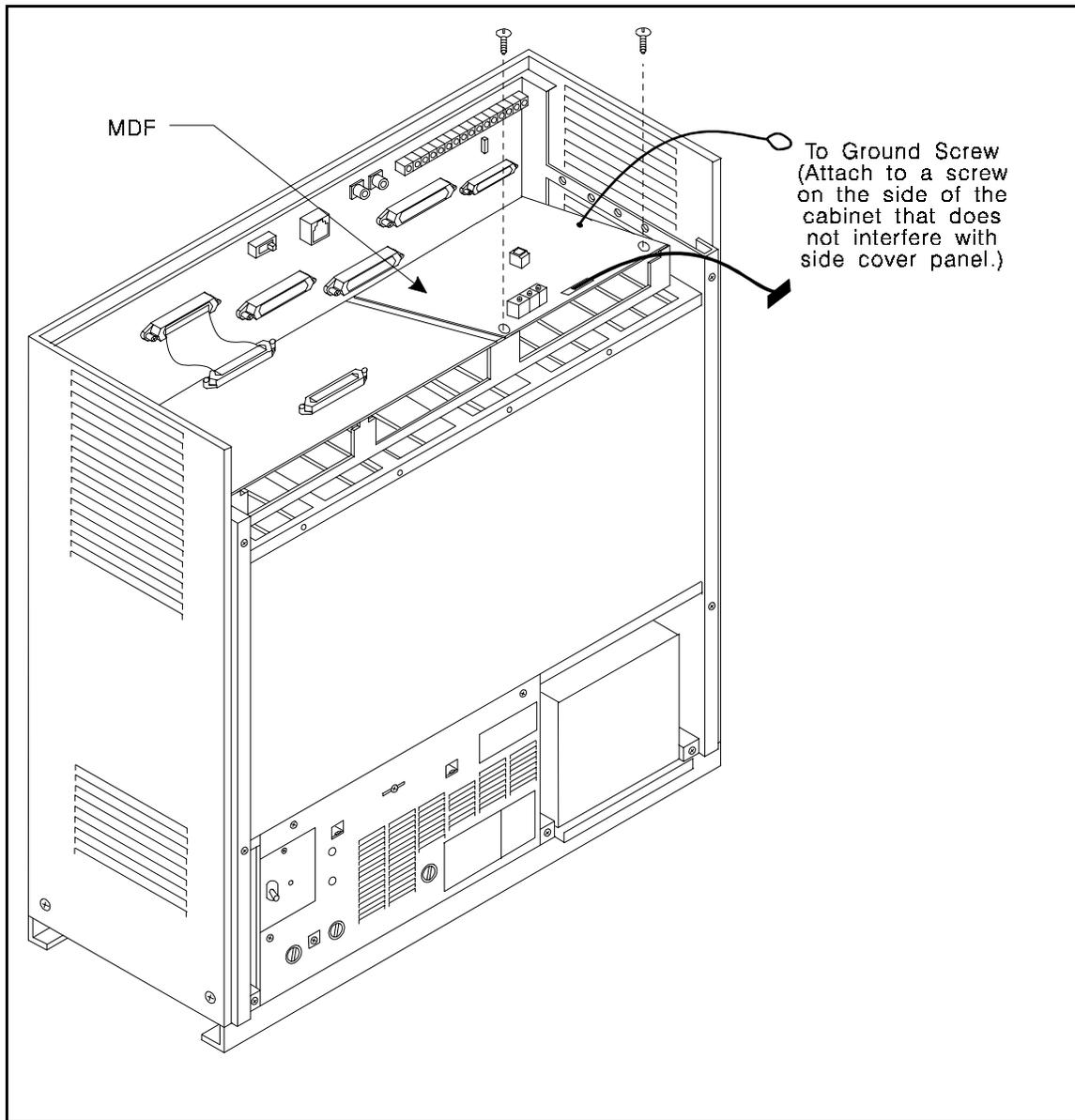
**Note:** Before attaching the Sync Unit, insert the three spacers provided with the unit and remove the jumpers from CN2 of the CPC-B card.

Figure 2-4. T1 Sync Unit installation



5. Install the T1 MDF (main distribution frame) card in the top of the cabinet as shown in Figure 2-5.

*Figure 2-5. T1 MDF card installation*



6. Set SW1 on the T1 card according to the following table.

These switch settings correspond to the distance between the DBS and the CSU. To turn a switch on, flip it to the “up” position.

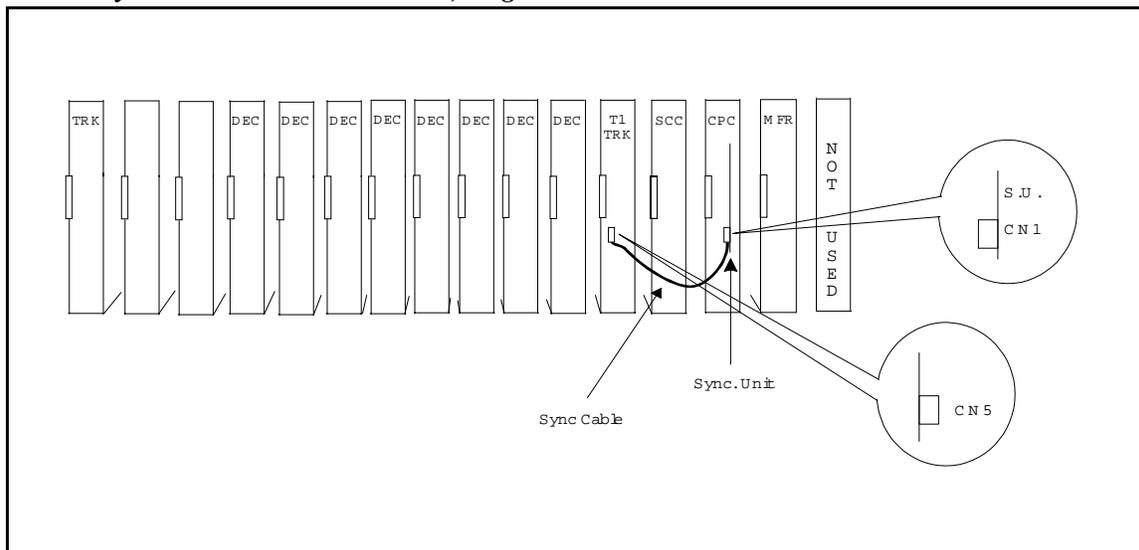
**Table 2-11. Switch settings for SW1 on the T1 card**

SW	Distance from the DBS to the CSU		
	0 to 150 ft.	150-450 ft.	450-655 ft.
SW1	On	Off	Off
SW2	Off	On	Off
SW3	Off	Off	On
SW4	Off	On	Off
SW5	Off	Off	On
SW6	Off	On	Off
SW7	Off	Off	On
SW8	Not used	Not used	Not used

7. Install the T1 card in the “EC/TRK” slot

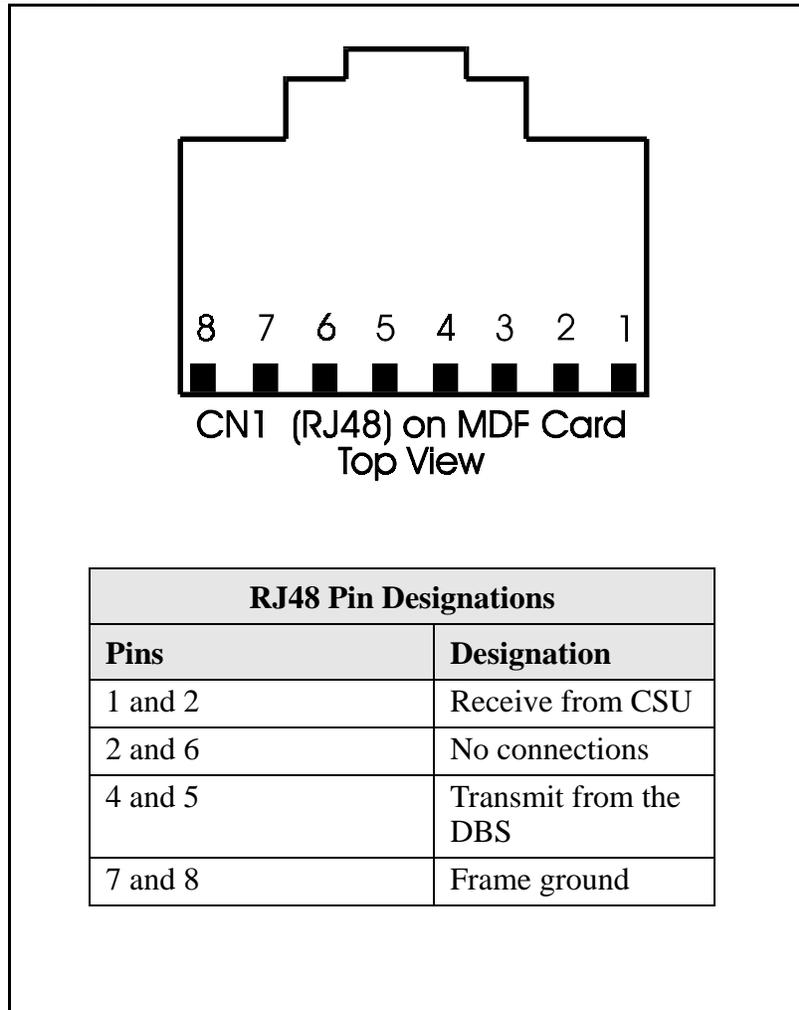
8. Connect the Sync Cable from CN1 on the Sync Unit to CN5 on the T1 card.

**Figure 2-6. Sync Unit and T1 connection, single-cabinet installation**



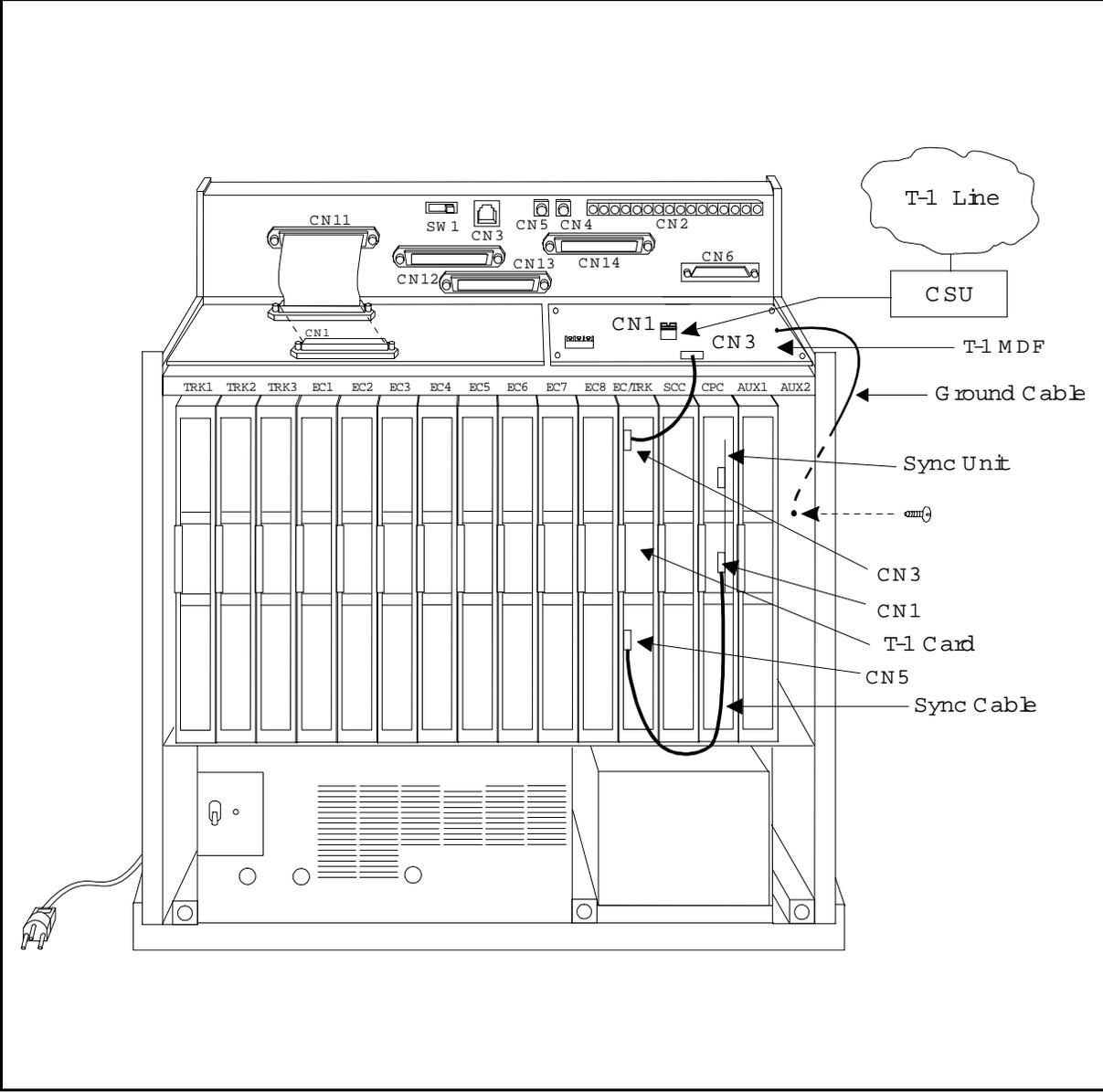
9. Connect the cable attached to CN3 on the T1 MDF card to CN3 on the T1 card (Figure 2-8).
10. Using an RJ48 cable, connect CN1 on the T1 MDF card to the CSU (Figure 2-8). The following illustration shows CN1 pinouts.

*Figure 2-7. RJ48 pinouts, CN1 connector*



11. Connect the ground cable from the T1 MDF card to the cabinet as shown in Figure 2-8.

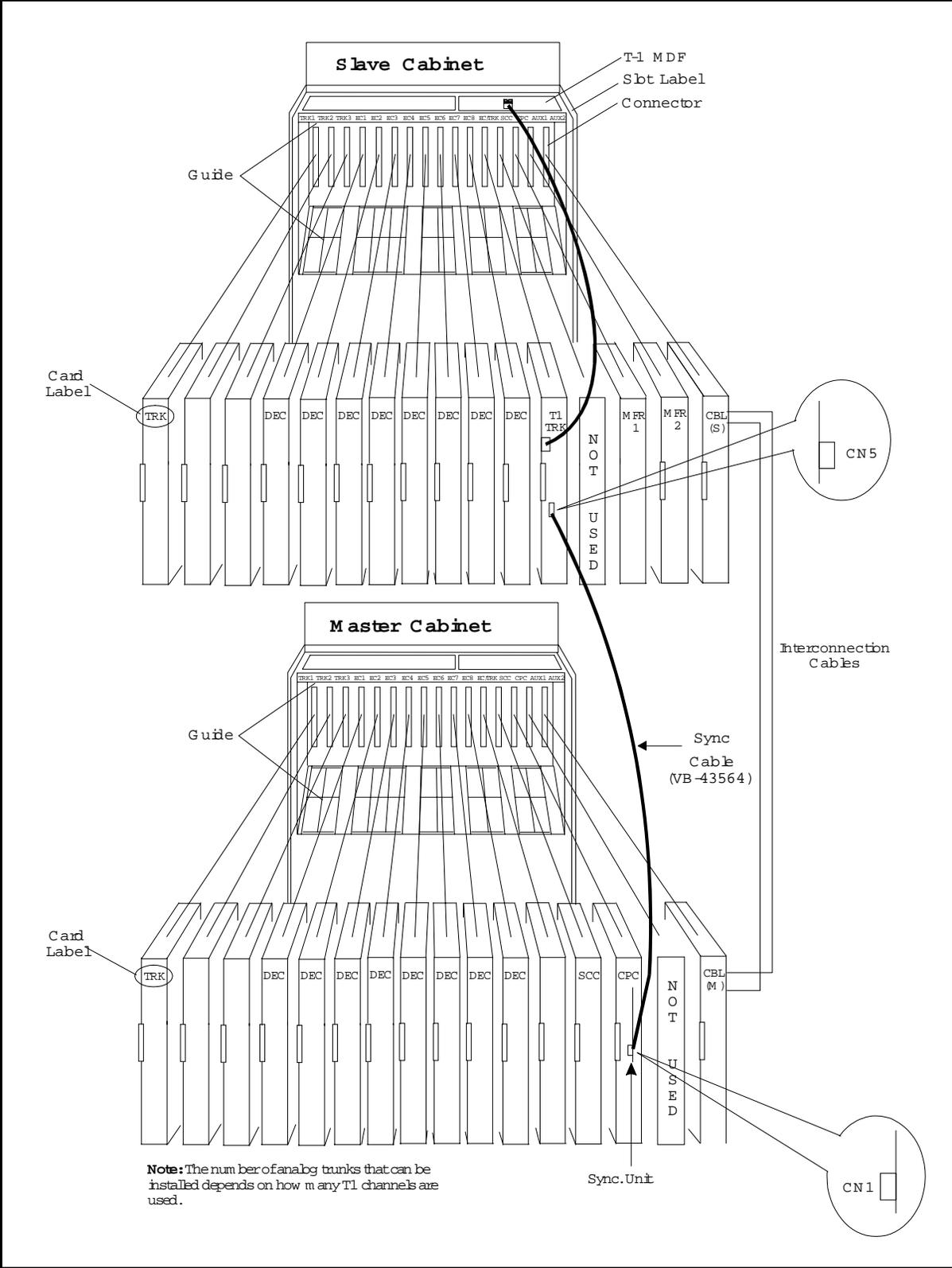
Figure 2-8. T1 cabinet connections, single-cabinet installation



## Installing T1 in a Double Cabinet with the T1 in the Slave

1. Before beginning T1 installation, perform the “New Function Reset” command (FF1 8# 1# 1#). *This command must be issued before the T1 can be installed properly.*
2. Check SW4 on the SCC-B card. Be sure it is set to “Mode B.” (See Step 2 on page 2-14.)
3. Install the Sync Unit in the master cabinet as described in Steps 3 and 4 on pages 2-14 and 2-15.
4. Install a T1 MDF card in the slave cabinet. (See Step 5 on page 2-17.)
5. Set Switch 1 on the T1 card. (See Step 6 on page 2-18.)
6. Install a T1 card in the “EC/TRK” slot of the slave cabinet.
7. Connect the Sync Cable from CN1 on the Sync Unit to CN5 on the T1 card (Figure 2-9).  
  
**Note:** Part Number VB-43564 is used for the Sync Cable when a T1 is installed only in the slave cabinet of a two-cabinet system.
8. At the slave cabinet, connect the cable attached to CN3 on the T1 MDF card to CN3 on the T1 card (Figure 2-8).
9. Using an RJ48 cable, connect CN1 of the T1 MDF card to the CSU. (See Figure 2-7 for RJ48 pinouts.)
10. At the slave cabinet, connect the ground cable on the T1 MDF card as shown in Figure 2-8 on page 2-20.

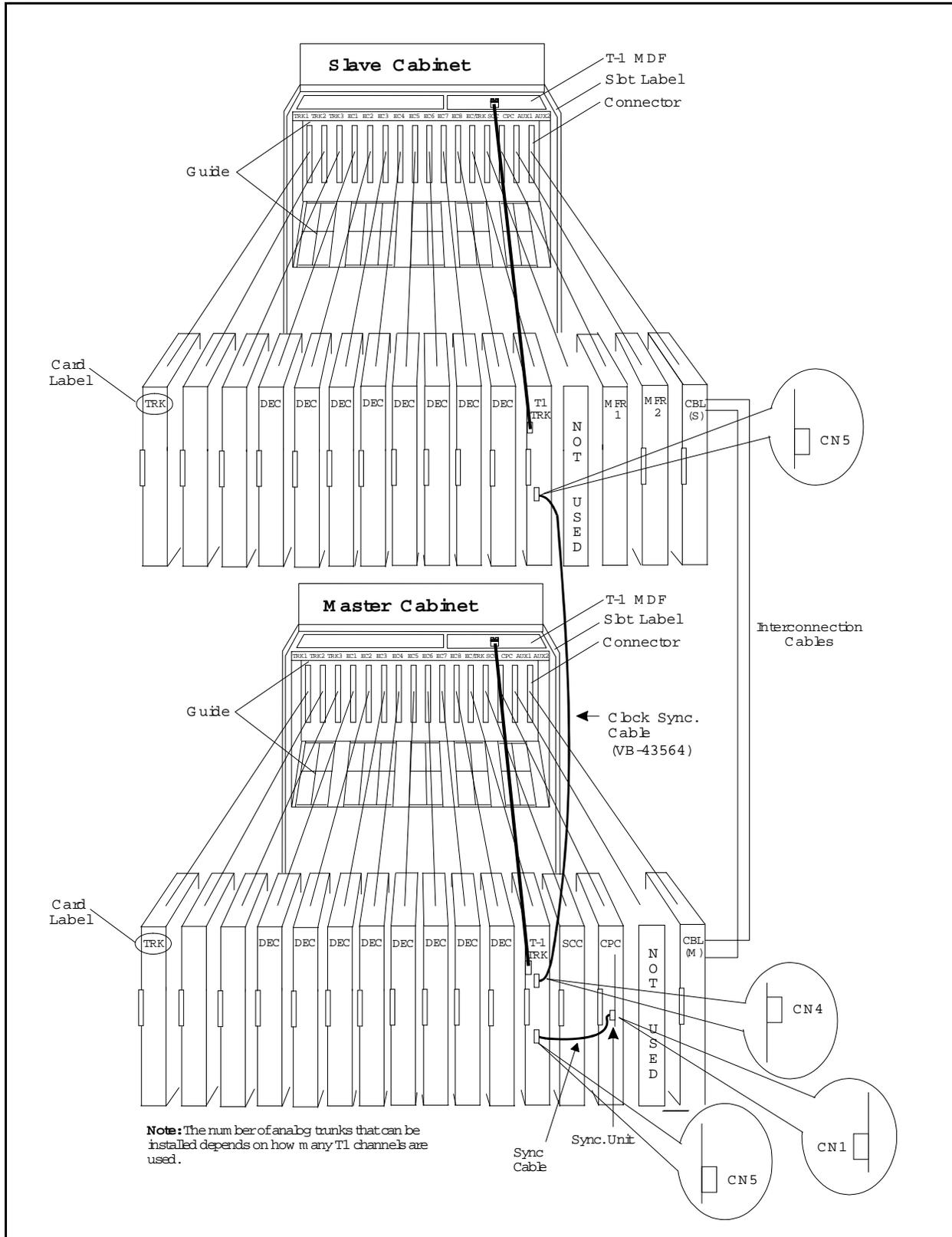
Figure 2-9. Sync cable connections, double-cabinet with a T1 in the slave



## Installing T1 in a Double Cabinet with T1s in the Master and Slave

1. Before beginning T1 installation, perform the “New Function Reset” command (FF1 8# 1# (0-1)#). *This command must be issued before the T1 can be installed properly.*
2. Check SW4 on the SCC-B card. Be sure it is set to “Mode B.” (See Step 2 on page 2-14.)
3. Install the Sync Unit in the master cabinet as described in Steps 3 and 4 on pages 2-14 and 2-15.
4. Install a T1 MDF card in each cabinet. (See Step 5 on page 2-17.)
5. Set Switch 1 on the T1 cards. (See Step 6 on page 2-18.)
6. Install a T1 card in each “EC/TRK” slot.
7. Connect the Clock Sync Cable from CN4 on the master-cabinet T1 to CN5 on the slave-cabinet T1, as shown in Figure 2-10.  
  
**Note:** Part Number VB-43564 is used for the Clock Sync Cable when T1s are installed in the master and slave cabinets.
8. At the master cabinet, connect the Sync Cable from CN1 on the Sync Unit to CN5 on the T1 card (Figure 2-10).
9. At each cabinet, connect the cable attached to CN3 on the T1 MDF card to CN3 on the T1 card (Figure 2-8).
10. Using an RJ48 cable, connect CN1 of each T1 MDF card to a CSU. (See Figure 2-7 for RJ48 pinouts.)
11. For both cabinets, connect the ground cable from the T1 MDF card as shown in Figure 2-8 on page 2-20.

Figure 2-10. Clock sync cable and sync cable connections, double-cabinet installation



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# Chapter 3. Quick-Start Programming

The T1 Interface includes many programming options, which allow you to customize how your T1 is used.

In most cases, however, you only need to set a few of the programs to get your T1 online. This chapter summarizes the programs that are essential to T1 installation.

The following table shows the topics that are described in this chapter. For detailed descriptions of all the T1 programs, see Chapter 4, “Programming Reference.”

<b>Topic</b>	<b>Page</b>
Before You Begin	3-3
Programming Initial T1 Options	3-4
Minimum Programming	3-4
DNIS Programming	3-7



# Before You Begin

Before you begin programming, you should be familiar with resetting the DBS and performing the “New Function Reset” command. The following paragraphs explain when these two procedures are used.

***The New Function Reset command.*** If you are installing T1 while you’re upgrading to a new DBS release, perform the “New Function Reset” before you begin T1 programming.

You must perform the reset command if you’re upgrading to a completely new release, but not if you’re upgrading to a point release. For example, if you’re upgrading from Version 3.10 to Version 4.00, you need to perform the reset. However, if you’re upgrading to a point release (4.06 to 4.07), you do not need to perform the reset.

***Manually Resetting the DBS.*** Many of the T1 programs require a manual reset to take effect. Program all of the quick-start items first, then reset the system by powering it off then back on.

# Programming Initial T1 Options

The following instructions explain the minimum programming required to make the T1 operational, plus the programming required for DNIS. Each instruction includes a page number that references the relevant detailed descriptions in Chapter 4. Default settings appear in bold.

## Minimum Programming

1. If you're installing the T1 while upgrading to a new DBS release, perform the "New Function Reset" command (page 4-40).

**Note:** You must perform the reset command if you're upgrading to a completely new release, but not if you're upgrading to a point release. For example, if you're upgrading from Version 3.10 to Version 4.00, you need to perform the reset. However, if you're upgrading to a point release (4.06 to 4.07), you do not need to perform the reset.

Address	FF1 8# 1# (0-1)#
Options	<b>0=No (retain settings)</b> 1=Yes (clear settings)

2. Enter the system configuration (page 4-3).

Address	FF1 8# 4# 1# 1# (0-8)#
Options	<b>0=DBS 40</b> 1=DBS 72 2=DBS 96 3=DBS 40 + DBS 40 (T1 must be in the slave cabinet.) 4=DBS 72 + DBS 40 (T1 is not supported.) 5=DBS 72 + DBS 72 (T1 must be in the slave cabinet.) 6=DBS 96 + DBS 40 7=DBS 96 + DBS 72 8=DBS 96 + DBS 96

3. Assign the sync sources (pages 4-4 to 4-6).

Addresses	Sync Source 1: FF1 8# 4# 1# 2# (1-3)# Sync Source 2: FF1 8# 4# 1# 3# (0-3)# Sync Source 3: FF1 8# 4# 1# 4# (0-3)#
Options	Sync Source 1: 1=T1 of the master cabinet 2=T1 of the slave cabinet <b>3=Free run (internal clocking)</b>  Sync Source 2: <b>0=None</b> 1=T1 of the master cabinet 2=T1 of the slave cabinet 3=Free run (internal clocking)  Sync Source 3: <b>0=None</b> 1=T1 of the master cabinet 2=T1 of the slave cabinet 3=Free run (internal clocking)
Examples	In most cases, set the sync sources as follows: T1 in a single cabinet or T1 in a master cabinet: Source 1=1 (T1 of the master cabinet) Source 2=3 (Free run) Source 3=0 (None)  T1 in a slave cabinet Source 1=2 (T1 of the slave cabinet) Source 2=3 (Free run) Source 3=0 (None)  T1s in the master and slave Source 1=1 (T1 of the master cabinet) Source 2=2 (T1 of the slave cabinet) Source 3=3 (Free run)

4. Specify the trunk configuration (page 4-18).

Addresses	Master cabinet: FF1 8# 4# 4# 1# 1# (0-1)# Slave cabinet: FF1 8# 4# 5# 1# 1# (0-1)#
Options	<b>0=Analog only</b> 1=T1 and analog trunks

5. Specify the number of T1 channels (page 4-18).

Addresses	Master cabinet: FF1 8# 4# 4# 1# 2# (0-24)# Slave cabinet: FF1 8# 4# 5# 1# 2# (0-24)#
Options	0-24 ( <b>0</b> )

6. Specify the framing format (page 4-19).

Be sure to match the framing format ordered from the CO. In most cases, SF (D4) is used.

Addresses	Master cabinet: FF1 8# 4# 4# 1# 3# (0-1)# Slave cabinet: FF1 8# 4# 5# 1# 3# (0-1)#
Options	<b>0=SF</b> (SF stands for super frame, which is also known as D4.) 1=ESF (ESF stands for extended super frame.) Note: ESF was the default until version 5.01

7. Specify the line coding (clear channel) format (page 4-19).

Be sure to match the line coding format ordered from the CO. In most cases, AMI is used.

Addresses	Master cabinet: FF1 8# 4# 4# 1# 4# (0-1)# Slave cabinet: FF1 8# 4# 5# 1# 4# (0-1)#
Options	<b>0=AMI</b> (AMI stands for alternate mark inversion.) 1=B8ZS (B8ZS stands for binary 8-zeros suppression.)

8. Specify which trunk channels are used for T1 (page 4-35).

Address	FF2 (1-64)# 21# (0-3)#
Options	<b>0= Loop start</b> 1=Ground start 2=DID 3=T1

9. Specify trunk emulation for the T1 channels (page 4-35).

Be sure to match the signaling ordered from the CO.

Address	FF1 8# 4# 6# (1-64)# 1# (0-3)#
Options	0=Loop start 1= Not used 2=Ground start <b>3=E&amp;M</b>

10. Specify the outgoing signaling type used by the T1 (page 4-36).

Be sure to match the signaling ordered from the CO.

Address	FF1 8# 4# 6# (1-64)# 3# (0-2)#
Options	<b>0=Immediate start</b> 1=Wink start 2=Dial-tone start

11. Specify the incoming signaling type used by the T1 (page 4-37).

Be sure to match the signaling ordered from the CO.

Address	FF1 8# 4# 6# (1-64)# 4# (0-1)#
Options	<b>0=Immediate start/ringdown</b> 1=Wink start

12. If you need to program DNIS, go to the instructions under “DNIS Programming.”

If you do not need to program DNIS, you are finished with initial T1 programming. Reset the DBS by turning it off then on again.

## DNIS Programming

1. Enable DNIS for the desired trunk channels (page 4-36).

Address	FF1 8# 4# 6# (1-64)# 2# (0-1)#
Options	<b>0=Not provided</b> 1=DID 2=DNIS

2. If you wish to assign the same DNIS number to more than one station, enable Multiple DID/DNIS numbering (page 4-41).

Address	FF1 2# 1# 32# (0-1)#
Options	<b>0=Off</b> 1=On

3. Select DP or DTMF digits for the DNIS channels (page 4-38).

Address	FF1 8# 4# 6# (1-64)# 7# (0-1)#
Options	0=Dial Pulse (10PPS) <b>1=DTMF</b>

4. Assign the DNIS numbers to stations (page 4-39).

Address	FF1 8# 4# 7# (0000-9999)# (10-69 or 100-699)#
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5. Reset the DBS by turning it off then on again.

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# Chapter 4. Programming Reference

This chapter describes programming parameters for the T1 Interface.

The descriptions of each parameter include a list of available options and the associated programming address. Default options appear in bold.

This chapter is intended for readers who are familiar with DBS programming. For an introduction to DBS programming, see the *Programming Guidance Manual, Section 400*.

The following table lists the topics described in this chapter.

Topic	Page
T1 System Settings	4-3
System Size	4-3
Clock Settings	4-4
System-Wide Timers	4-7
Digital Pad Settings	4-14
Master and Slave Settings	4-18
Trunk Configuration	4-18
Trunk Signaling	4-19
Alarm Settings	4-21
Alarm Descriptions	4-21
Alarm Transmission Options	4-24
Alarm Timers	4-25
Error Counters for FF Alarm Keys	4-29
Alarm Relay Controls	4-32
Trunk Settings	4-35
FF Key Settings	4-42
Special T1 Function Codes	4-43



# T1 System Settings

## System Size

Parameter	System Configuration
Description	Identifies the system size. <b>Note:</b> For changes to this parameter to take effect, the system must be powered down, then back up again.
Programming	FF1 8# 4# 1# 1# (0-8)#
Options	<b>0=DBS 40</b> 1=DBS 72 2=DBS 96 3=DBS 40 + DBS 40 (T1 must be in the slave cabinet.) 4=DBS 72 + DBS 40 (T1 is not supported.) 5=DBS 72 + DBS 72 (T1 must be in the slave cabinet.) 6=DBS 96 + DBS 40 7=DBS 96 + DBS 72 8=DBS 96 + DBS 96

## Clock Settings

Parameter	Sync Source 1
Description	<p>The Sync Card (installed on the CPC-B) provides a method of synchronizing the DBS with the public network. This parameter determines the first clocking source for network synchronization. If the first source fails, the system will switch to the second source. The system will attempt to go back to the first source based on the value entered under “Network Re-sync Timer” (page 4-7).</p> <p>The system considers a clock source to have failed when the slip rate error counter is exceeded within a 24-hour period. (See page 4-30 for instructions on setting the slip rate error counter.)</p> <p>In most cases, the 1st sync source is set to “1.” See page 3-5 for a list of typical sync source settings for single and double-cabinet systems.</p> <p><b>Notes:</b></p> <ol style="list-style-type: none"> <li>1. The “free run” setting is the only setting that can be entered for more than one sync source.</li> <li>2. For changes to this parameter to take effect, the system must be powered down, then back up again.</li> </ol>
Programming	FF1 8# 4# 1# 2# (1-3)#
Options	<p>1=T1 of the master cabinet (synchronizes clocking with the public network)</p> <p>2=T1 of the slave cabinet (synchronizes clocking with the public network)</p> <p><b>3=Free run (internal clocking)</b></p>

Parameter	Sync Source 2
Description	<p>Determines the source of clocking for the second sync source. The second sync source is used if the first sync source fails. The system will attempt to switch from the second source back to the first source based on the value entered under “Network Re-sync Timer” (page 4-7).</p> <p>If the second source fails and the first source is not working, the system will switch to the third source.</p> <p>In most cases, a system with one T1 has the 2nd sync source set to “3.” Systems with two T1s normally have the 2nd sync source set to “2.” See page 3-5 for a list of typical sync source settings for single and double-cabinet systems.</p> <p>One of the three sync sources should be set to “3” (free run). A free-run setting is needed, so the DBS T1 can provide its own clocking if the network clock fails.</p> <p>(See “1st sync” for an introduction to clock synchronization.)</p> <p><b>Notes:</b></p> <ol style="list-style-type: none"> <li>1. The “free run” setting is the only setting that can be entered for more than one sync source.</li> <li>2. For changes to this parameter to take effect, the system must be powered down, then back up again.</li> </ol>
Programming	FF1 8# 4# 1# 3# (0-3)#
Options	<p><b>0=None</b></p> <p>1=T1 of the master cabinet (synchronizes clocking with the public network)</p> <p>2=T1 of the slave cabinet (synchronizes clocking with the public network)</p> <p>3=Free run (internal clocking)</p>

Parameter	Sync Source 3
Description	<p>Determines the source of clocking for the third sync source. The third sync source is used if both the first and second source fail. The system will attempt to switch from the third source back to the first source based on the value entered under “Network Re-sync Timer” (page 4-7).</p> <p>In most cases, a system with one T1 has the 3rd sync source set to “0.” Systems with two T1s normally have the 3rd sync source set to “3.” See page 3-5 for a list of typical sync source settings for single and double-cabinet systems.</p> <p>One of the three sync sources should be set to “3” (free run). A free-run setting is needed, so the DBS T1 can provide its own clocking if the network clock fails.</p> <p>(See “Sync Source 1” on page 4-4 for an introduction to clock synchronization.)</p> <p><b>Notes:</b></p> <ol style="list-style-type: none"> <li>1. The “free run” setting is the only setting that can be entered for more than one sync source.</li> <li>2. For changes to this parameter to take effect, the system must be powered down, then back up again.</li> </ol>
Programming	FF1 8# 4# 1# 4# (0-3)#
Options	<p><b>0=None</b></p> <p>1=T1 of the master cabinet (synchronizes clocking with the public network)</p> <p>2=T1 of the slave cabinet (synchronizes clocking with the public network)</p> <p>3=Free run (internal clocking)</p>

# System-Wide Timers

Parameter	Network Re-sync Timer
Description	<p>If one clock source fails, the system will switch to another clock source. The re-sync timer determines how often the system attempts to return to the original clock source.</p> <p>For example, if the first clock source (1st sync) fails, the system switches to the second source. However, the system will try to return to the first source based on the re-sync timer. Attempts to go back to the first sync source drops all calls.</p> <p>For instance, if the system changes to the second source at 12:00 p.m. and the re-sync timer is set for 24 hours, the DBS will attempt to return to the first clock source at 12:00 p.m. every day. If the re-sync timer is set for 1 hour, the DBS will attempt to return to the first clock source every hour.</p> <p>If the second source fails and the first source continues to be out-of-service, the system switches to the third source. Again, the re-sync timer determines how often the system will attempt to return to the first source.</p> <p><b>Note:</b> When the system attempts to go back to the first clock source, existing calls will be disconnected.</p>
Programming	FF1 8# 4# 2# 1# (0-25)#
Options	<p>0-25</p> <p>0=immediate (DBS returns to the first clock immediately.)</p> <p>1-24=hours (Determines how often the DBS attempts to return to the first clock.)</p> <p><b>25=no retries</b> (DBS does not attempt to go back to the first clock.)</p>

Parameter	Disconnect Timer
Description	Determines how long the DBS <u>waits before sending</u> a disconnect signal from the T1 to the CO. (The CO Disconnect Timer [FF2 (1-64)# 18# (0-15#)] determines how long the system waits to <u>receive</u> a disconnect signal from the CO.) <b>Note:</b> For changes to this parameter to take effect, the system must be powered down, then back up again.
Programming	FF1 8# 4# 2# 2# (0-12)#
Options	0-12
Values	0=150 ms <b>1=200 ms</b> 2=250 ms 3=300 ms 4=400 ms 5=500 ms 6=1000 ms 7=1500 ms 8=2000 ms 9=2500 ms 10=3000 ms 11=3500 ms 12=Off (DBS does not automatically send a disconnect signal.)
Note	To determine how long the DBS <u>waits after receiving</u> a disconnect from the CO, see the Trunk Disconnect Detection Timer (FF2 (Trunk No.)# 18# (0/1)#. If this address is changed, the DBS must be reset for the change to take effect for T1 trunks.

Parameter	Guard Timer																
Description	<p>Determines how long the system guards a T1 circuit. Guarding holds a circuit after it has been released in order to ensure that the previous call has been properly disconnected.</p> <p>In other words, once a call over a T1 channel has ended, the guard timer determines how much time must pass before the channel can be used for another call.</p> <p><b>Note:</b> For changes to this parameter to take effect, the system must be powered down, then back up again.</p>																
Programming	FF1 8# 4# 2# 3# (0-15)#																
Options	0-15																
Values	<table> <tbody> <tr> <td>0=200 ms</td> <td>8=1600 ms</td> </tr> <tr> <td>1=300 ms</td> <td>9=1800 ms</td> </tr> <tr> <td>2=400 ms</td> <td>10=2000 ms</td> </tr> <tr> <td>3=500 ms</td> <td>11=2200 ms</td> </tr> <tr> <td>4=800 ms</td> <td>12=2400 ms</td> </tr> <tr> <td>5=1000 ms</td> <td>13=2600 ms</td> </tr> <tr> <td><b>6=1200 ms</b></td> <td>14=2800 ms</td> </tr> <tr> <td>7=1400 ms</td> <td>15=3000 ms</td> </tr> </tbody> </table>	0=200 ms	8=1600 ms	1=300 ms	9=1800 ms	2=400 ms	10=2000 ms	3=500 ms	11=2200 ms	4=800 ms	12=2400 ms	5=1000 ms	13=2600 ms	<b>6=1200 ms</b>	14=2800 ms	7=1400 ms	15=3000 ms
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5=1000 ms	13=2600 ms																
<b>6=1200 ms</b>	14=2800 ms																
7=1400 ms	15=3000 ms																

Parameter	Release Acknowledge Timer	
Description	Determines how long the DBS waits for the CO to acknowledge a disconnect signal. Once this timer expires, the DBS abandons the call even if the CO has not acknowledged the disconnect. This allows the DBS to disconnect idle trunks if the CO is not signaling properly.	
Programming	FF1 8# 4# 2# 4# (0-15)#	
Options	0-15	
Values	0=1 second 1=2 seconds 2=5 seconds 3=10 seconds 4=20 seconds 5=30 seconds 6=60 seconds 7=90 seconds	8=120 seconds <b>9=240 seconds</b> 10=480 seconds 11=960 seconds 12=1080 seconds 13=1420 seconds 14=1920 seconds 15=an infinite number of seconds

Parameter	Outpulse Delay Timer	
Description	Determines how long the system waits before outpulsing dialed digits to the network.	
Programming	FF1 8# 4# 2# 5# (0-8)#	
Options	0-8	
Values	0=100 ms 1=300 ms <b>2=500 ms</b> 3=700 ms 4=1000 ms	5=1200 ms 6=1500 ms 7=1700 ms 8=2000 ms

Parameter	Wink Timeout Timer	
Description	<p>When wink-start signaling is used, the DBS waits for a wink signal from the CO when a user goes offhook. Once a wink signal is received, the DBS sends CO dial tone to the extension.</p> <p>This timer determines how long the DBS waits for a wink signal once an extension goes offhook. If the DBS does not receive a wink signal before the timer expires, the DBS disconnects the T1 channel and returns busy tone to the user.</p>	
Programming	FF1 8# 4# 2# 6# (0-15)#	
Options	0-15	
Values	0=150 ms 1=250 ms 2=500 ms 3=750 ms 4=1000 ms 5=1250 ms 6=1500 ms 7=1750 ms	8=2000 ms 9=2500 ms 10=3000 ms 11=3500 ms 12=4000 ms 13=4500 ms 14=5000 ms <b>15=5500 ms</b>

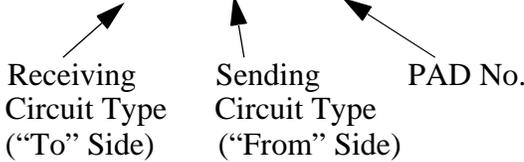
Parameter	Incoming Detection Timer	
Description	<p>Once an incoming call seizes a DBS T1 trunk, this timer determines how long the DBS waits before recognizing the seizure as an incoming call. The purpose of this timer is to prevent false incoming ringing.</p> <p>This parameter only applies when E+M signaling is used.</p> <p><b>Note:</b> For changes to this parameter to take effect, the system must be powered down, then back up again.</p>	
Programming	FF1 8# 4# 2# 7# (0-15)#	
Options	0-15	
Values	0=20 ms 1=30 ms 2=40 ms 3=50 ms 4=60 ms 5=70 ms 6=80 ms <b>7=90 ms</b>	8=100 ms 9=110 ms 10=120 ms 11=130 ms 12=140 ms 13=150 ms 14=160 ms 15=170 ms

Parameter	Answer Supervision Timer	
Description	When the DBS generates a call over the T1, answer supervision is provided to determine if the call is actually answered. This timer determines how long the offhook signal from the called party must last before the DBS treats the offhook signal as an answer.	
Programming	FF1 8# 4# 2# 8# (0-8)#	
Options	0-8	
Values	0=50 ms 1=100 ms 2=200 ms <b>3=600 ms</b> 4=1000 ms	5=2000 ms 6=3000 ms 7=4000 ms 8=10,000 ms

Parameter	Immediate Glare Timer	
Description	<p>A glare is a conflict between an incoming call and an outgoing call.</p> <p>When immediate-start signaling is used, this timer determines how long the system searches for an incoming call before connecting a station user to a trunk channel.</p> <p>The timer begins when the station goes offhook.</p> <p>If this parameter is set to “0” (non glare), the DBS does not check for glare. Therefore, if a trunk call is coming into a station that is going offhook, the station does not ring but is connected to the incoming call automatically.</p>	
Programming	FF1 8# 4# 2# 9# (0-15)#	
Options	0-15	
Values	0=The DBS does not check for glare. 1=20 ms 2=40 ms <b>3=60 ms</b> 4=80 ms 5=100 ms 6=120 ms 7=140 ms	8=160 ms 9=180 ms 10=200 ms 11=250 ms 12=300 ms 13=350 ms 14=400 ms 15=450 ms

Parameter	Wink Glare Timer																
Description	<p>A glare is a conflict between an incoming call and an outgoing call.</p> <p>When wink-start signaling is used, this timer determines how long the system searches for an incoming call before connecting a station user to a trunk channel.</p> <p>The timer begins when a wink is received.</p> <p>If this parameter is set to "0" (non glare), the DBS does not check for glare. Therefore, if a trunk call is coming into a station that is going offhook, the station does not ring but is connected to the incoming call automatically.</p>																
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# Digital Pad Settings

Parameter	Digital Pad Settings																										
Description	<p>Adjusts the volume of connections made via the T1. Default volume levels are included for connections between different types of terminals or circuits. For example, a K-TEL to T1 connection may use one volume setting, while an SLT-to-T1 connection may use another.</p> <p>The volume settings are controlled by changing a pad number, which in turn changes the loss or gain of the connection. In most cases, the default pad settings do not need to be changed.</p>																										
Programming	<p>If the volume level of a connection is unsatisfactory, include the receiving and sending circuit types in the command, then adjust the volume by assigning a new pad number. Figure 4-1 shows the numbers used to identify each circuit type. Pad numbers are defined in Figure 4-3 on page 4-15.</p> <p style="text-align: center;"> <code>FF1 8# 4# 3# (1-12)# (1-12)# (0-30)#</code>   </p> <p><b>Figure 4-1. Circuit-type numbers</b></p> <table border="1" data-bbox="613 1171 980 1667"> <thead> <tr> <th>Circuit Types</th> <th>No.</th> </tr> </thead> <tbody> <tr><td>K-TEL</td><td>1</td></tr> <tr><td>SLT</td><td>2</td></tr> <tr><td>DATA#</td><td>3</td></tr> <tr><td>Analog CO Trk</td><td>4</td></tr> <tr><td>T1 Master</td><td>5</td></tr> <tr><td>T1 Slave</td><td>6</td></tr> <tr><td>OPTION 1*</td><td>7</td></tr> <tr><td>OPTION 2*</td><td>8</td></tr> <tr><td>DTMF#</td><td>9</td></tr> <tr><td>CONF (SCC)#</td><td>10</td></tr> <tr><td>TONE1 (MFR1)#</td><td>11</td></tr> <tr><td>TONE2 (MFR2)#</td><td>12</td></tr> </tbody> </table> <p><b>Notes:</b></p> <p><b>#Circuit Types 3 and 9-12 are reserved for future use.</b></p> <p>*Options 1 and 2 can be used to assign unique PAD levels to circuits that require special volume levels. For example, if an OPX station needs a higher volume level than other SLTs, the OPX station could be defined as an “Option 1” circuit type.</p>	Circuit Types	No.	K-TEL	1	SLT	2	DATA#	3	Analog CO Trk	4	T1 Master	5	T1 Slave	6	OPTION 1*	7	OPTION 2*	8	DTMF#	9	CONF (SCC)#	10	TONE1 (MFR1)#	11	TONE2 (MFR2)#	12
Circuit Types	No.																										
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T1 Slave	6																										
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OPTION 2*	8																										
DTMF#	9																										
CONF (SCC)#	10																										
TONE1 (MFR1)#	11																										
TONE2 (MFR2)#	12																										

Options	<p>Figure 4-2 shows the default values for the most common T1 connections. Figure 4-3 lists the adjustments provided by each pad number.</p> <table border="1" data-bbox="618 302 1084 779"> <caption>Figure 4-2. Default pad values</caption> <thead> <tr> <th>From</th> <th>To</th> <th>Setting</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>T1 #1</td> <td>K-TEL</td> <td>16</td> <td>-2 dB</td> </tr> <tr> <td>T1 #2</td> <td>K-TEL</td> <td>16</td> <td>-2 dB</td> </tr> <tr> <td>T1 #1</td> <td>SLT</td> <td>16</td> <td>-2 dB</td> </tr> <tr> <td>T1 #2</td> <td>SLT</td> <td>16</td> <td>-2 dB</td> </tr> <tr> <td>K-TEL</td> <td>T1 #1</td> <td>16</td> <td>-2 dB</td> </tr> <tr> <td>K-TEL</td> <td>T1 #2</td> <td>16</td> <td>-2 dB</td> </tr> <tr> <td>SLT</td> <td>T1 #1</td> <td>16</td> <td>-2 dB</td> </tr> <tr> <td>SLT</td> <td>T1 #2</td> <td>16</td> <td>-2 dB</td> </tr> </tbody> </table> <p><b>Note:</b> T1 #1=master T1 #2=slave</p> <table border="1" data-bbox="1146 302 1409 1052"> <caption>Figure 4-3. Pad Nos.</caption> <thead> <tr> <th>Pad No.</th> <th>Level</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0 dB</td> </tr> <tr> <td>1</td> <td>+2 dB</td> </tr> <tr> <td>.</td> <td>.</td> </tr> <tr> <td>.</td> <td>.</td> </tr> <tr> <td>.</td> <td>.</td> </tr> <tr> <td>14</td> <td>+28 dB</td> </tr> <tr> <td>15</td> <td>+30 dB</td> </tr> <tr> <td>16</td> <td>-2 dB</td> </tr> <tr> <td>17</td> <td>-4 dB</td> </tr> <tr> <td>.</td> <td>.</td> </tr> <tr> <td>.</td> <td>.</td> </tr> <tr> <td>.</td> <td>.</td> </tr> <tr> <td>29</td> <td>-28 dB</td> </tr> <tr> <td>30</td> <td>-30 db</td> </tr> </tbody> </table>	From	To	Setting	Value	T1 #1	K-TEL	16	-2 dB	T1 #2	K-TEL	16	-2 dB	T1 #1	SLT	16	-2 dB	T1 #2	SLT	16	-2 dB	K-TEL	T1 #1	16	-2 dB	K-TEL	T1 #2	16	-2 dB	SLT	T1 #1	16	-2 dB	SLT	T1 #2	16	-2 dB	Pad No.	Level	0	0 dB	1	+2 dB	.	.	.	.	.	.	14	+28 dB	15	+30 dB	16	-2 dB	17	-4 dB	.	.	.	.	.	.	29	-28 dB	30	-30 db
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T1 #1	K-TEL	16	-2 dB																																																																
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29	-28 dB																																																																		
30	-30 db																																																																		
Example	<p>If calls to SLTs via a master T1 have low volume levels, the PAD level for connections <i>from</i> the master T1 <i>to</i> all SLTs can be changed.</p> <p>By referring to Figure 4-2, you can see that the default pad setting for connections <i>from</i> the master T1 <i>to</i> all SLTs is 16. You can also tell by Figure 4-2 that the default pad value for setting 16 is -2 dB.</p> <p>To raise the volume by 2 dB, you can change the pad value to 0. (As you can see from Figure 4-3, the db level for value 0 is 0 dB.)</p> <p>The following example shows the programming required to change the value to 0 dB:</p> <pre>FF1 8# 4# 3# 2# 5# 0#</pre> <p>2=Circuit type number for SLTs (Figure 4-1). 5=Circuit type number for the T1 in the master cabinet (Figure 4-1). 0=Pad number for 0 dB loss/gain (Figure 4-3).</p>																																																																		

## Extension Port Settings

Parameter	Station Port Class
Description	<p>By default, DBS phones are assigned a circuit type, based on whether they are KTELEs or SLTs.</p> <p>The circuit type is used with digital pad settings to determine the loss/gain settings for connections to the T1. (See “Digital Pad Setting” on page 4-14.)</p> <p>The Port Class parameter is provided in case a specific phone or group of phones needs a unique pad level.</p> <p>For example, an SLT is assigned by default as “circuit type 2.” However, if an SLT in a remote warehouse has inadequate volume levels, the circuit type for the SLT could be changed to 7 (Option 1). Once the SLT is changed to circuit type 7, the pad levels for circuit type 7 could be changed to provide the correct volume setting.</p> <p><b>Note:</b> Circuit types are also provided for trunk ports. See Figure 4-1 on page 4-14 for a definition of circuit types.</p>
Programming	FF3 (1-144)# 37# (1-2 or 7-8)#
Options	This programming parameter will allow you to assign circuit types 1-12 to a station port. However, the only circuit types that should be used with a station port are circuit types 1, 2, 7, or 8. (Circuit types 7 and 8 are used to assign unique PAD levels to circuits that require special volume levels.)

## Trunk Port Settings

Parameter	Trunk Port Class
Description	<p>By default, DBS trunks are assigned a circuit type, based on whether they are analog or T1.</p> <p>The circuit type is used with digital pad settings to determine the loss/gain settings for connections to the T1. (See “Digital Pad Setting” on page 4-14.)</p> <p>The Port Class parameter is provided in case a specific trunk or group of trunks needs a unique pad level.</p> <p>For example, a T1 in a slave cabinet is assigned by default as “circuit type 6.” However, if a specific T1 trunk in a slave has inadequate volume levels, the circuit type for the T1 trunk port could be changed to 8 (Option 2). Once the port number is changed to circuit type 8, the pad levels for circuit type 8 could be changed to provide the correct volume setting.</p> <p><b>Note:</b> Circuit types are also provided for station ports. See Figure 4-1 on page 4-14 for a definition of circuit types.</p>
Programming	FF2 (1-64)# 26# (5-8)#
Options	This programming parameter will allow you to assign circuit types 1-12 to a trunk port. However, the only circuit types that should be used with a T1 trunk port are circuit types 5 to 8. (Circuit types 7 and 8 are used to assign unique PAD levels to circuits that require special volume levels.)

# Master and Slave Settings

## Trunk Configuration

Parameter	Trunk Configuration (Omitted with version 6.03 and later)
Description	Specifies the trunk combinations used in the DBS. <b>Note:</b> For changes to this parameter to take effect, the system must be powered down, then back up again.
Programming	Master cabinet: FF1 8# 4# 4# 1# 1# (0-1)# Slave cabinet: FF1 8# 4# 5# 1# 1# (0-1)#
Options	<b>0=Analog only</b> 1=T1 and analog trunks

Parameter	Number of T1 Channels
Description	Determines how many T1 channels are used. Though each T1 Interface provides 24 trunk channels, T1 trunks do not increase the overall trunk capacity of the DBS. Each T1 channel subtracts from the total number of analog trunks that can be installed. Furthermore, the number of analog trunks that can be used are always decremented in quantities of 8. For instance, if you're installing a T1 in a DBS 96 and you only want to use 12 T1 channels, the logical number of analog trunks that would be available is 20 ( $32 - 12 = 20$ ). However, because the number of analog trunks must be decremented in quantities of 8, the actual number of analog trunks that can be used is 16: (32 total trunks - 16 (two 8-trunk increments) = 16.) See "Trunk Assignments for Single-Cabinet Systems" (page 2-5) and "Trunk Assignments for Double-Cabinet Systems" (page 2-6) for possible T1 and analog trunk channel combinations. <b>Note:</b> For changes to this parameter to take effect, the system must be powered down, then back up again.
Programming	Master cabinet: FF1 8# 4# 4# 1# 2# (0-24)# Slave cabinet: FF1 8# 4# 5# 1# 2# (0-24)#
Options	0-24 ( <b>0</b> ) <b>Note:</b> If the Trunk Configuration is changed (see command above), the number of T1 channels resets to 24.

## Trunk Signaling

Parameter	Frame Format
Description	Selects the framing format used by the T1. The framing format must match what is ordered from the CO.
Programming	Master cabinet: FF1 8# 4# 4# 1# 3# (0-1)# Slave cabinet: FF1 8# 4# 5# 1# 3# (0-1)#
Options	<p><b>0=SF</b> (SF stands for superframe, which is also known as D4. The superframe consists of 12 frames, with each frame including 192 information bits and one framing bit.)</p> <p><b>1=ESF</b> (ESF stands for extended super frame. An extended super frame consists of 24 frames, thereby doubling the length of the super frame (SF) format. ESF also supports monitoring and maintenance capabilities that are not available with the SF format.)</p> <p><b>Note:</b> For changes to this parameter to take effect, the system must be powered down, then back up again.</p> <p><b>Note:</b> Prior to version 5.01, ESF was the default.</p>

Parameter	Line Coding (Clear Channel)
Description	Selects the line coding format used by the T1. The line coding format must match what is offered by the CO. AMI is used in almost all cases.
Programming	Master cabinet: FF1 8# 4# 4# 1# 4# (0-1)# Slave cabinet: FF1 8# 4# 5# 1# 4# (0-1)#
Options	<p><b>0=AMI</b> (AMI stands for alternate mark inversion.)</p> <p><b>1=B8ZS</b> (B8ZS stands for binary 8-zeros suppression.)</p> <p><b>Note:</b> For changes to this parameter to take effect, the system must be powered down, then back up again.</p>

Parameter	Failure Mode
Description	Determines the way the system responds to alarms. <b>Note:</b> For changes to this parameter to take effect, the system must be powered down, then back up again.
Programming	Master cabinet: FF1 8# 4# 4# 1# 5# (0-1)# Slave cabinet: FF1 8# 4# 5# 1# 5# (0-1)#
Options	<b>0=Mode 1 (T1 stays in operation even if errors are detected.)</b> 1=Mode 2 (T1 shuts down if errors are detected.)

Parameter	Remote Loopback (Test use only)
Description	This address is reserved for future use.
Programming	Master cabinet: FF1 8# 4# 4# 1# 6# (0-1)# Slave cabinet: FF1 8# 4# 5# 1# 6# (0-1)#

Parameter	Flash Key Operation
Description	In the current version of DBS T1, a “switchhook flash” releases and reseizes the T1 line.
Programming	Master cabinet: FF1 8# 4# 4# 1# 8# (0-1)# Slave cabinet: FF1 8# 4# 5# 1# 8# (0-1)#
Options	<b>0=Release and reseize</b> 1=(Future use)

# Alarm Settings

## Alarm Descriptions

T1 alarms can be reported through LEDs on the T1 card, an alarm relay on the T1 MDF card, or FF keys on a key phone. Table 4-1 summarizes the types of alarms that can occur with the T1. Table 4-2 summarizes alarm settings for all three types of alarms.

*Table 4-1. T1 alarm definitions*

Alarm	Description	Notification
Red	The DBS activates a red alarm when a loss of signal or out-of-frame condition lasts for more than 2.5 seconds.	FF key (after the counter is exceeded) CFA LED on the T1 card Alarm relay on the T1 MDF card
Yellow	A yellow alarm is sent to the distant end of the T1 link to indicate that a red alarm has occurred. If a red alarm occurs at the CO, the CO sends a yellow alarm to the DBS. If a red alarm occurs at the DBS, the DBS sends a yellow alarm to the CO.	FF key (after the counter is exceeded) YEL LED on the T1 card Alarm relay on the T1 MDF card
Frame Loss	The DBS activates an OOF alarm when more than one out of four consecutive framing bits is in error.	FF key (after the counter is exceeded) OOF LED on the T1 card CFA LED on the T1 card Alarm relay on the T1 MDF card
Slip	The DBS activates a slip alarm when a data bit is lost due to a frame misalignment. Frame misalignment is caused by timing errors.	FF key (after the counter is exceeded) OOF LED on the T1 card SLIP LED on the T1 card (See Note.)
Sync Loss	The DBS activates a sync loss alarm due to timing errors. Timing errors result in frame misalignment.	FF key (after the counter is exceeded) SLIP LED on the T1 card CFA LED on the T1 card
AIS	The CO sends an AIS (Alarm Indication Signal) to indicate an “out-of-service” condition on the network side. The AIS, also referred to as the “keep alive signal,” is comprised of all 1s and is unframed. The DBS sends an AIS through the “AIS Signal Transmission” code (page 4-45).	AIS LED on the T1 card OOF LED on the T1 card CFA LED on the T1 card Alarm relay on the T1 card
Loss of Signal	The DBS activates a loss of signal alarm when the incoming T1 signal is not received for more than 150 ms.	FF key (after the counter is exceeded) CFA LED on the T1 card OOF LED on the T1 card
<p><b>Note:</b> The LEDs on the T1 card are normally steadily lit during an alarm condition. However, SLIP alarms cause the SLIP LED to toggle on or off rather than light. For instance, the SLIP LED will turn on for a first slip, turn off for a second slip, turn on for a third slip, etc.</p>		

Table 4-2. Alarm-related programs

Parameter	Address	Function
<b>Yellow Alarms</b>		
Yellow Alarm Send	FF1 8# 4# 4# 1# 7# (0-1)# FF1 8# 4# 5# 1# 7# (0-1)#	Determines whether the DBS sends a yellow alarm to the CO.
Yellow Alarm Detection	FF1 8# 4# 4# 2# 2# (0-15)# FF1 8# 4# 5# 2# 2# (0-15)#	Determines how long a yellow alarm signal must be on before the system detects a yellow alarm. When a yellow alarm occurs, the YEL LED on the T1 card lights, and the alarm relay on the T1 MDF closes.
Yellow Alarm Recovery	FF1 8# 4# 4# 2# 3# (0-15)# FF1 8# 4# 5# 2# 3# (0-15)#	Determines how long the DBS tries to recover from a yellow alarm before it re-syncs the T1 trunk.
Yellow Alarm Counter	FF1 8# 4# 4# 3# 6# (0-9000)# FF1 8# 4# 5# 3# 6# (0-9000)#	Error counter for the Yellow Alarm FF key.
Yellow Alarm Relay	FF1 8# 4# 4# 4# 1# (0-1)# FF1 8# 4# 5# 4# 1# (0-1)#	Determines if the alarm relay on the T1 MDF card closes in the event of yellow alarms.
<b>Red Alarms</b>		
Red Alarm Detection	FF1 8# 4# 4# 2# 1# (0-15)# FF1 8# 4# 5# 2# 1# (0-15)#	The red alarm value is determined by network requirements. This value should not be changed.  When a red alarm occurs, the CFA LED on the T1 card lights, and the alarm relay on the T1 MDF card closes.
Red Alarm Counter	FF1 8# 4# 4# 3# 3# (0-9000)# FF1 8# 4# 5# 3# 3# (0-9000)#	Error counter for the Red Alarm FF key.
Red Alarm Relay	FF1 8# 4# 4# 4# 2# (0-1)# FF1 8# 4# 5# 4# 2# (0-1)#	Determines if the alarm relay on the T1 MDF card closes in the event of red alarms.
<b>Alarm Indication Signal</b>		
AIS Relay	FF1 8# 4# 4# 4# 5# (0-1)# FF1 8# 4# 5# 4# 5# (0-1)#	Determines if the alarm relay on the T1 MDF card closes in the event of an alarm indication signal. An alarm indication signal is comprised of all 1's and is unframed.
<b>Frame Loss Alarms</b>		
Frame Loss Counter	FF1 8# 4# 4# 3# 1# (0-9000)# FF1 8# 4# 5# 3# 1# (0-9000)#	Error counter for the Frame Loss FF key.
Frame Loss Relay	FF1 8# 4# 4# 4# 4# (0-1)# FF1 8# 4# 5# 4# 4# (0-1)#	Determines if the alarm relay on the T1 MDF card closes in the event of frame loss alarms.

Parameter	Address	Function
<i>Slip Alarms</i>		
Slip Counter	FF1 8# 4# 4# 3# 2# (0-9000)# FF1 8# 4# 5# 3# 2# (0-9000)#	Error counter for the Slip FF key.
<i>Signal Loss Alarms</i>		
Loss of Signal Counter	FF1 8# 4# 4# 3# 4# (0-9000)# FF1 8# 4# 5# 3# 4# (0-9000)#	Error counter for the Signal Loss FF key.
<i>Sync Loss Alarms</i>		
Sync Loss Counter	FF1 8# 4# 4# 3# 5# (0-9000)# FF1 8# 4# 5# 3# 5# (0-9000)#	Error counter for the Sync Loss FF key.
Sync Loss Relay	FF1 8# 4# 4# 4# 3# (0-1)# FF1 8# 4# 5# 4# 3# (0-1)#	Determines if the alarm relay on the T1 MDF card closes in the event of sync loss alarms.
<i>General Alarms Control</i>		
Other Alarms Detection	FF1 8# 4# 4# 2# 4# (0-15)# FF1 8# 4# 5# 2# 4# (0-15)#	Determines how long an out of frame (OOF), loss of signal, sync loss, or AIS signal must be on before the system generates an alarm.  If an OOF, sync loss, or AIS alarm occurs, a corresponding LED on the T1 card lights.  The alarm relay on the T1 MDF card will also close if the corresponding relay parameter is turned on.  <b>Note:</b> Sync loss alarms light the SLIP LED.
Other Alarms Recovery	FF1 8# 4# 4# 2# 5# (0-15)# FF1 8# 4# 5# 2# 5# (0-15)#	Determines how long the DBS tries to recover from an out-of-frame (OOF), Loss of Signal, Sync Loss, or AIS alarm before it re-syncs the T1 trunk.
<i>Relay Control</i>		
Relay Reset	FF1 8# 4# 4# 4# 6# (0-1)# FF1 8# 4# 5# 4# 6# (0-1)#	Determines whether the alarm relay is cleared manually or automatically.

## Alarm Transmission Options

Parameter	Yellow Alarm Send
Description	Determines whether the DBS sends a yellow alarm signal to the CO.
Programming	Master cabinet: FF1 8# 4# 4# 1# 7# (0-1)# Slave cabinet: FF1 8# 4# 5# 1# 7# (0-1)#
Options	0=No <b>1=Yes</b>

Parameter	Red Alarm Detection
Description	The default value for this parameter is determined by network specifications. It should <b>not</b> be changed. If a red alarm occurs, the “CFA” LED on the T1 card lights. Also, if the “Red Alm Relay” parameter (page 4-32) is turned on, the alarm relay on the T1 MDF card closes. <b>Note:</b> For changes to this parameter to take effect, the system must be powered down, then back up again.
Programming	Master cabinet: FF1 8# 4# 4# 2#1# (0-5)# Slave cabinet: FF1 8# 4# 5# 2# 1# (0-5)#
Options	0-5
Values	0=4 1=6 <b>2=8</b> 3=10 4=12 5=14

## Alarm Timers

Parameter	Yellow Alarm Detection	
Description	<p>Determines how long a yellow alarm signal must be on before the system detects a yellow alarm. When a yellow alarm occurs, the YEL LED on the T1 card lights. Also, if the “Yel Alm Relay” parameter (page 4-32) is turned on, the alarm relay on the T1 MDF card closes.</p> <p><b>Note:</b> For changes to this parameter to take effect, the system must be powered down, then back up again.</p>	
Programming	<p>Master cabinet: FF1 8# 4# 4# 2# 2# (0-15)#</p> <p>Slave cabinet: FF1 8# 4# 5# 2# 2# (0-15)#</p>	
Options	0-15	
Values	<p>0=0 ms (immediate)</p> <p><b>1=50 ms</b></p> <p>2=100 ms</p> <p>3=150 ms</p> <p>4=200 ms</p> <p>5=250 ms</p> <p>6=300 ms</p> <p>7=350 ms</p>	<p>8=400 ms</p> <p>9=450 ms</p> <p>10=500 ms</p> <p>11=550 ms</p> <p>12=600 ms</p> <p>13=650 ms</p> <p>14=700 ms</p> <p>15=750 ms</p>

Parameter	Yellow Alarm Recovery	
Description	Determines how long the DBS tries to recover from a yellow alarm before it re-syncs the T1 trunk. <b>Note:</b> For changes to this parameter to take effect, the system must be powered down, then back up again.	
Programming	Master cabinet: FF1 8# 4# 4# 2# 3# (0-15)# Slave cabinet: FF1 8# 4# 5# 2# 3# (0-15)#	
Options	0-15	
Values	0=0 ms <b>1=10 ms</b> 2=20 ms 3=30 ms 4=40 ms 5=50 ms 6=60 ms 7=70 ms	8=80 ms 9=90 ms 10=110 ms 11=120 ms 12=130 ms 13=140 ms 14=150 ms 15=160 ms

Parameter	Other Alarms Detection																
Description	<p>Determines how long an out of frame (OOF), loss of signal, sync loss, or AIS signal must be on before the system generates an alarm.</p> <p>If an OOF, sync loss, or AIS alarm occurs, a corresponding LED on the T1 card lights. (Sync loss alarms light the SLIP LED.)</p> <p>The alarm relay on the T1 MDF card will also close if the corresponding relay parameter is turned on.</p> <p><b>Note:</b> For changes to this parameter to take effect, the system must be powered down, then back up again.</p>																
Programming	<p>Master cabinet: FF1 8# 4# 4# 2# 4# (0-15)#</p> <p>Slave cabinet: FF1 8# 4# 5# 2# 4# (0-15)#</p>																
Options	0-15																
Values	<table> <tbody> <tr> <td>0=0 ms</td> <td>8=2000 ms</td> </tr> <tr> <td><b>1=250 ms</b></td> <td>9=2500 ms</td> </tr> <tr> <td>2=500 ms</td> <td>10=3000 ms</td> </tr> <tr> <td>3=750 ms</td> <td>11=3500 ms</td> </tr> <tr> <td>4=1000 ms</td> <td>12=4000 ms</td> </tr> <tr> <td>5=1250 ms</td> <td>13=4500 ms</td> </tr> <tr> <td>6=1500 ms</td> <td>14=5000 ms</td> </tr> <tr> <td>7=1750 ms</td> <td>15=5500 ms</td> </tr> </tbody> </table>	0=0 ms	8=2000 ms	<b>1=250 ms</b>	9=2500 ms	2=500 ms	10=3000 ms	3=750 ms	11=3500 ms	4=1000 ms	12=4000 ms	5=1250 ms	13=4500 ms	6=1500 ms	14=5000 ms	7=1750 ms	15=5500 ms
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7=1750 ms	15=5500 ms																

Parameter	Other Alarms Recovery	
Description	Determines how long the DBS tries to recover from an out-of-frame (OOF), Loss of Signal, Sync Loss, or AIS alarm before it re-syncs the T1 trunk. <b>Note:</b> For changes to this parameter to take effect, the system must be powered down, then back up again.	
Programming	Master cabinet: FF1 8# 4# 4# 2# 5# (0-15)# Slave cabinet: FF1 8# 4# 5# 2# 5# (0-15)#	
Options	0-15	
Values	0=0 ms <b>1=250 ms</b> 2=500 ms 3=750 ms 4=1000 ms 5=1500 ms 6=2000 ms 7=2500 ms	8=3000 ms 9=4000 ms 10=5000 ms 11=6000 ms 12=7000 ms 13=8000 ms 14=9000 ms 15=10000 ms

## Error Counters for FF Alarm Keys

The following counters determine when FF alarm keys light.

FF alarm keys light when an error counter exceeds the specified number within 24 hours. FF alarm keys can indicate the following types of alarms:

- Red alarms
- Loss of signal alarms
- Sync loss alarms
- Yellow alarms
- Slip alarms
- Frame loss alarms.

In most cases, the default values for the error counters do not need to be changed.

The alarm keys can be assigned to any key telephone. However, the keys will only work on a non-attendant phone that has the programming authorization code (#98 9999) activated. With attendant phones, the keys work whether or not the programming authorization code is activated.

For instructions on programming FF alarms keys, see page 4-42.

**Note:** Once the alarm condition is corrected, the FF alarm key will remain lit until the end of the 24-hour period, unless you enter the “historical error clearance” command. For a description of this command, see page 4-46.

Parameter	Frame Loss Counter
Description	Determines how many frame losses occur before a Frame Loss FF key is lit.  The FF key lights when the counter exceeds the specified number within a 24-hour period.  (See page 4-42 for instructions on programming T1 alarm keys.)
Programming	Master cabinet: FF1 8# 4# 4# 3# 1# (0-9000)# Slave cabinet: FF1 8# 4# 5# 3# 1# (0-9000)#
Options	0-9000/24 hours ( <b>9000</b> )

Parameter	Slip Counter
Description	<p>Determines how many slips occur before a Slip FF key is lit.</p> <p>The FF key lights when the counter exceeds the specified number within a 24-hour period.</p> <p>This parameter also determines the number of slips that can occur before the system switches to the next clock source. When the system switches to the next clock source, the slip error counter for the first clock source is reset.</p> <p>Slips are losses of data bits due to framing errors.</p> <p>(See page 4-42 for instructions on programming FF alarm keys.)</p>
Programming	<p>Master cabinet: FF1 8# 4# 4# 3# 2# (0-9000)#</p> <p>Slave cabinet: FF1 8# 4# 5# 3# 2# (0-9000)#</p>
Options	0-9000/24 hours ( <b>9000</b> )

Parameter	Red Alarm Counter
Description	<p>Determines how many red alarms occur before a Red Alarm FF key is lit.</p> <p>The FF key lights when the counter exceeds the specified number within a 24-hour period.</p> <p>(See page 4-42 for instructions on programming FF alarm keys.)</p>
Programming	<p>Master cabinet: FF1 8# 4# 4# 3# 3# (0-9000)#</p> <p>Slave cabinet: FF1 8# 4# 5# 3# 3# (0-9000)#</p>
Options	0-9000/24 hours ( <b>9000</b> )

Parameter	Loss of Signal Counter
Description	Determines how many instances of loss of signal occur before a Signal Loss FF key is lit.  The FF key lights when the counter exceeds the specified number within a 24-hour period.  (See page 4-42 for instructions on programming T1 FF keys.)
Programming	Master cabinet: FF1 8# 4# 4# 3# 4# (0-9000)# Slave cabinet: FF1 8# 4# 5# 3# 4# (0-9000)#
Options	0-9000/24 hours ( <b>9000</b> )

Parameter	Sync Loss Counter
Description	Determines how many instances of sync loss occur before a Sync Loss FF key is lit.  The FF key lights when the counter exceeds the specified number within a 24-hour period.  (See page 4-42 for instructions on programming FF alarm keys.)
Programming	Master cabinet: FF1 8# 4# 4# 3# 5# (0-9000)# Slave cabinet: FF1 8# 4# 5# 3# 5# (0-9000)#
Options	0-9000/24 hours ( <b>9000</b> )

Parameter	Yellow Alarm Counter
Description	Determines how many yellow alarm indications occur before a Yellow Alarm FF key is lit.  The FF key lights activated when the counter exceeds the specified number within a 24-hour period.  (See page 4-42 for instructions on programming FF alarm keys.)
Programming	Master cabinet: FF1 8# 4# 4# 3# 6# (0-9000)# Slave cabinet: FF1 8# 4# 5# 3# 6# (0-9000)#
Options	0-9000/24 hours ( <b>9000</b> )

## Alarm Relay Controls

Parameter	Yellow Alarm Relay
Description	<p>Determines whether the system closes the alarm relay on the T1 MDF card in the event of yellow alarms.</p> <p>The alarm relay can be connected to an external alarm device such as a buzzer. The external alarm device must be purchased separately; it is not provided with the DBS T1.</p> <p>(The “Yel Alm Det” parameter on page 4-25 determines how many yellow alarms occur before the relay closes.)</p>
Programming	<p>Master cabinet: FF1 8# 4# 4# 4# 1# (0-1)#</p> <p>Slave cabinet: FF1 8# 4# 5# 4# 1# (0-1)#</p>
Options	<p><b>0=Off (Alarm relay does not close.)</b></p> <p>1=On (Alarm relay closes.)</p>

Parameter	Red Alarm Relay
Description	<p>Determines whether the system closes the alarm relay on the T1 MDF card in the event of red alarms.</p> <p>The alarm relay can be connected to an external alarm device such as a buzzer. The external alarm device must be purchased separately; it is not provided with the DBS T1.</p> <p>A red alarm indicates a loss of frame (OOF) or loss of signal has continued for over 2.5 seconds.</p> <p>(The “Red Alm Det” parameter on page 4-25 determines how many red alarms occur before the relay closes.)</p>
Programming	<p>Master cabinet: FF1 8# 4# 4# 4# 2# (0-1)#</p> <p>Slave cabinet: FF1 8# 4# 5# 4# 2# (0-1)#</p>
Options	<p><b>0=Off (Alarm relay does not close.)</b></p> <p>1=On (Alarm relay closes.)</p>

Parameter	Sync Loss Relay
Description	<p>Determines whether the system closes the alarm relay on the T1 MDF card in the event of sync loss alarms.</p> <p>The alarm relay can be connected to an external alarm device such as a buzzer. The external alarm device must be purchased separately; it is not provided with the DBS T1.</p> <p>Sync-loss alarms result from clocking errors.</p>
Programming	<p>Master cabinet: FF1 8# 4# 4# 4# 3# (0-1)#</p> <p>Slave cabinet: FF1 8# 4# 5# 4# 3# (0-1)#</p>
Options	<p><b>0=Off (Alarm relay does not close.)</b></p> <p>1=On (Alarm relay closes.)</p>

Parameter	Frame Loss Relay
Description	<p>Determines whether the system closes the alarm relay on the T1 MDF card in the event of frame loss alarms.</p> <p>The alarm relay can be connected to an external alarm device such as a buzzer. The external alarm device must be purchased separately; it is not provided with the DBS T1.</p>
Programming	<p>Master cabinet: FF1 8# 4# 4# 4# 4# (0-1)#</p> <p>Slave cabinet: FF1 8# 4# 5# 4# 4# (0-1)#</p>
Options	<p><b>0=Off (Alarm relay does not close.)</b></p> <p>1=On (Alarm relay closes.)</p>

Parameter	AIS Relay
Description	<p>Determines whether the system closes the alarm relay on the T1 MDF card in the event of alarm indication signals.</p> <p>An alarm indication signal is comprised of all 1's and is unframed.</p> <p>The alarm relay can be connected to an external alarm device such as a buzzer. The external alarm device must be purchased separately; it is not provided with the DBS T1.</p>
Programming	<p>Master cabinet: FF1 8# 4# 4# 4# 5# (0-1)#</p> <p>Slave cabinet: FF1 8# 4# 5# 4# 5# (0-1)#</p>
Options	<p><b>0=Off (Alarm relay does not close.)</b></p> <p>1=On (Alarm relay closes.)</p>

Parameter	Relay Reset
Description	<p>Determines whether the T1 alarm relay is cleared (opened) automatically or manually.</p> <p>If cleared automatically, the relay is opened approximately one second after the alarm condition ceases.</p> <p>If cleared manually, the relay can be opened by entering the Alarm Relay Clear code.</p> <p>To enter the Alarm Relay Clear code, first enter the programming authorization code (#98 9999), then enter one of the following codes:</p> <p>(Master cabinet: ON/OFF #94 8)</p> <p>(Slave cabinet: ON/OFF #95 8)</p>
Programming	<p>Master cabinet: FF1 8# 4# 4# 4# 6# (0-1)#</p> <p>Slave cabinet: FF1 8# 4# 5# 4# 6# (0-1)#</p>
Options	<p><b>0=Auto</b></p> <p>1=Manual</p>

# Trunk Settings

Parameter	Trunk Type
Description	Determines whether the trunk circuit is an analog loop start, analog ground start, analog DID, or T1. <b>Note:</b> For changes to this parameter to take effect, the system must be powered down, then back up again.
Programming	FF2 (1-64)# 21# (0-3)#
Options	<b>0= Loop start</b> 1=Ground start 2=DID 3=T1

Parameter	T1 Trunk Type
Description	Determines the type of trunk signaling that each T1 channel emulates. <b>Note:</b> For changes to this parameter to take effect, the system must be powered down, then back up again.
Programming	FF1 8# 4# 6# (1-64)# 1# (0-3)#
Options	0=Loop start 1=Not used 2=Ground start <b>3=E&amp;M</b>

Parameter	DID/DNIS
Description	<p>Determines if DID or DNIS is provided for a trunk. DNIS is available only with T1.</p> <p>If DID is selected, the system uses a DID Numbers Table, which allows the installer to assign up to 500 DID numbers. If DNIS is selected, the system uses a DNIS Numbers Table, which allows the installer to assign up to 500 DNIS numbers.</p> <p>The DID Numbers Table can be used for DID or DNIS. Therefore, if all the numbers in the DNIS Numbers Table are used, a T1 channel can be set to DID, and DNIS service can still be used.</p> <p><b>Notes:</b></p> <ol style="list-style-type: none"> <li>1. The DBS only supports 4-digit DID/DNIS numbers.</li> <li>2. When the central office sends a DID/DNIS call to the DBS, it first receives a wink from the DBS before sending the digits. Once the wink is received, the central office should wait at least 200 ms before sending the digits. It is the installer's responsibility to request the delay from the central office.</li> <li>3. For changes to this parameter to take effect, the system must be powered down, then back up again.</li> </ol>
Programming	FF1 8# 4# 6# (1-64)# 2# (0-2)#
Options	<p><b>0=Not provided</b></p> <p>1=DID</p> <p>2=DNIS</p>

Parameter	Outgoing Type
Description	<p>Determines the signaling class used by T1 channels on outgoing calls.</p> <p>The outgoing type must match what is ordered from the CO.</p> <p><b>Note:</b> For changes to this parameter to take effect, the system must be powered down, then back up again.</p>
Programming	FF1 8# 4# 6# (1-64)# 3# (0-2)#
Options	<p><b>0=Immediate start</b></p> <p>1=Wink start</p> <p>2=Dial-tone start</p>

Parameter	Incoming Type
Description	Determines the signaling class used by T1 channels on incoming calls.  The incoming type must match what is ordered from the CO. <b>Note:</b> For changes to this parameter to take effect, the system must be powered down, then back up again.
Programming	FF1 8# 4# 6# (1-64)# 4# (0-1)#
Options	<b>0=Immediate start/ringdown</b> 1=Wink start
Note	If using DNIS, use Wink start.

Parameter	Trunk Mode
Description	Determines whether T1 channels are used as outgoing only or bothway.  <b>Note:</b> For changes to this parameter to take effect, the system must be powered down, then back up again.
Programming	FF1 8# 4# 6# (1-64)# 5# (0-1)#
Options	<b>0=Bothway</b> 1=Outgoing only

Parameter	Robbed Bit Setting
Description	Determines if robbed bit signaling is used.  <b>Note:</b> For changes to this parameter to take effect, the system must be powered down, then back up again.
Programming	FF1 8# 4# 6# (1-64)# 6# (0-1)#
Options	0=Off (Robbed bit signaling is not used.) <b>1=On (Robbed bit signaling is used.)</b>

Parameter	Incoming Dialing Method
Description	Determines whether the system expects DP or DTMF digits for incoming DID or DNIS calls.  <b>Note: Notes:</b> 1. If “DTMF” is selected, the DBS must be equipped with an MFR card. 2. The DBS only supports 4-digit DID/DNIS numbers. 3. For changes to this parameter to take effect, the system must be powered down, then back up again.
Programming	FF1 8# 4# 6# (1-64)# 7# (0-1)#
Options	0=Dial Pulse (10PPS) <b>1=DTMF</b>

Parameter	Dial Tone Transmission
Description	Transmits dial tone on the DBS T1 channel.
Programming	FF1 8# 4# 6# (1-64)# 8# (0-1)#

Parameter	Busy Tone Transmission
Description	This address is reserved for future use.
Programming	FF1 8# 4# 6# (1-64)# 9# (0-1)#

Parameter	Dial Tone Receive
Description	Transmits dial tone from the DBS T1 channel to DBS stations. <b>Notes:</b> 1. Select this option only if the CO does not provide dial tone. 2. Dial tone receive requires SCC 1.3.
Programming	FF1 8# 4# 6# (1-64)# 10# (0-1)#
Options	<b>0=Off</b> 1=On

Parameter	Ringback Tone Transmission
Description	Transmits ringback tone from the DBS T1 channel to the central office.
Programming	FF1 8# 4# 6# (1-64)# 11# (0-1)#
Options	<b>0=Off</b> 1=On

Parameter	DNIS Number Setting
Description	Associates a dialed number with a station.
Programming	FF1 8# 4# 7# (0000-9999)# (10-69 or 100-699)#
Options	Associates a four-digit dialed number with a station number. DNIS is available only with the T1 Interface. <b>Note:</b> Stations are numbered using one of two patterns: 10-69 or 100-699.

Parameter	New Function Reset
Description	<p>Resets the T1 settings stored in SRAM (Static Random Access Memory). The reset restores these settings to default values.</p> <p><b>Notes:</b></p> <ol style="list-style-type: none"> <li>1. Prior to Version 3.1, the DBS stored DID numbers with individual station settings. Beginning with Version 3.1, DID numbers are stored in the DID Numbers Table. This parameter erases extension-based DID numbers, but it does <b>not</b> erase the settings stored in the DID Numbers Table.</li> <li>2. Before upgrading from one software version to another, you must first perform the New Function Reset. For example, if you're upgrading from Version 3.10 to Version 4.00, you need to perform the reset. However, if you're upgrading to a point release (4.01 to 4.07), you do not need to perform the reset.</li> </ol>
Programming	<p>FF1 8# 1# (0-1)#</p> <p><b>Note:</b> If you enter a "1," the following display appears:</p> <p style="padding-left: 40px;">CONFIRM</p> <p style="padding-left: 40px;">0: NO 1: YES</p> <p>The purpose of this display is to make sure you want to reset the data. Enter a 0 or 1, depending on whether you want to complete or cancel the reset.</p> <p><b>0=Do not reset</b></p> <p><b>1=Reset</b></p>
Options	<p><b>0=No (retain settings)</b></p> <p><b>1=Yes (clear settings)</b></p>

Parameter	Multiple DID/DNIS
Description	<p>This programming address controls two functions.</p> <p>If only analog trunks are used, a “1” turns on multiple DID numbering. Multiple DID numbering allows the assignment of one DID number to multiple extensions. If one DID number is assigned to multiple stations, the stations ring simultaneously when the DID number is dialed. More than one DID number can be assigned to a single extension.</p> <p>If T1 trunks are used, a “1” also turns on multiple DNIS (Dialed Number Identification Service) numbering. Multiple DNIS numbering allows the assignment of one DNIS number to multiple extensions. If one DNIS number is assigned to multiple stations, the stations ring simultaneously when the DNIS number is dialed. DNIS is available only with T1 trunks. More than one DNIS number can be assigned to a single extension.</p> <p>Up to 500 DID numbers can be assigned in each system; also, up to 500 DNIS numbers can be assigned. See “DID/DNIS” on page 4-36 and “DNIS Number Setting” on page 4-39 for more information on assigning DNIS numbers.</p>
Programming	FF1 2# 1# 32# (0-1)#
Options	<p><b>0=Off</b></p> <p>1=On</p>

# FF Key Settings

Parameter	FF Alarm keys																					
Description	<p>This command dedicates FF keys for T1 alarms. The FF key lights when alarm occurrences exceed a specified number within a 24-hour period.</p> <p>The alarm keys can be assigned to any key telephone. However, the keys will only work on a non-attendant phone that has the programming authorization code (#98 9999) activated. With attendant phones, the keys work whether or not the programming authorization code is activated.</p>																					
Assignment	<p><b>Note:</b> If you're assigning an FF alarm to an FF key that is currently programmed, you must first clear the FF key before making a new assignment.</p> <p>Alarms from T1 in the master cabinet: ON/OFF PROG FFkey (101-107)# HOLD</p> <p>Alarms from T1 in the slave cabinet: ON/OFF PROG FFkey (121-127)# HOLD</p>																					
Options	<p>Keys can be assigned for the following alarms:</p> <ul style="list-style-type: none"> <li>• Red alarms</li> <li>• Yellow alarms</li> <li>• Sync loss</li> <li>• Signal loss</li> <li>• Frame loss</li> <li>• Slips</li> </ul> <p>The following table shows alarm key addresses. The addresses differ depending on whether alarms are generated from the master or slave cabinet.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Alarm</th> <th>Master T1</th> <th>Slave T1</th> </tr> </thead> <tbody> <tr> <td>Red</td> <td>103#</td> <td>123#</td> </tr> <tr> <td>Yellow</td> <td>107#</td> <td>127#</td> </tr> <tr> <td>Sync loss</td> <td>105#</td> <td>125#</td> </tr> <tr> <td>Signal loss</td> <td>104#</td> <td>124#</td> </tr> <tr> <td>Frame loss</td> <td>101#</td> <td>121#</td> </tr> <tr> <td>Slips</td> <td>102#</td> <td>122#</td> </tr> </tbody> </table>	Alarm	Master T1	Slave T1	Red	103#	123#	Yellow	107#	127#	Sync loss	105#	125#	Signal loss	104#	124#	Frame loss	101#	121#	Slips	102#	122#
Alarm	Master T1	Slave T1																				
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Yellow	107#	127#																				
Sync loss	105#	125#																				
Signal loss	104#	124#																				
Frame loss	101#	121#																				
Slips	102#	122#																				

## Special T1 Function Codes

The following function codes are used for troubleshooting and maintenance of the T1 Interface.

These codes can be entered remotely by dialing into the DBS and entering the T1 maintenance mode. To enter the T1 maintenance mode, type an uppercase "T" at the REMT prompt.

Parameter	Loopback 1
Description	<p>Loopbacks provide diagnostic tests of the T1 circuit or the T1 connection to the CO.</p> <p>This loopback initiates a loopback with the CO. The loopback takes place through the Line Build Out (LBO) chip on the T1 card.</p> <p>This loopback is typically used to check the continuity between the CO, CSU, MDF, and T1 card.</p> <p><b>Note:</b> Before executing this loopback, you must first enter the programming authorization code (#98 9999).</p>
Execution	<p>Master: ON/OFF #94 0 (0 or 1)</p> <p>Slave: ON/OFF #95 0 (0 or 1)</p>
Options	<p><b>0=Off</b></p> <p>1=On</p>

Parameter	Loopback 2
Description	<p>Loopbacks provide diagnostic tests of the T1 circuit or the T1 connection to the CO.</p> <p>This loopback also initiates a loopback with the CO. Loopback 2 is identical to Loopback 1, except that it loops back through the Frammer chip on the T1 card, thereby testing more of the T1 circuitry.</p> <p><b>Note:</b> Before executing this loopback, you must first enter the programming authorization code (#98 9999).</p>
Execution	<p>Master: ON/OFF #94 1 (0 or 1)</p> <p>Slave: ON/OFF #95 1 (0 or 1)</p>
Options	<p><b>0=Off</b></p> <p>1=On</p>

Parameter	Loopback 3
Description	<p>Loopback 3 is used in conjunction with the “1 kHz Signal Transmission” command on page 4-45. Loopback 3 performs an internal loopback through the T1 card, and the “1 kHz Signal Transmission” command tests the audio circuitry of a specific T1 channel.</p> <p>To use these two commands together, enter the Loopback 3 command first, followed by the 1 kHz Signal Transmission command.</p> <p><b>Notes:</b></p> <ol style="list-style-type: none"> <li>1. Before executing this loopback, you must first enter the programming authorization code (#98 9999).</li> <li>2. For best results, this command should be used when the clock source is set to “free run.” The command can be issued without setting the clock source to “free run,” but you may hear “clicks” during the loopback.</li> </ol>
Execution	<p>Master: ON/OFF #94 2 (0 or 1)</p> <p>Slave: ON/OFF #95 2 (0 or 1)</p>
Options	<p><b>0=Off</b></p> <p>1=On</p>

Parameter	Remote Loopback
Description	This command is reserved for future use.
Execution	<p>Master: ON/OFF #94 3 (0 or 1)</p> <p>Slave: ON/OFF #95 3 (0 or 1)</p>



Parameter	Forced Re-synchronization
Description	Re-synchronizes the DBS T1 with the public network. <b>Notes:</b> 1. Forced re-synchronization disconnects existing calls. 2. Before executing this code, you must first enter the programming authorization code (#98 9999).
Execution	Master: ON/OFF #94 6 Slave: ON/OFF #95 6
Options	None. Re-synchronization begins as soon as the code is entered.

Parameter	Historical Error Clearance
Description	Clears the error counters for the following alarms: <ul style="list-style-type: none"> <li>• yellow</li> <li>• red</li> <li>• framing loss</li> <li>• slip rate</li> <li>• loss of signal</li> <li>• sync loss</li> </ul> <b>Note:</b> Before executing this code, you must first enter the programming authorization code (#98 9999).
Execution	Master: ON/OFF #94 7 Slave: ON/OFF #95 7
Options	None. The counters are cleared as soon as the code is entered.

Parameter	Alarm Relay Clear
Description	Clears (opens) the alarm relay on the T1 MDF card. <b>Note:</b> Before executing this code, you must first enter the programming authorization code (#98 9999).
Execution	Master: ON/OFF #94 8 Slave: ON/OFF #95 8
Options	None. The relay is cleared as soon as the code is entered.

---

## Appendix A CPC-EX 1.0 Updates

CPC-EX Version 1.0 (and above) offers the following enhancements to the DBS phone system.

Note that every enhancement described here may *not* apply directly to T1. However, pay special attention to those that do as they may supersede information provided in the main chapters of this manual.

---

### Compatibility

CPC-EX Version 1.0 supports all features of CPC-B Version 7.1 (with the exception of TSAPI support). In addition, CPC-EX Version 1.0 adds support for additional features, including the 44-Series phones, T1 Networking, and ISDN.

The CPC-EX card can be installed into an existing DBS cabinet, with no hardware modifications.

CPC-EX software uses existing CPC-B programming addresses, with the same numbering. Additional addresses have been added for CPC-EX features.

**Note:** CPC-EX requires SCC-B.

---

### 44-Series Phone Support

CPC-EX provides full support for Panasonic's 44-Series phones (VB-44xxx). Table 1 below lists all 44-Series phone models and their part numbers. Most models are available in two colors: gray and black.

*Table A-1. 44-Series Phones*

16-Key Phone (gray)	VB-44210G
16-Key Phone (black)	VB-44210B
16-Key Speakerphone (gray only)	VB-44211G
22-Key Phone (gray only)	VB-44220G
22-Key Small-Display Speakerphone (gray)	VB-44223G
22-Key Small-Display Speakerphone (black)	VB-44223B
34-Key Small-Display Phone (gray only)	VB-44230G
34-Key Small-Display Speakerphone (gray)	VB-44233G
34-Key Small-Display Speakerphone (black)	VB-44233B
22-Key Large-Display Speakerphone (gray)	VB-44225G
22-Key Large-Display Speakerphone (black)	VB-44225B
DSS/72 Console (gray)	VB-44320G
DSS/72 Console (black)	VB-44320B
EM/24 Unit (gray)	VB-44310G
EM/24 Unit (black)	VB-44310B

Enhanced DBS features that can be executed on the 44-Series phones are described below:

## Directory Mode

On the small-display phones, you can scroll through SSD names, PSD names, or extension names and select a displayed name for dialing.

## Variable Mode

The small-display phones provide one-touch access to various features displayed during each of the following call states: 1) during an intercom call; 2) during CO dial tone; 3) during a trunk call; and 4) after dialing a busy extension.

## Handset Mute

The large-display phone now contains a MUTE key, and a mute feature is available on all 44-series phones. Pressing the MUTE key during an off-hook call will block audio from the handset transmitter to the outside party. You can still hear them, but they can't hear you.

## Off-Hook Monitoring

If you press the ON/OFF key during an off-hook call on any 44-series speakerphone, the other party's voice will be heard through both the handset and the speaker. This allows a third party to hear both sides of a conversation. **Note:** This feature does not activate your phone's microphone - audio will be transmitted only through your handset.

## Analog Adapter

The large-display phone can be enhanced with an analog port adapter which allows you to connect to an analog device such as a FAX or modem to the phone. This allows the same phone to be alternately used for analog or digital communications.

## MSG (Message) Key

A MSG key on the large-display phone will perform Auto-Callback (automatically dialing the extension that sent a "Message Waiting" to your phone), or Auto-Answer Message (automatically dialing your voice mailbox).

## DSS/72 and EM/24 - Key Arrangement

The keys on the consoles are arranged differently, affecting the text layout and default extension numbers assigned to these keys.

---

## FF-Key Programming

Because T1 Networking adds the capability of 4-digit extension numbering, you can now program up to 8 digits (not 6) into an FF-key.

---

## Speed Dial Enhancements

CPC-EX supports up to 500 System Speed Dial (SSD) numbers. CPC-EX also allows SSD codes to be chained, or “linked”, to another SSD number, and either PSD or SSD codes to be chained to a PSD number.

---

## Additional Serial Port

The CPC-EX card contains an on-board serial port (Serial Port 2) which can be used for Bus Monitor/Maintenance. This allows remote maintenance to be accomplished without disconnecting SMDR cabling.

---

## T1 Networking Capability

Up to 4 DBS's can now be connected together via T1 interface to form a DBS phone network. The DBS's can be located in the same building, in separate buildings in a campus-type environment, or at remote locations in separate states. Networked DBS's use 4-digit extensions, with the first digit of the extension number identifying the DBS site.

Each site requires its own DBS cabinet with a CPC-EX card and a T1 card. Programming addresses are included in CPC-EX software for setting up the T1 Network. (*see the T1 Networking Reference Manual for complete instructions.*)

---

## Modification to Toll Restriction Service

The program address for TRS Operator Access (FF7 1# 18#) has been modified to allow an extension to dial “0+NXX” phone numbers, even if “0-only” dialing is denied.

---

## Maximum Time Priority Route Tables

CPC-EX allows a maximum of 8 Time Priority Route Tables (not 15) to be used during LCR programming. Since few systems use more than 3 Time Priority Route Tables, this change will allow the saved memory space to be used for future enhancements.

---

## SMDR Modifications

SMDR reports contain several additional call types and other parameters due to CPC-EX support of T1 Networking and ISDN calls.

---

## ISDN Support

CPC-EX supports ISDN-PRI (Integrated Services Digital Network -- Primary Rate Interface). The program address for Trunk Circuit Type (FF2 (trunk #)# 21#) has been modified to allow for ISDN. Programming addresses have also been added in CPC-EX to support ISDN. (*See the ISDN Reference Manual for complete instructions.*)

---

## Modification to T1 Signaling Types

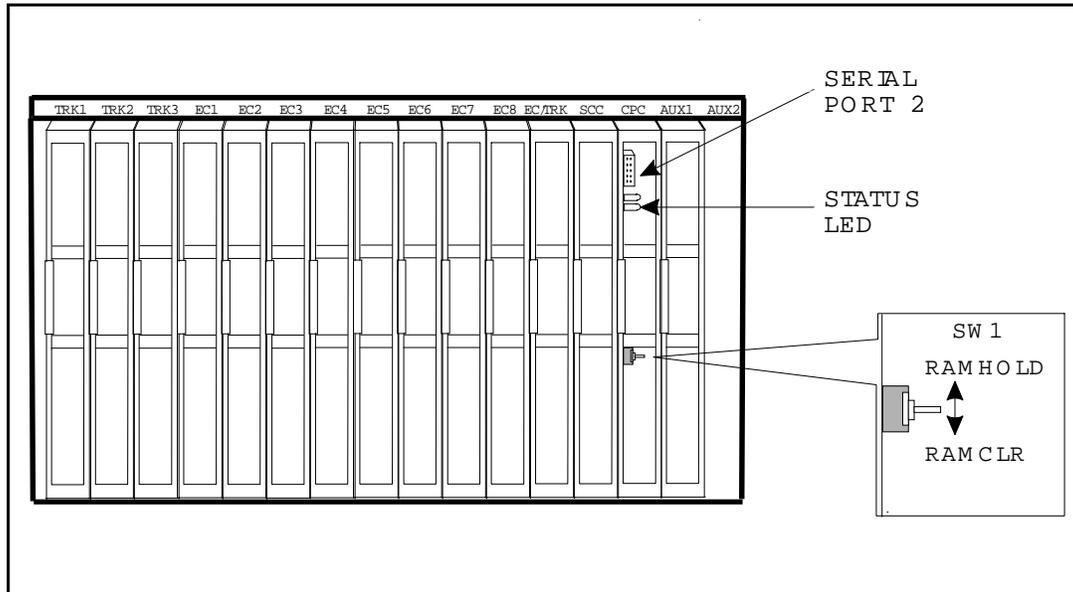
To allow easier programming of E&M trunks, CPC-EX uses “Wink Start” (not “Immediate Start”) as the default for T1 Incoming and Outgoing Signal Types.

---

## Installation Notes

### CPC-EX Installation

Use normal installation procedures to install the CPC-EX. The following illustration shows an installed CPC-EX:

*Figure A-1.CPC-EX*

## Key Telephone Installation

### Desi Strip Cover

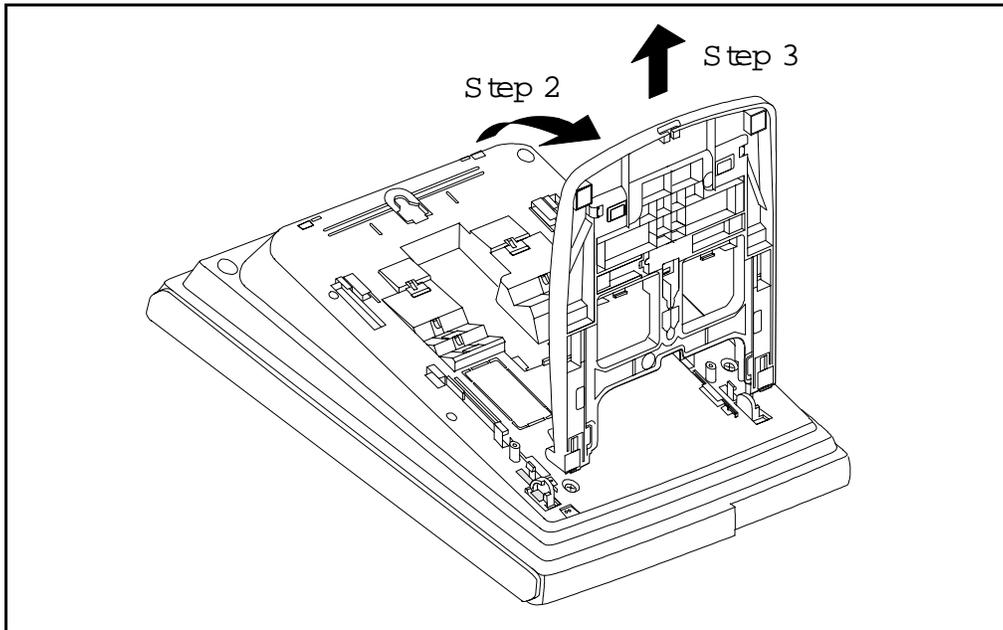
The 44-Series Key Telephones are shipped with a thin green protective film over the Desi strip cover. Be sure to remove this film from both sides of the Desi cover before placing the phone in service.

### Key Telephone Wall Mounting Instructions

The following procedures apply to 44-Series Key Telephones only. Please be sure to follow these procedures exactly. Removing the desk stand incorrectly can result in damage to the telephone and/or desk stand.

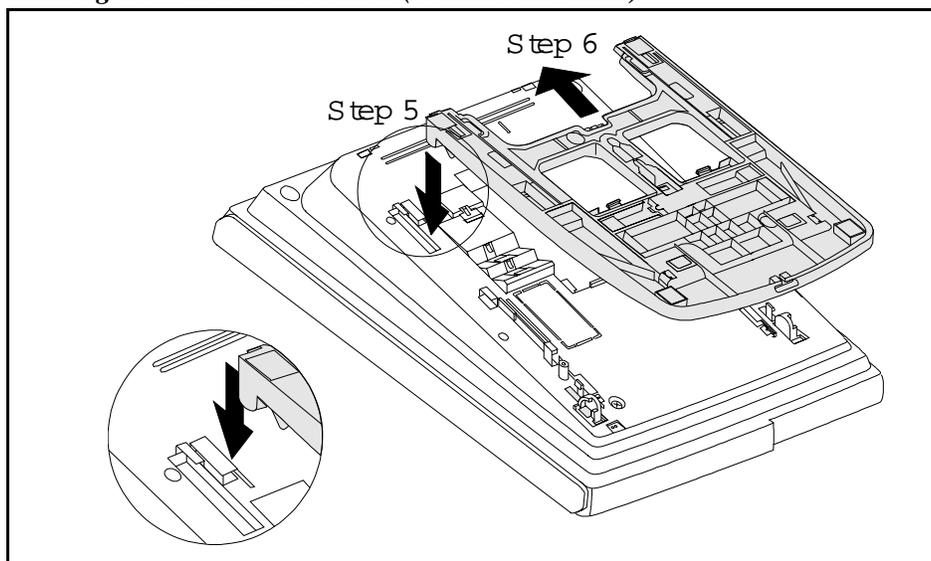
1. Place the telephone face down on a flat surface.
2. Grasp the top of the desk stand (at the **>ABS<** label) and pull up the end to 90° vertical (refer to Step 2 in Figure 2). The stand will click as it releases from the plastic securing latches.
3. Lift the desk stand as shown in Step 3 of Figure 2.

**Figure A-2.Desk Stand Removal.**



4. Rotate the desk stand 180°. In this position it doubles as a wall mount bracket.
5. Insert the wall mount bracket into the mounting guides as shown in Figure 3.
6. Slide the wall mount bracket onto the telephone.

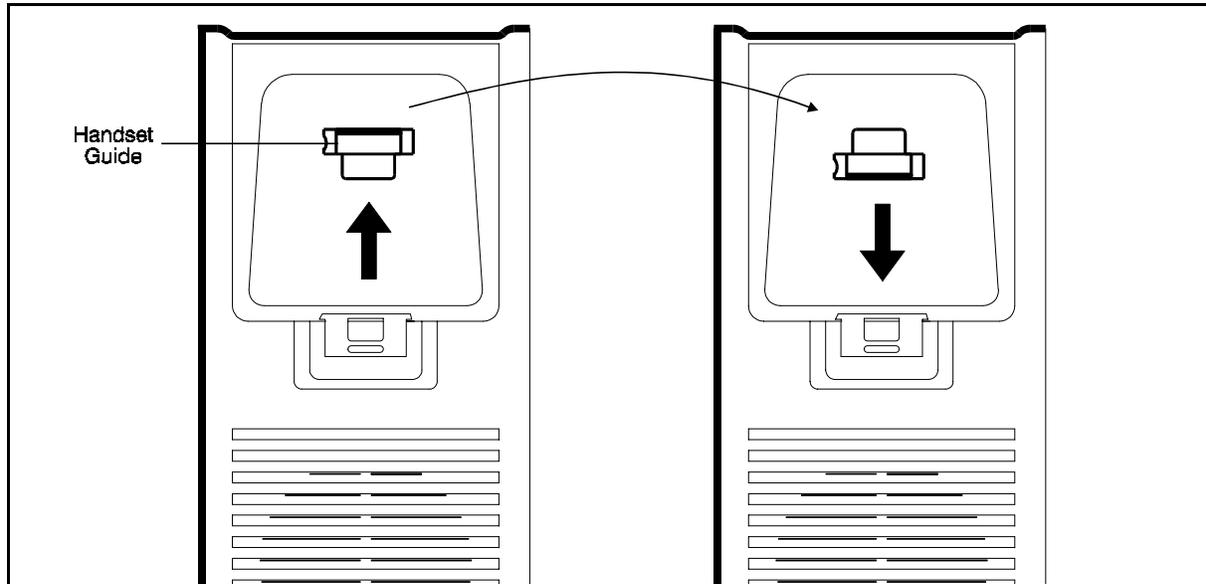
**Figure A-3.Inserting the wall mount bracket (rotated desk stand)**



7. While viewing the front of the telephone, find the handset guide located just below the hookswitch (see Figure 8).

- Slide the handset guide out, rotate 180° so that the holding clip is exposed, and reinsert.

*Figure A-4. Handset guide insertion for wall mounting, key telephone*



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## 44-Series Enhanced Phone Features

**Note:** The enhanced features introduced with these phones are supported by CPC-EX Version 1.0, CPC-AII/B Version 8.0, and CPC-S/M Version 2.0. You can also use the 44-Series phones with previous DBS versions, but the enhanced features won't be supported.

Figure A-5.44-Series Small-Display Phone

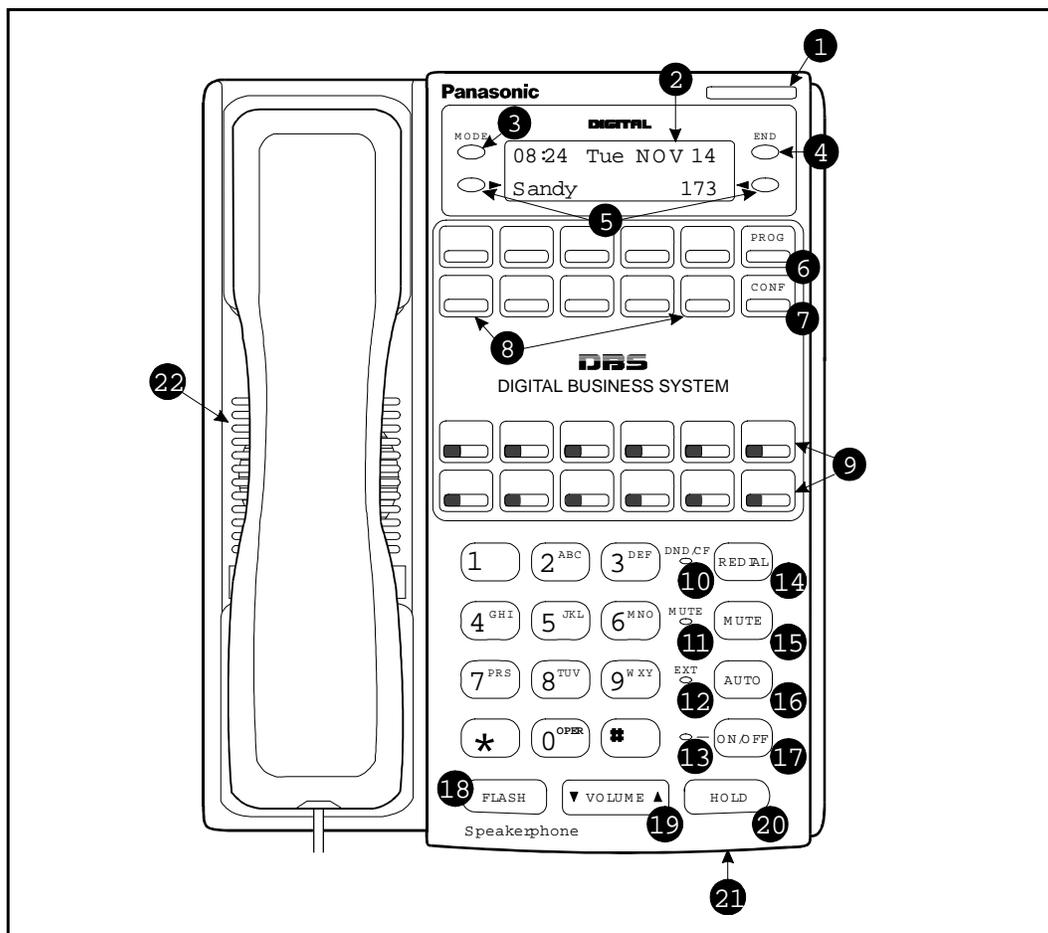


Table A-2. Small-Display Phone Features

#	Feature	Description
1	Message Indicator	Indicates that you have a message.
2	Display	Displays information about phone's status, menus, dialing directories, and text message information.
3	Mode Key	Used to change display modes from default to directory mode.
4	End Key	Used to exit directory mode and return display to default mode.
5	Select Keys	Used to select and dial System Speed Dial, Personal Speed Dial, and Extension numbers from a directory.
6	PROG Key	Used to program FF and one-touch keys and to adjust ringer volume. Depending on the setup of your system, may also be used to transfer calls.
7	CONF Key	Used to establish conference calls, check FF key and one-touch features, and scroll through messages.

#	Feature	Description
8	One-Touch Keys	Used to make outside calls or to access call-handling features.
9	Flexible Function (FF) Keys	Used to access outside lines or to access call-handling features.
10	DND/CF Indicator	Indicates that Do-Not-Disturb, Call Forwarding, or Absence Message is set.
11	MUTE Indicator	Indicates that your voice is muted - i.e., party on the other end cannot hear you. Lights solid when your hands-free microphone is muted and flashes when your handset is muted.
12	EXT Indicator	Lights when you are on a call; flashes when you hold a call.
13	ON/OFF Indicator	Lights when ON/OFF key has been pressed.
14	REDIAL Key	Used to redial last outside number dialed.
15	MUTE Key	Used to activate/deactivate MUTE function. When activated, the party on the other end cannot hear you. (See item 11, MUTE Indicator.)
16	AUTO Key	Used to access speed dialing, enter account codes, or for message waiting answer/cancel.
17	ON/OFF Key	Used to make a call without lifting handset.
18	FLASH Key	Used to end an outside call and to restore dial tone without hanging up receiver.
19	VOLUME Key	Used to adjust level of tones, background music, ringing, receiver volume, and display contrast.
20	HOLD Key	Used to hold calls, to retrieve held calls, and to complete FF key programming.
21	Microphone	Used to talk with other party without using the handset.
22	Speaker	Outputs tones and voice at your extension.

Figure A-6.44-Series Large-Display Phone

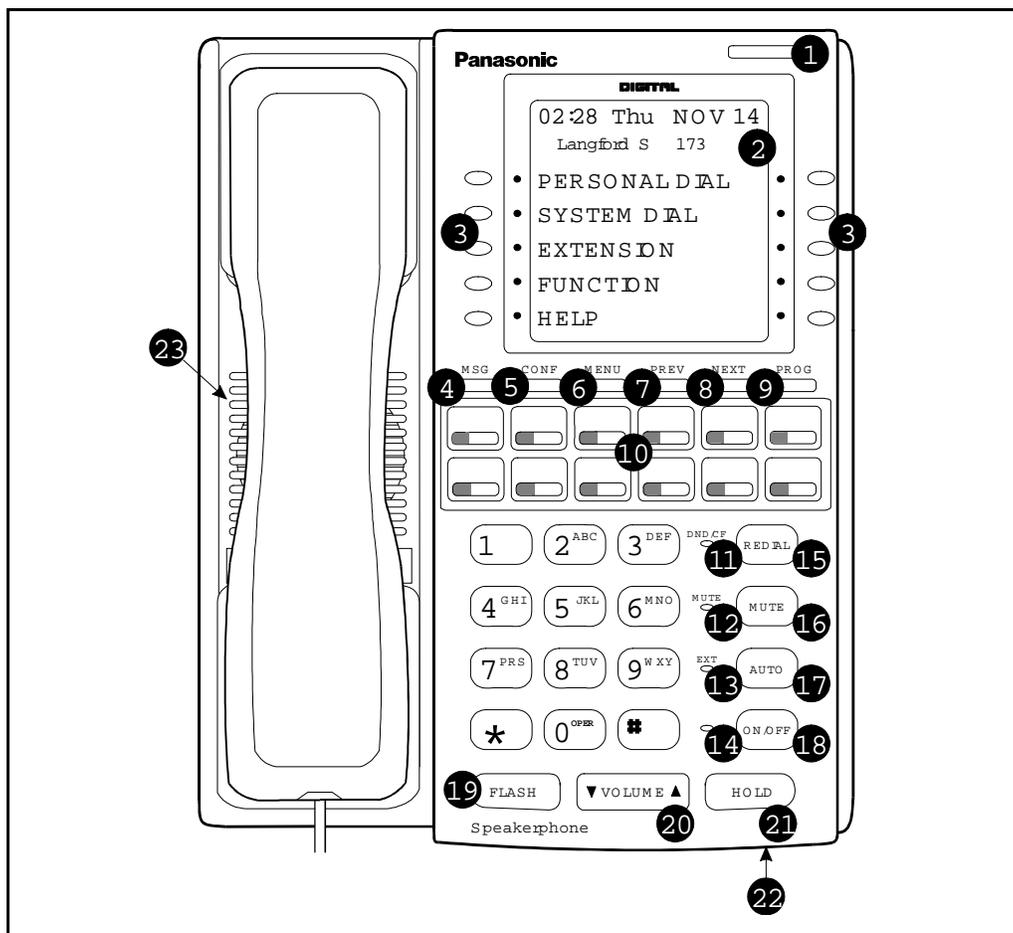


Table A-3. Large-Display Phone Features

#	Feature	Description
1	Message Indicator	Indicates that you have a message.
2	Display	Displays information about phone's status, menus, dialing directories, and text message information.
3	Soft Keys	Used to make outside calls or to access call-handling features.
4	MSG Key	Used for Auto-CallBack to a telephone which has left a text message or to access voice messages.
5	CONF Key	Used to establish conference calls, check FF and one-touch key settings, and scroll through messages.

#	Feature	Description
6	MENU Key	Used to return to the Main Menu screen. The default Main Menu screen contains the following items: <ul style="list-style-type: none"> <li>• PERSONAL DIAL</li> <li>• SYSTEM DIAL</li> <li>• EXTENSION</li> <li>• FUNCTION</li> <li>• HELP</li> </ul>
7	PREV Key	Used to return to the previous menu.
8	NEXT Key	Used to advance to the next menu.
9	PROG Key	Used to program FF and one-touch keys and to adjust ringer volume. Depending on the setup of your system, may also be used to transfer calls.
10	Flexible Function (FF) Keys	Used to access outside lines or to access call-handling features.
11	DND/CF Indicator	Indicates that Do-Not-Disturb, Call Forwarding, or Absence Message is set.
12	MUTE Indicator	Indicates that your voice is muted - i.e., party on the other end cannot hear you. Lights solid when your hands-free microphone is muted and flashes when your handset is muted.
13	EXT Indicator	Lights when you are on a call; flashes when you hold a call.
14	ON/OFF Indicator	Lights when ON/OFF key has been pressed.
15	REDIAL Key	Used to redial last outside number dialed.
16	MUTE Key	Used to activate/deactivate MUTE function. When activated, the party on the other end cannot hear you. (See item 12, MUTE Indicator.)
17	AUTO Key	Used to access speed dialing, enter account codes, or for message waiting answer/cancel.
18	ON/OFF Key	Used to make a call without lifting handset.
19	FLASH Key	Used to end an outside call and to restore dial tone without hanging up receiver.
20	VOLUME Key	Used to adjust level of tones, background music, ringing, receiver volume, and display contrast.
21	HOLD Key	Used to hold calls, to retrieve held calls, and to complete FF key programming.
22	Microphone	Used to talk with other party without using the handset.
23	Speaker	Outputs tones and voice at your extension.

## Directory Mode

### Description

This enhanced feature applies to the 44-Series small-display phone only (i.e., phones with a 2-line LCD display).

In Directory Mode, you can use the phone's select keys (as well as other keys) to scroll through a directory of existing System Speed Dial (SSD) names, Personal Speed Dial (PSD) names, or extension names -- and select one to dial.

- *For example, if you can't remember the party's extension number or speed-dial number to which you want to transfer a call on hold, you can use Directory Mode to find the number and execute the transfer.*

### Operation

The select keys on the 44-Series small-display phone are located next to the display's 2nd line. Pressing select key 1 (“>” on the left) or select key 2 (“<” on the right) will access the displayed directory.

#### To use Directory Mode:

1. Press the MODE key to turn Directory Mode on. The 2nd line of the LCD will display “SSD” on the left and “PSD” on the right.
  - Press the MODE key again to access the directory for extension names. The 2nd line of the LCD will display “EXT” on the left.
2. Press the > select key to access the directory of existing SSD or EXT names; or the < select key to access the PSD directory. The 2nd line will show two speed-dial or extension names at a time (the first 7 characters of each name), beginning with the A's.
3. To scroll through the names (two at a time), press the # key. To back-scroll, press the \* key.
4. To jump to another letter in the directory, press the numeric key for it. For example, press the “6” key to jump to the M's, N's, and O's. The M's will appear first. Press “6” again to jump to the N's, and again to jump to the O's. (**Note:** This doesn't work for PSD names unless the system is a DBS 824 CPC-M Version 2.0 or higher, which allows up to 40 PSDs.)
  - For names beginning with Q or Z, use the 1 key.
5. When the correct speed-dial or extension name is displayed, you can execute the dialing of its speed-dial or extension number by pressing the select key that points to it (> if the name is displayed on the left; or < if the name is on the right).

- Or, to exit the directory without selecting a number to dial, press the END key or go on-hook.

## Notes

***Incompatibility with older phone versions.*** Directory Mode is available on the 44-Series phones only.

***Hot Dial Pad and Directory Mode.*** The Hot Dial Pad feature (FF3 ExtPort# 48#) will not work on an extension in Directory Mode.

## Variable Mode

### Description

This feature applies to the 44-Series small-display phone only (i.e., phones with a 2-line LCD display).

When the phone is in Variable Mode, the features for Flexible Function Screen select keys 1 and 2 will display during each of the following call states:

<u>Call State</u>	<u>Existing Program Address*</u>
• During an intercom call	FF3 (ExtPort)# 28# (25-39)#
• During CO dial tone	FF3 (ExtPort)# 29# (25-39)#
• During a trunk call	FF3 (ExtPort)# 30# (25-39)#
• After dialing a busy extension	FF3 (ExtPort)# 33# (25-39)#

**\* In these addresses, you assign a Flexible Function Screen (25-39) to appear on the extension while it is in the call state.**

### Operation

The select keys on the 44-Series small-display phone are labeled “>” and “<” to the left and right of the display’s 2nd line. Pressing select key 1 (“>” on the left) or select key 2 (“<” on the right) will perform the displayed feature.

#### To use Variable Mode:

1. Activate Variable Mode by pressing **ON/OFF \*61 ON/OFF**.
  - When you dial \*61 in the above sequence, the 1st line of the LCD will display “Variable md ON”. The display will return to normal when you press the second ON/OFF.
  - The \*61 code toggles Variable Mode on and off. Press **ON/OFF \*61 ON/OFF** again to turn Variable Mode off.
2. While the extension is engaged in an intercom call, the 2nd line will display select key 1 and 2 features from the Flexible Function Screen assigned to display in FF3 ExtPort# 28#. The same applies when the extension receives CO dial tone (FF3

ExtPort# 29#); during a trunk call (FF3 ExtPort# 30#); and after dialing a busy extension (FF3 ExtPort# 33#).

- Use existing addresses FF1 2# 7# 1# thru 4# to assign select key features to Flexible Function Screens.
  - Use existing addresses FF1 2# 7# 2# to assign screen text.
  - Select key features for *Fixed* Function Screens will not appear on small-display phones.
3. While the select key feature is displayed, you can execute the feature by pressing the > or < select key.

## Notes

***Toggling Variable Mode On/Off with an FF-Key.*** You can program the \*61 code into an FF-key: In programming mode, press FF5 (ExtPort)# (KeyNo.)# (\*61)#. The FF-key will toggle Variable Mode on/off while the extension is idle or in an off-hook/dial-tone state. The FF-key LED will remain lit (red) while Variable Mode is “On”. (You can also use a one-touch key to toggle Variable Mode on and off; however, one-touch keys do not contain an LED to indicate when Variable Mode is on.)

***Variable Mode After Power-Cycling.*** If Variable Mode is “On”, the extension will stay in Variable Mode even after power-cycling (system is powered down, then powered back up).

***Incompatibility with older phone versions.*** Variable Mode is available on the 44-Series phones only.

***Conditions under which Variable Mode does not work.*** Variable Mode will be temporarily overridden under the following conditions: during an incoming message state, hold state, message-waiting state, or call-waiting state. Incoming messages include:

- CO Queuing
- Incoming [trunk no.]
- REV.[extension no.]
- TRF.[trunk no.]
- H-Recall
- Call Wait
- REC.[trunk no.]
- Recall Hnt [Hunt Group no.]
- DISA Incoming
- Call [extension no.]
- Transf [extension no.]
- Recall [trunk no.]
- HOLD Recall

## Handset Mute

### Description

While using the handset (not on speaker) during a phone conversation, you can press the MUTE key to block audio path to the other party -- you can still hear them, but they can't hear you. This feature is called "Handset Mute."

### Operation

1. To turn on Handset Mute while using the handset, press the MUTE key.
  - The MUTE indicator lamp (LED next to MUTE key) will flash.
  - The handset transmitter will be muted. You will still be able to hear the other party, but they can't hear you.
2. To turn off Handset Mute, do one of the following:
  - press the MUTE key again;
  - press HOLD to place the call on hold;
  - replace the handset on-hook; or
  - press the flashing FF-key to answer another call.
    - Note: This will drop the first call unless Key Bank Hold is enabled (FF1 2# 1# 9#).
  - The MUTE indicator lamp will stop flashing.

### Notes

**Headset Use.** The Handset Mute feature also works if you are using a headset on the phone to handle calls (#51 activates Headset mode).

**Speakerphone Use.** The MUTE key works the same as before (mutes the microphone) when you are on speaker. The MUTE lamp lights steadily when the microphone is muted, and flashes when the handset is muted.

**Handsfree Answerback.** The MUTE key enables or disables Handsfree Answerback the same as before. (Handsfree Answerback allows you to answer intercom calls on speaker, without picking up the handset. While the phone is idle, press the MUTE key to toggle between Handsfree Answerback On and Off. When the MUTE indicator lamp is unlit, Handsfree Answerback is ON. When the lamp is lit, Handsfree Answerback is OFF.)

**Offhook Monitoring.** This feature and Handset Mute can both be ON simultaneously, so that both the speaker and handset transmitters are muted (but the speaker and handset receivers still operate). For more information about Offhook Monitoring, see -16 of these Release Notes.

**Barge-Ins During Handset Mute.** If another phone barges in on your call while Handset Mute is ON, and you change to conference talk (but not by pressing HOLD), Handset Mute will remain ON.

***FF-Key/One-Touch Key Restriction.*** Handset Mute cannot be assigned to an FF-key or a one-touch (soft) key.

## Off-Hook Monitoring

**Description** Off-Hook Monitoring lets you put a call on speaker while the handset is off-hook. You can still communicate with the outside party via the handset, but you will also be able to hear the other party on the phone's speaker. He/she will only be able to hear what is spoken through your handset, however - audio will not be transmitted through your microphone.

- Operation**
1. During a call, press the ON/OFF key.
    - Another receiver path is established on the phone's speaker -- you can now hear the outside party on the speaker as well as in the handset.
    - Your phone's microphone is muted so that the outside party hears only what is spoken through your handset. (To mute handset transmission, press MUTE.)
  2. To turn off Off-Hook Monitor ("kill" the speaker but stay on the line with the outside party through the handset), press ON/OFF again.

## Analog Adapter

**Description** The Analog Adapter (VB-44100) consists of a base adapter and PC board which is installed on the underside of the phone. It is used to connect the 44-Series large-display phone to an analog device such as an SLT telephone, cordless phone, FAX machine, or modem. This allows the same phone line to be used to alternate between normal phone calls and analog communications. *(To install, see the instructions supplied with VB-44100).*

## Programming

to register the installation of the Analog Adapter on an extension...

**FF3 (ExtPort)# 51# (0 or 1)#**

Extension Port where  
VB-44225 Large-Display  
Phone is installed

**0=Analog Adapter is not  
installed on this extension.**  
1=Analog Adapter is  
installed on this extension.

to implement data security measures (interrupt tones, overrides)  
for the Analog Port...

**FF3 (ExtPort)# 52# (0 or 1)#**

Extension Port where  
VB-44225 Large-Display  
Phone is installed

**0=Disable data security on the  
Analog Adapter.**  
1=Enable data security on the  
Analog Adapter.

NOTE: This address will affect only the Analog Adapter, not the  
Large-Display phone itself.

## Operation

The first device to go off-hook will seize the line (off-hook is either lifting the handset or pressing the ON/OFF key). If the analog device goes off-hook first, the large-display phone will be unable to dial or go off-hook.

You can choose which device will ring by going off-hook at either the digital key telephone or the analog device and dialing **\*71**. The digital key telephone display will reflect "Analog port RING" or "Key Tel RING", depending on which device is selected - the default is "Key Tel RING".

You can still *answer* an incoming call from either device, regardless of which device is ringing. For example, if the analog device is ringing, you can pick up the call on the digital key telephone by going off-hook before the analog device does. Similarly, if the digital key telephone is ringing or has not answered a voice call, the analog device can pick up the call by going off-hook first.

You can program the \*71 ring select command into an FF key. Pressing the key toggles between “Analog Port RING” and “Key Tel RING”. When the analog port is set to ring, the FF key LED lights red. When the key telephone is set to ring, the LED is off.

## Notes

### *Phone Restrictions*

- The Analog Adapter will work on the large-display phone only (VB-44225).
- A dial-pulse SLT will not function on the analog port.
- Stutter Dial Tone (indicating Call-Forwarding mode, Do-Not-Disturb mode, etc.) will not function on an SLT connected to the Analog Adapter.
- An analog phone connected to the Analog Adapter cannot program or access speed dials.

### *Incoming Calls*

- You cannot program both devices to ring simultaneously.
- The “\*71” code will not work if the other device is in use.
- The “\*71” code will not work if FF3 (ExtPort)# 51# is set to “0”.
- If set to “Analog port RING”, the large-display phone will work like an SLT/OPX (no page announcements, no voice calls from other extensions, etc.).
- If the phone is in CF/DND (Call-Forward or Do Not Disturb), the phone will remain in CF/DND even if the ringing device is changed via the \*71 code.
- The incoming ring pattern for the analog device is the same as for the digital key telephone (determined by the Extension Ring Pattern in FF3 (ExtPort)# 39# (0-9)#). If this address is set to “0” (determined by CO), the analog device will automatically default to “1 second ON, 3 seconds OFF.”

***Ring Patterns Not Applicable to Analog Device.*** The following ring pattern addresses ***will not*** affect the analog device:

Analog Transfer Ring Pattern	FF1 2# 1# 31# (0-6)#
SLT DISA Ring Pattern	FF1 2# 1# 34# (0 or 1)#
Inbound Ring Pattern	FF2 (Trunk)# 17# (0-9)#

***Flash Interaction.*** Any disconnect signal sent to the analog port must be greater than the SLT Flash Control; otherwise the disconnect signal will be interpreted as a flash and the call will be placed on hold.

**Programming Addresses That Affect the Analog Device.** The following addresses will control the analog device, but will not affect the digital key telephone:

AEC Disconnect Duration	FF1 2# 1# 35# (0-15)#
SLT Flash Control	FF1 2# 1# 11# (0 or 1)#
SLT Onhook Flash Timer	FF1 3# 14# (0-6)#
AEC Disconnect or 1)#	FF3 (ExtPort)# 46# (0 or 1)#
Analog Port on Large-Display Phone or 1)#	FF3 (ExtPort)# 51# (0 or 1)#
Data Security on Analog Port or 1)#	FF3 (ExtPort)# 52# (0 or 1)#

## MSG (Message) Key

### Description

The MSG key on the VB-44225 Large-Display Phone adds the following functionality to the phone:

- **Auto-Callback.** If a callback message has been left by another extension, you can press the MSG key to place an automatic callback to the extension that sent the message. If more than one callback message has been received, pressing the MSG key will perform auto-callback in the order received.
- **Auto-Answer Voice Message.** You can press the MSG key to automatically access your voice mailbox. The phone will dial your voice mailbox and send access codes (if programmed) for retrieving messages.

### Programming

Auto-Callback is always enabled for large display phones. Use the following to enable the MSG key for Auto-Answer Voice Message.

to enable the MSG key for Auto-Answer Voice Message...

**FF3 (ExtPort)# 53# (0 or 1)#**

↑

Extension Port where  
VB-44225 Large-Display  
Phone is installed

↑

**0=Disable MSG key from returning  
a “Message Waiting”.**  
1=Enable MSG key for returning  
a “Message Waiting”.

**Operation To Program Voice Mailbox Access Codes into the MSG Key:**

Press PROG MSG [16-digit number] HOLD

The display will reflect “Regist Data”.

**To Confirm a Voice Mailbox Access Code Programmed into the Message Key..**

Press CONF MSG.

The programmed access code will be displayed.

**Notes**

***Operation With Message Waiting Indicator.*** The Message Waiting Indicator on the phone’s upper right corner will flash whenever a callback message or voice message has been received.

***Operation During Call States.*** The MSG key will work only when the phone is idle, receiving dial tone, or in Directory Mode (via select key).

***Operation If Phone Has Both a Callback Message from another Extension and a Voice Message.*** Messages are accessed in a First In, First Out order. If the callback message was received before the voice message, then pressing the MSG key will activate Auto-Callback first. Likewise, if the voice message was received before the callback message, pressing the MSG key will access your Voice Mailbox.

***Interaction with Tone-Calling Mode.*** If an Auto-Callback is placed to a phone that is in tone-calling mode (i.e., not voice-calling), that phone must answer or the message canceled before another message can be accessed.

***FF-Key Restriction.*** These MSG features cannot be assigned to an FF-key.

***Reprogramming the MSG key if Extension Number Digits is changed.*** If the DBS is reprogrammed to use a different extension numbering plan (i.e., changed from 2-digit to 3-digit extensions, 3-digit to 4-digit extensions, etc.), the Voice Mailbox Access Code must be reprogrammed into the MSG key.

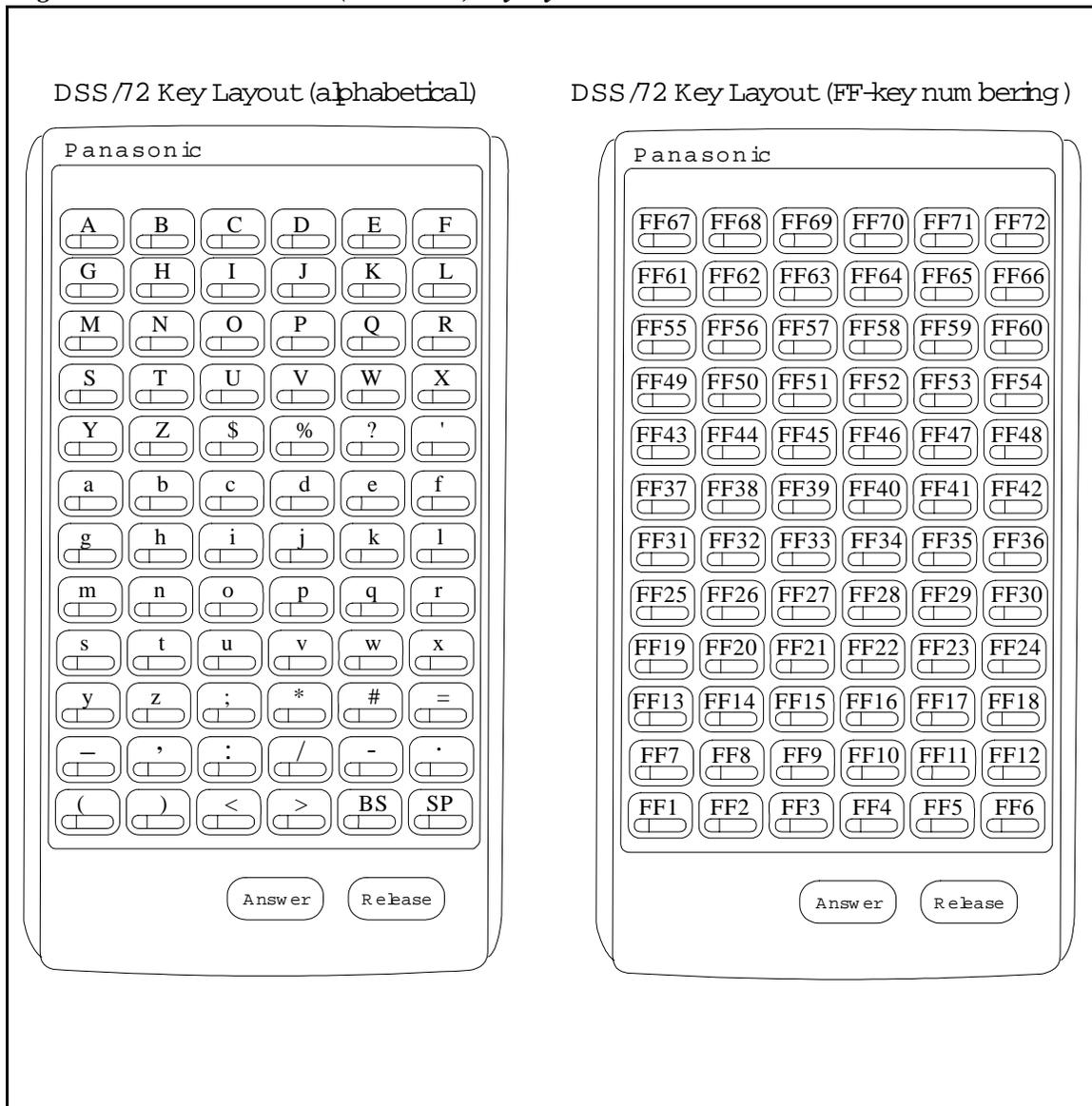
**DSS/72 Console - Key Arrangement****Description**

The keys on the DSS/72 Console (VB-44320) are arranged differently from the VB-43320 model. The DSS console has 6 columns x 12 rows of keys (not 8 columns x 9 rows as in the previous version). This affects the following:

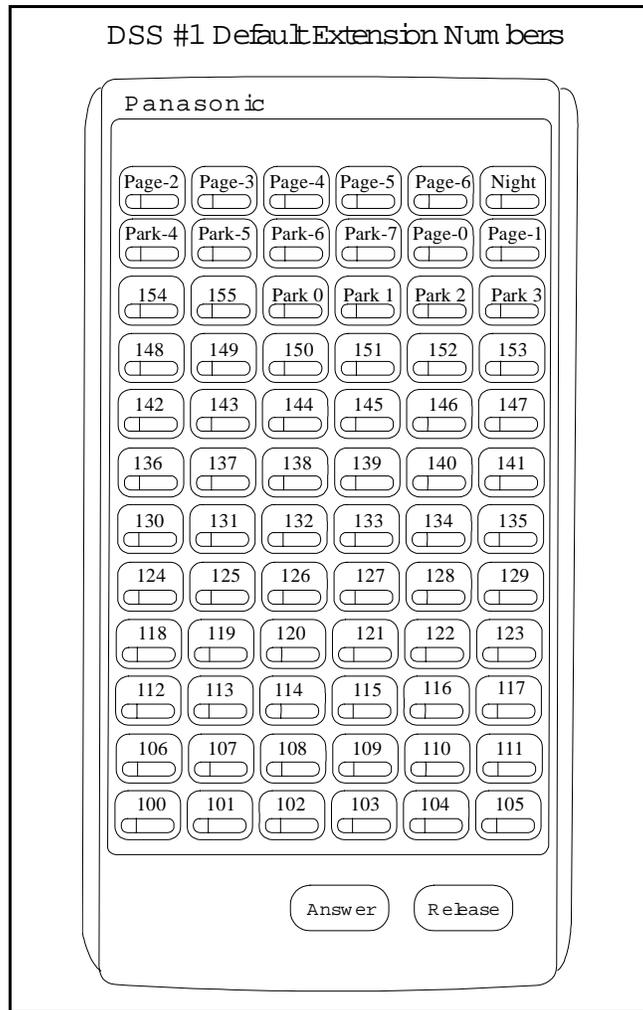
- **Name and Message Assignments (FF6 addresses).** The alphabetical arrangement of the keys is different.
- **FF-Keys.** The FF-keys on the DSS/72 console are numbered left-to-right, bottom row first.
- **DSS #1 Defaults.** The default extension number assignments on DSS #1 are different.

The DSS key arrangement is shown in Figures 7 & 8.

Figure A-7.DSS/72 Console (VB-44320) key layout



**Figure A-8.DSS/72 #1 Default Extension Numbers**



**Programming**

The DSS/72 console (DSS #1 ... DSS #4) is assigned to its extension number in the same manner as before:

**Terminal Type: FF3 (ExtPort)# 2# (11-14)#**

where...

- 11 is the first DSS console for the first attendant
- 12 is the second DSS console for the first attendant
- 13 is the first DSS console for the second attendant
- 14 is the second DSS console for the second attendant

The DSS/72 console's FF-keys are assigned feature codes in the same manner as before (the only difference is the numbering arrangement of FF-keys 1-72):

**FF Key Assignments: FF5 (DSSPort)# CONF (1-72)# (Code)#**

The Name and Message Assignment addresses work the same way as before on the DSS/72 console (the only difference is the placement of the keys when entering the characters of the text):

**Extension Name: FF6 1# (ExtPort)# CONF (10 char.)#**

**SSD Name: FF6 2# (SSD)# CONF (16 char.)#**

**PSD Name: FF6 3# (ExtPort)# (PSD)# CONF (16 char.)#**

**Absence Message: FF6 4# (5-9)# CONF (15 char.)#**

**Trunk Name: FF6 5# (Trunk)# CONF (6 char.)#**

**Hunt Group Name: FF6 6# (HuntGrp)# CONF (10 char.)#**

**CW/OHVA Reply: FF6 7# (1-5)# CONF (15 char.)#**

**DID Name: FF6 8# (1-200)# (1/2)# (0000-9999)# (6 char.)#**

**DNIS Name: FF6 9# (1-200)# (1/2)# (0000-9999)# (6 char.)#**

**Note:** If you use the 44-Series DSS/72 for Name and Message assignment, you should use the 44-Series phone for the attendant.

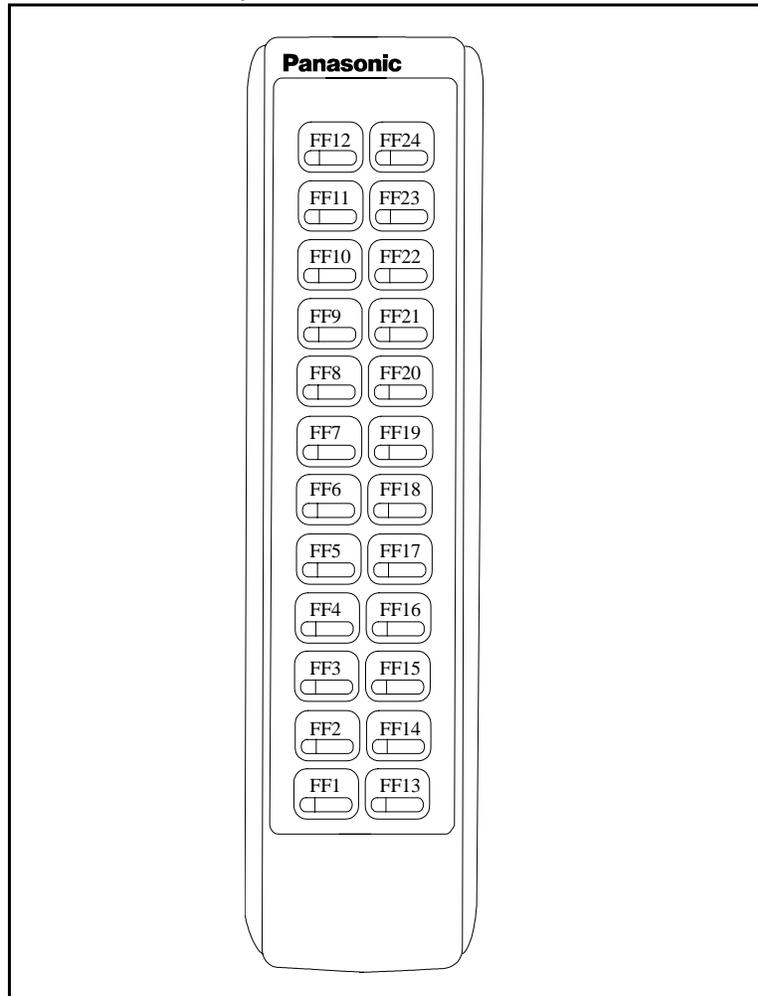
**Operation** The 44-Series DSS/72 operates the same as previous models.

## EM/24 - Key Arrangement

**Description** The keys on the EM/24 unit (VB-44310) are arranged differently from the VB-43310 model. The EM/24 unit has 2 columns x 12 rows of keys (not 3 columns x 8 rows as in the previous version). This affects the following:

- **FF-Keys.** The FF-keys on the EM/24 are numbered bottom-to-top, left column first.

The EM/24 key arrangement is shown in Figure 9.

*Figure A-9.EM/24 Unit (VB-44310) keys*

**Programming** The terminal type for the EM/24 is specified in the same manner as before:

**Terminal Type: FF3 (EM/24 ExtPort)# 2# (1-48)#**

The EM/24 unit is linked to its extension phone in the same manner as before:

**EM/24 Port Assignment: FF3 (EM/24 ExtPort)# 3# (phone ExtPort)#**

The EM/24's FF-keys are assigned feature codes in the same manner as before (the only difference is the numbering arrangement of FF-keys 1-24):

**FF Key Assignments: FF5 (ExtPort)# (1-24)# CONF (Code)#**

**Operation**

The 44-Series EM/24 operates the same as previous models.

## Speed-Dial Enhancements

### Description

The CPC-EX supports up to 500 SSD numbers (code range 000-499) for each system, and up to 10 PSD numbers (code range 900-909) for each extension.

With CPC-EX, you can chain up to 4 SSD codes together within a fifth SSD number. You can also chain up to 4 SSD or PSD codes together within a fifth PSD number. You can include both speed-dial codes and regular dialed numbers into the same speed-dial number.

The maximum length of any speed-dial number is still 16 digits.

### Programming

Assigning SSDs from programming mode:

to assign a System Speed Dial number from programming mode...

**FF10 1# (000-499)# (up to 16 digits)#**

3-Digit SSD Code

000 thru 499 = range for CPC-EX  
Version 1.0

Valid Entries (using a DSS console):

**0-9** (digits 0-9)  
**CONF** (to clear data)  
**< or BS** (to backspace)  
**>** (to forward-space)  
**P** (to insert a pause)  
**C** (to access trunk group)  
**AUTO** (to insert an SSD code)

*EXAMPLE: To chain together SSD code 000 (C9-Pause), SSD code 001 (10288-Pause), and SSD code 002 (555-1212) within SSD code 003...*

**FF10 1# 000# C9 P #**  
**FF10 1# 001# 10288 P #**  
**FF10 1# 002# 5551212 #**  
**FF10 1# 003# AUTO 000 AUTO 001 AUTO 002 #**

*EXAMPLE: To program SSD code 350 to access trunk group 81, then pause, then dial 555-1212...*

**FF10 1# 350# C 1 P 5551212#**

## Assigning SSDs from the attendant phone:

to assign a System Speed Dial number from the attendant phone...

1. Press **ON/OFF**.
2. Press **PROG**.
3. Press **AUTO**.
4. Enter the SSD code (000-499).
5. Enter the number to be dialed.
6. Press **HOLD**.
7. Press **ON/OFF**.

*EXAMPLE: To chain together SSD code 000 (C9-Pause), SSD code 001 (10288-Pause), and SSD code 002 (555-1212) within SSD code 003...*

1. Program SSD code 000 to dial "C9-Pause":
  - j. Press **ON/OFF**, then **PROG**, then **AUTO**.
  - k. Enter 000.
  - l. Press **CONF** (to access a trunk group), then 9.
  - m. Press **REDIAL** (to specify a "pause").
  - n. Press **HOLD**.
2. Program SSD code 001 to dial "10288-Pause".
  - a. Press **ON/OFF**, then **PROG**, then **AUTO**.
  - b. Enter 001.
  - c. Enter 10288.
  - d. Press **REDIAL** (to specify a "pause").
  - e. Press **HOLD**.
3. Program SSD code 002 to dial "555-1212".
  - a. Press **ON/OFF**, then **PROG**, then **AUTO**.
  - b. Enter 002.
  - c. Enter 5551212.
  - d. Press **HOLD**.
4. Program SSD code 003 to chain dial all digits in SSD 000, SSD 001, and SSD 002.
  - a. Press **ON/OFF**, then **PROG**, then **AUTO**.
  - b. Enter 003.
  - c. Press **AUTO**, 000, then **AUTO**, 001, then **AUTO**, 002.
  - d. Press **HOLD**.

## Assigning PSDs from programming mode:

to assign a Personal Speed Dial number from programming mode...

**FF10 2# (ExtPort)# (900-909)# (up to 16 digits)#**

3-Digit PSD Code

Valid Entries (using a DSS console):

**0-9** (digits 0-9)  
**CONF** (to clear data)  
**< or BS** (to backspace)  
**>** (to forward-space)  
**P** (to insert a pause)  
**C** (to access trunk group)  
**AUTO** (to insert an SSD or PSD code)

*EXAMPLE: To chain-dial SSD code 001 and PSD codes 901-902 together into PSD code 909 on extension port 033...*

**FF10 2# 033# 909# AUTO 001 AUTO 901 AUTO 902#**

*EXAMPLE: To program PSD code 906 on extension port 033 to access pooled trunk group 81, then pause, then dial 555-1212...*

**FF10 2# 033# 906# C 1 P 5551212#**

## Assigning PSDs from a key telephone:

to assign a Personal Speed Dial number from a key telephone...

1. Press **ON/OFF**.
2. Press **PROG**.
3. Press **AUTO**.
4. Enter the PSD code (90-99 or 900-909).
5. Enter the number to be dialed.
6. Press **HOLD**.
7. Press **ON/OFF**.

*EXAMPLE: To chain together SSD code 000 (C9-Pause) and SSD code 002 (555-1212) within PSD code 900...*

1. Press **ON/OFF**, **PROG**, **AUTO**.
2. Enter 900.
3. Press **AUTO**, 000, then **AUTO**, 002.
4. Press **HOLD**.

**Notes**

- 1) Chain-Dialing Limitations and Restrictions:

- You cannot chain-dial any PSD codes within an SSD number, because the system would not be able to choose which extension to take the PSD code from (the same PSD code might exist on multiple extensions).
  - You cannot “chain-within-a-chain”. For example:
    - SSD Code 001 = AUTO 002(will not dial out; returns busy tone instead)
    - SSD Code 002 = AUTO 003(will dial out)
    - SSD Code 003 = 555-1212(will dial out)(the above restriction applies to PSD codes as well)
  - You cannot chain-dial PSD or SSD codes if they are both included in each other’s speed-dial number. For example:
    - SSD Code 000 = AUTO 001(will not dial out; returns busy tone instead)
    - SSD Code 001 = AUTO 000(will not dial out; returns busy tone instead)
- 2) The programming address for SSD Display Restriction (FF1 2# 1# 5# [0 or 1]#) affects SSD codes 400-499.
- If disabled (i.e., set to “0”), the numbers assigned to SSD codes 400-499 will display during dialing. The default is “0”.
  - If enabled (set to “1”), the numbers assigned to SSD codes 400-499 will not display during dialing.
  - Numbers associated with SSD codes 000-399 will always display during dialing.

---

## Additional Serial Port on CPC Card

### Description

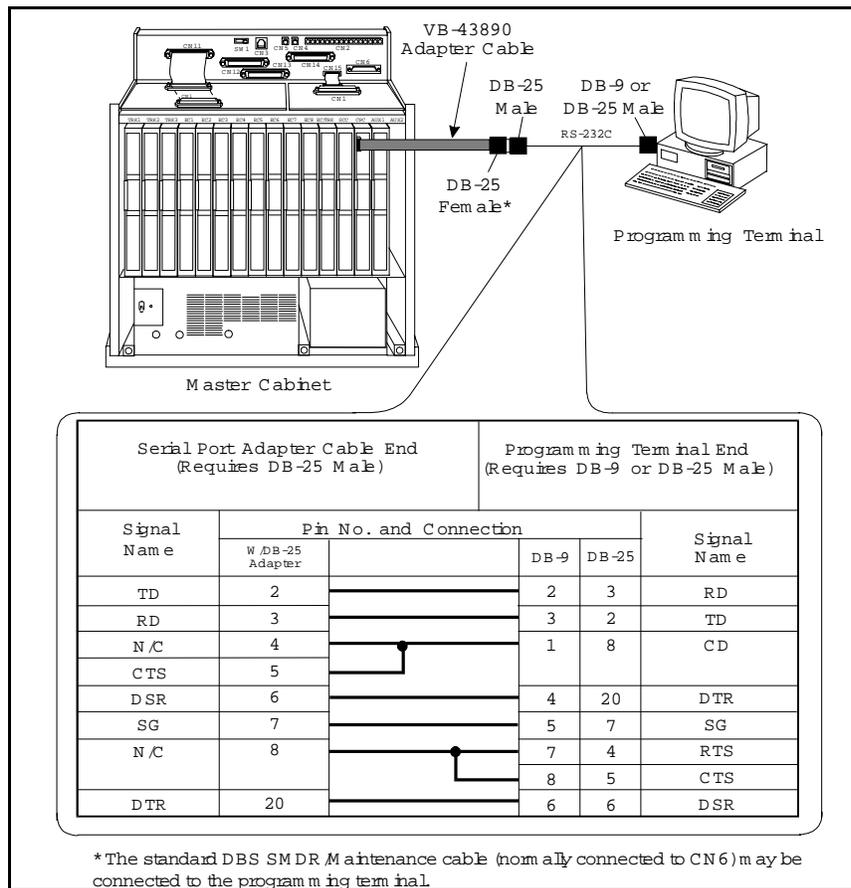
The CPC-EX card contains an on-board serial port (Serial Port 2) which can be used for Bus Monitor/ Remote Maintenance. This serial port (labeled CN5) is located just above the LEDs on the front of the card (see the illustration on -4). This additional serial port allows you to dial directly into the system for remote maintenance, without having to disconnect the SMDR cabling from the backplane serial port (Serial Port 1).

- Serial Port 1 (the backplane port) and Serial Port 2 have separate controls for baud rate, stop bit, parity, and data length

### Installation

Serial Port 2 requires the CPC-EX Serial Port Adapter Cable (VB-43890). This cable connects to Serial Port 2 via a 10-pin connector, and to a programming terminal via a DB25 connector.

Figure A-10.CPC-EX Serial Port 2



**Programming** The following addresses apply to CPC-EX Serial Port 2. (The addresses that control the SMDR port remain at FF1 2# 2# 1# thru 9#.)

to program the DBS to perform **Parity Check** on Serial Port 2...

**FF1 2# 2# 11# (0 or 1)#**

↑

0=Parity check OFF  
1=Parity check ON

to specify **Parity Count** for Serial Port 2 (if Parity Check is ON in the above address)...

**FF1 2# 2# 12# (0 or 1)#**

↑  
0=Odd parity count  
1=Even parity count

to specify **Baud Rate** for Serial Port 2...

**FF1 2# 2# 13# (1-4)#**

↑  
1=300 bits per second (bps)  
2=1200 bps  
3=4800 bps  
4=9600 bps

to specify **Stop Bit Length** for Serial Port 2...

**FF1 2# 2# 14# (1-2)#**

↑  
1=1 bit  
2=2 bits

to specify **Data Length** for Serial Port 2...

**FF1 2# 2# 15# (3 or 4)#**

↑  
3=7 bits  
4=8 bits

## Notes

- Serial Port 2 requires a special interface cable.
- Serial Port 2 can be used for Bus Monitor/Maintenance only. You must continue to use the backplane port (Serial Port 1) for SMDR.
- Port selections are made from the Attendant phone as follows:

	<i>to set Serial Port 1 for...</i>	<i>and Serial Port 2 for...</i>
dial #90	Bus Monitor/Maintenance	no output
dial #92	SMDR	Bus Monitor/Maintenance
dial #93	SMDR/Maintenance	no output

- When Serial Port 2 is used (i.e., #92 has been entered), the internal RAI modem cannot be accessed.

## T1 Networking

*NOTE: The following information covers T1 Networking features that directly affect CPC-EX operation. For detailed information regarding T1 Networking, see "T1 Networking Reference Guide", Part No.550X10001, Section 540.*

CPC-EX allows up to 4 DBS's to be connected together via T1 interface to form a DBS phone network. Such a network provides the following features:

- Network Extension to Extension Calling
- Call Forwarding to Network Extensions
- Paging across Network nodes
- Network Route selection
- Remote DBS CO Access
- SMDR Network Support
- Independent Node Attendant Assignment

These feature are described in greater detail in the following sections.

## Hardware Requirements

Each site (node) must contain the following hardware:

- CPC-EX
- SCC-B
- T1 Trunk Card
- T1 MDF
- T1 Sync Unit

- External CSU (not provided by Panasonic)

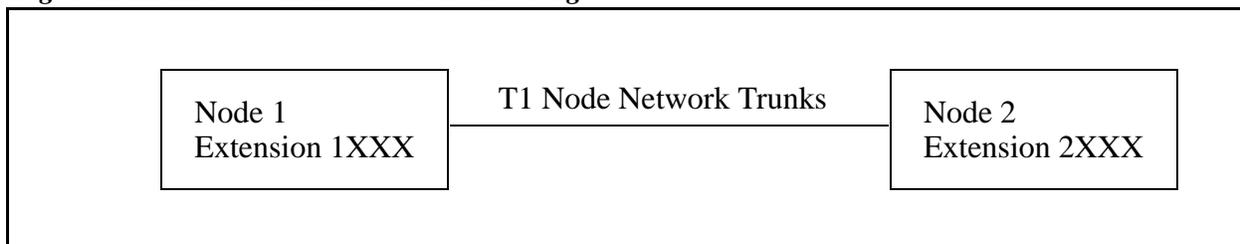
The maximum number of nodes which can be connected together is 4. Each node can be either a single or double DBS cabinet configuration. The connection between these systems is accomplished via T1 talk paths, with the quantity determined during installation.

## Network Extension to Extension Calling

Networked DBS's use a 4-digit extension numbering plan. The first digit determines the node being called. For example:

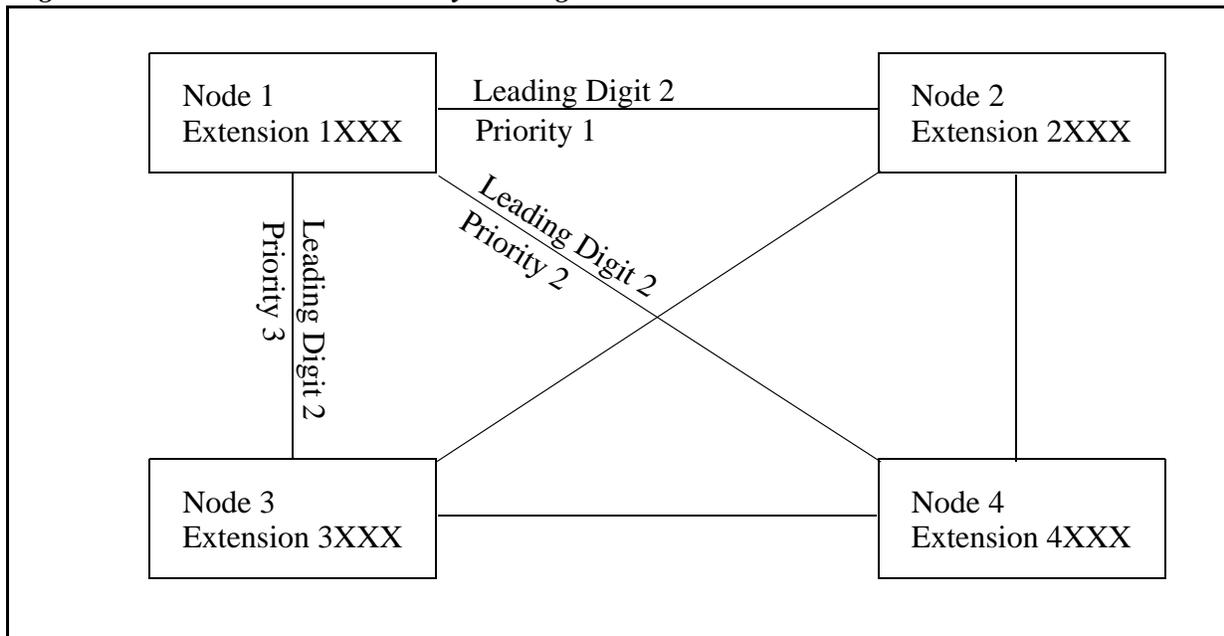
- Node 1 - leading digit 1
- Node 2 - leading digit 2
- Node 3 - leading digit 3
- Node 4 - leading digit 4

*Figure A-11.T1 Network Extension Numbering*



When an extension in one node is called via the intercom from an extension in a different node, the called extension rings - Intercom Voice Calling and OHVA do not work when calling from one node to another.

The DBS determines how to route the calls based on the network trunk group priorities established during programming. To allow optimum flexibility in a 4-node network, up to 3 different trunk group priorities can be established.

**Figure A-12.T1 Network Call Priority Routing**

## Call Forwarding to Network Extensions

Any call can forward to an extension on any node by assigning the targeted extension number in a Personal Speed Dial bin. To establish the call forward setting, the user follows normal call forwarding settings and uses the (AUTO)XXX personal speed dial number entry.

## Paging Across Network Nodes

Every node can allow or deny network paging for each class of service.

## Network Route Selection

An enhanced option is available for Forced Least Cost Routing to include network route selection. This option provides 50 6-digit entries which determine how dialed numbers are routed through the network for optimal cost performance.

For example, if Node 1 of a networked system is in the 201 area code and Node 2 is in the 212 area code, all calls from Node 1 to the 212 area code or surrounding area codes can be routed through the second node to the public network.

## Remote CO Access

End users in one node can also place calls manually through a distant node by dialing the node number followed by a trunk group (9).

## SMDR Network Support

Enhanced options are available in CPC-EX to support call accounting in networked systems. These options are:

Specifying the call record to be printed. A field has been added:

### **FF1 2# 2# 6# (2#) - Incoming, Outgoing, Network**

In the actual SMDR record output, network traffic will be indicated by the following record types:

W = CO Outgoing to Network  
w = CO Incoming from Network  
t = Network Transfer

The following data output is found in the extension number field:

#01-#64 - Network trunk number

## Independent Node Attendant Assignment

A central network operator can be assigned for Dial 0 access from any node. Each node can independently designate a network attendant. For example, Nodes 1, 2 & 3 can send Dial 0 calls to the attendant on Node 1, while Node 4 sends Dial 0 calls to its local attendant.

---

## Settings Modified for Networking

The following programming addresses have been modified to add parameters necessary for T1 networking. (*See the T1 Networking Reference Manual for complete instructions*)

## Extension Number Digits

### **Description**

The CPC-EX card allows a 4-digit extension numbering plan to be used on networked DBS systems. The first digit of the extension determines on which DBS the extension is located - for example, extension 1321 will be on DBS 1, while extension 2547 will be on DBS 2. Each DBS routes calls based on the leading digit of the dialed extension.

A DBS operating in a network environment must use the 4-digit extension numbering plan. Stand-alone (non-networked) DBS systems, however, must continue to use 2 or 3 digit extensions.

## Programming

to specify the length of extension numbers...

**FF1 2# 1# 12# (0-2)##**

0=2-digit numbering  
**1=3-digit numbering**  
 2=4-digit numbering

**V1.0** →

Note: An extra “#” must be entered to confirm the selection. (or press “\*” to cancel)

## SMDR Printing Mode 1: Outbound and Inbound

**Description** SMDR data sent to Serial Port 1 can now include Network Calls also.

## Programming

to specify the call type to be included in SMDR...

**FF1 2# 2# 6# (0 - 2)#**

0=Include outbound calls only  
**1=Include both inbound and outbound calls**  
 2=Include inbound, outbound, and network calls

**V1.0** →

## T1 Trunk Type

**Description** The setting for T1 Trunk Type now includes a parameter for E&M Network.

## Programming

to determine the type of trunk signaling for each T1 channel...

**FF1 8# 4# 6# (1-64) 1# (0-4)#**

Trunk Number (1-64)

0=Loop Start  
 1=Ground start 1 (used for all ground start trunks)  
 2=Ground start 2 (not currently used)  
 3=E&M  
**V1.0** → 4=E&M Network

### Extension Numbers

**Description** The address for extension number assignments has been modified to allow for 4-digit extensions.

to assign extension numbers to ports...

**FF3 (1-144)# 1# (10-69, 100-699, N100-N699)#**

Extension Port

Extension Number  
 Defaults: Port 1=10, 100, or 1000  
 Port 2=11, 101, or 1001  
 Port 3=12, 102, or 1002  
 etc.  
**Note:** N=DBS network node number 1-4

### Forced LCR/NRS

**Description** The address for Forced Least Cost Routing has been modified to include Network Node Route Selection (NRS).

### Programming

to set individual extensions for forced LCR/NRS...

**FF3 (1-144)# 4# (0/1)#**

↑  
Extension Port

↑  
**0=Disabled (no forced LCR/NRS)**  
1=Enabled (forced LCR/NRS)

Note: If not in a network (NRS is not enabled),  
then only forced LCR is enabled.

---

## Other Changes to Programming Addresses

Flexible Function Screen Soft-Key Assignments (FF1 2# 7# 25-39# (1-10)# (xxxxxxxx)#) and FF Key Assignments have been modified to allow up to 8-digit entries.

### Enhanced Programming Addresses

Enhanced programming addresses have been added to support T1 Networking. These addresses are applicable only in a networked environment and can be ignored in a stand-alone (non-networked DBS). Refer to the T1 Networking Reference Guide for detailed information.

---

## Modification to Toll Restriction Service

### Description

The program address for TRS Operator Access (FF7 1# 18#...) has been modified to allow an extension to dial “0+NXX” phone numbers, even if “0-only” dialing is denied.

Four settings are possible. See Table 4 for descriptions.

### Programming

**FF7 1# 18# (1-144)# (0-3)#**

↖                      ↖

Extension Port      See Table 5

*Table A-4. TRS Operator Access settings*

IF EQUAL ACCESS CODE FORMAT IS: 0 = Old Format (10XXX ONLY)			IF EQUAL ACCESS CODE FORMAT IS: 1 = Ver 1.0 Format (101XXXX ONLY)		
Setting	Action	Type of Call	Setting	Action	Type of Call
0 (default)	Restrict	“0-only” and “00-only” calls. “10XXX0-only” calls.	0 (default)	Restrict	“0-only” and “00-only” calls. “101XXXX0-only” calls.
	Allow/Deny	“0” + additional digits per TRS tables. “00” + additional digits per TRS tables. “01” + additional digits per TRS tables, Overseas Access Switch, and International Calls Switch. “10XXX0” + additional digits per TRS tables. “10XXX01” + additional digits per TRS tables, Overseas Access Switch, and International Calls Switch.		Allow/Deny	“0” + additional digits per TRS tables. “00” + additional digits per TRS tables. “01” + additional digits per TRS tables, Overseas Access Switch, and International Calls Switch. “101XXXX0” + additional digits per TRS tables. “101XXXX01” + additional digits per TRS tables, Overseas Access Switch, and International Calls Switch.
continued...					
1	Allow	“0-only” and “00-only” only calls. “10XXX0-only” calls.	1	Allow	“0-only” and “00-only” calls. “101XXXX0-only” calls.
	Allow/Deny	“0” + additional digits per TRS tables. “00” + additional digits per TRS tables. “01” + additional digits per TRS tables, Overseas Access Switch, and International Calls Switch. “10XXX0” + additional digits per TRS tables. “10XXX01” + additional digits per TRS tables, Overseas Access Switch, and International Calls Switch.		Allow/Deny	“0” + additional digits per TRS tables. “00” + additional digits per TRS tables. “01” + additional digits per TRS tables, Overseas Access Switch, and International Calls Switch. “101XXXX0” + additional digits per TRS tables. “101XXXX01” + additional digits per TRS tables, Overseas Access Switch, and International Calls Switch.

<b>IF EQUAL ACCESS CODE FORMAT IS: 0 = Old Format (10XXX ONLY)</b>			<b>IF EQUAL ACCESS CODE FORMAT IS: 1 = Ver 1.0 Format (101XXXX ONLY)</b>		
<b>Setting</b>	<b>Action</b>	<b>Type of Call</b>	<b>Setting</b>	<b>Action</b>	<b>Type of Call</b>
2	Restrict	“0-only” and “00-only” calls. “10XXX0-only” calls.	2	Restrict	“0-only” and “00-only” calls. “101XXXX0-only” calls.
	Allow	“0” + additional digits. “00” + additional digits. “10XXX0” + additional digits.		Allow	“0” + additional digits. “00” + additional digits. “101XXXX0” + additional digits.
	Allow/Deny	“01” + additional digits per Overseas Access Switch and International Calls Switch. “10XXX01” + additional digits per Overseas Access Switch and International Calls Switch.		Allow/Deny	“01” + additional digits per Overseas Access Switch and International Calls Switch. “101XXXX01” + additional digits per Overseas Access Switch and International Calls Switch.
3	Allow	“0-only” and “00-only” calls. “10XXX0-only” calls. “0” + additional digits. “00” + additional digits. “10XXX0” + additional digits.	3	Allow	“0-only” and “00-only” calls. “101XXXX0-only” calls. “0” + additional digits. “00” + additional digits. “101XXXX0” + additional digits.
	Allow/Deny	“01” + additional digits per Overseas Access Switch and International Calls Switch. “10XXX01” + additional digits per Overseas Access Switch and International Calls Switch.		Allow/Deny	“01” + additional digits per Overseas Access Switch and International Calls Switch. “101XXXX01” + additional digits per Overseas Access Switch and International Calls Switch.

## Notes

- The Operator Access address applies only to DBS systems using the (1995) NANP dialing plan (FF7 1# 17# 1#), and to TRS types 2-6 (TRS types 0 and 1 do not allow outbound dialing; TRS type 7 allows all dialing).
- If “0-only”, “00-only”, “10XXX0-only”, or “101XXXX0-only” calls are restricted (settings 0 or 2), the system will wait 6 seconds before automatically disconnecting the call. However, if the user dials additional digits within 6 seconds, the DBS will check other switches to determine whether to allow or deny the call.
- For all settings (0-3), the system will check the Equal Access Code Format switch (FF7 1# 21#...) if a CIC (carrier identification code) is dialed to reach a preferred inter-exchange carrier.
- For all settings (0-3), the system will check the international calls switches (FF7 1# 1# and FF7 1# 19#) if “01”, “10XXX01”, or “10XXXX01” is dialed.
- For settings 2 and 3, the system will not consider TRS settings for the trunk.

---

## Maximum Time Priority Route Tables

### Description

CPC-EX allows a maximum of 8 Time Priority Route Tables to be used during LCR programming. (CPC-AII/B allows a maximum of 16 Time Priority Route Tables. This number is reduced with CPC-EX since very few systems require more than 3 of these tables and the saved memory space will allow for a planned future enhancement.)

The DBS uses Time Priority Route Tables to route calls to the least expensive carrier based on the time of day the call is placed. The following program addresses use Time Priority Route Tables:

- FF8 1#...LCR Area Codes
- FF8 2#...LCR Office Codes
- FF8 4#...Special LCR Office Code Tables
- FF8 5#...Time Priority Route Tables

## ISDN Support

### Description

CPC-EX supports ISDN-PRI (Integrated Services Digital Network -- Primary Rate Interface). This ISDN Interface provides 23 voice channels ("B" channels) and a control channel ("D" channel) over a 4-wire circuit.

One program address, for Trunk Circuit Type (FF2 (trunk #)# 21#), has been modified to allow for ISDN. This modification is described below. In addition, CPC-EX provides several additional programming addresses to support ISDN. The additional program addresses, as well as additional detail on ISDN, are described in the *ISDN Reference Manual, Part No. 504X00301A, Section 530*.

### Hardware Requirements

The following are the minimum hardware requirements for ISDN support in the DBS:

- ISDN Trunk Card (VB-43571)
- CPC-EX (VB-43415)
- SCC-B (VB-43421) (with ROM 1.3 or later)
- MDF Card (VB-43562)
- Sync Unit (VB-43563)
- External CSU (not provided by Panasonic)

### Setting Modified for ISDN

### Programming

to specify the Trunk Circuit Type...

**FF2 (1-64)# 21# (0-5)#**

Trunk Number

0=Loop start  
1=Ground start  
2=DID  
3=T1  
4=CID  
5=ISDN



## Setting Modified for SMDR

Values have been redefined for the SMDR Start Timer. The following table shows the enhanced values.

**Note:** These values apply to CPC-EX only.

## Programming

to specify the SMDR Display Start Timer for CO Calls...

**FF1 2# 1# 2# (0-10)#**



0 = 4sec	6 = 16 sec
1 = 6 sec	7 = 18 sec
2 = 8 sec	8 = 20 sec
3 = 10 sec	9 = 25 sec
4 = 12 sec	10 = 30 sec
5 = 14 sec	

## Related Programming

- FF1 (System): SMDR Print
- FF1 (System): Parity Check
- FF1 (System): Odd/Even Parity
- FF1 (System): Baud Rate
- FF1 (System): Stop Bit Length
- FF1 (System): Data Length
- FF1 (System): Serial Port Flow Control (X On/ X Off)
- FF1 (System): SMDR Display Start Timer for CO Calls
- FF1 (System): SMDR Printing Mode 1: Outbound, Inbound, Network
- FF1 (System): SMDR Printing Mode 2: Long Distance and Local Calls
- FF1 (System): SMDR Printing Mode 3: Header Title
- FF3 (Extension) Station Message Detail Recorder (SMDR) Report

### Hardware Requirements

- A printer or external call accounting system is required to receive SMDR data.

### Considerations

- Unlike other CPC circuit cards, the CPC-EX supports two serial ports. Serial Port 1 is labeled **CN4** and is located on the backplane. Serial Port 2 is labeled **CN5** and is located on the front of the CPC-EX card. Serial Port 2 requires a special interface cable.
- Be sure to select the correct port to output SMDR data. From the Attendant’s phone:
  - dial **#90** to set Serial Port 1 (the backplane port) to output Bus Monitor/Maintenance and Serial Port 2 to no output.
  - dial **#92** to set Serial Port 1 to output SMDR and Serial Port 2 to output Bus Monitor/Maintenance data.
  - dial **#93** to set Serial Port 1 to output SMDR data and Serial Port 2 to no output.

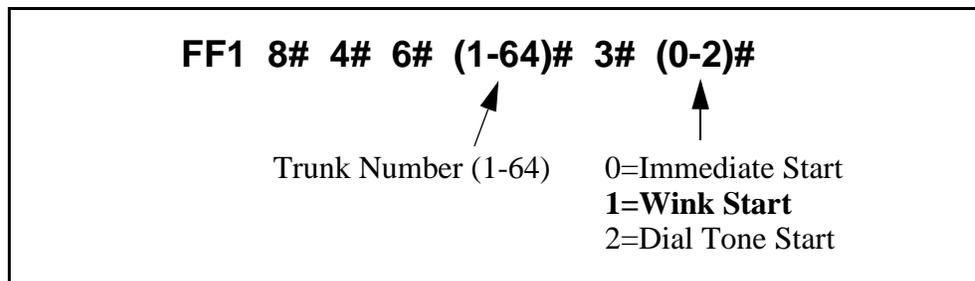
---

## Modification to T1 Signaling Types

**Description**      The default values for T1 Incoming and Outgoing Signal Types have been changed to set “Wink Start” as the default. This will allow easier programming of E&M trunks.

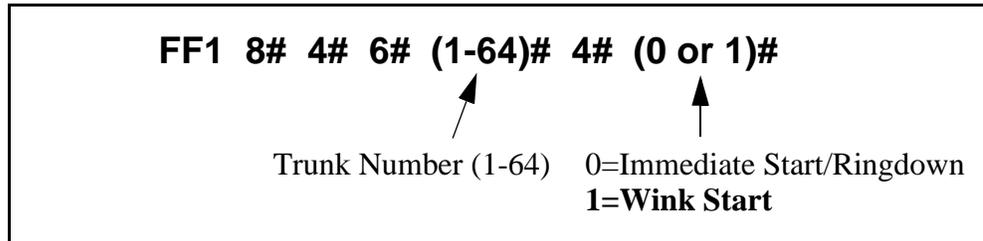
### Outgoing Signaling Type

#### Programming



## Incoming Signaling Type

### Programming



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## Appendix B CPC-EX 2.3.2 Updates

This section contains the CPC-EX Version 2.32 (and above) updates for the Panasonic DBS Digital Business System. It provides a description of each of the changes made to the Panasonic DBS Digital Business System software and hardware included in the system.

Note that every enhancement described here may *not* apply directly to T1. However, pay special attention to those that do as they may supersede information provided in the main chapters of this manual.

### Affected Items

The following hardware and software is affected:

VB-43415 with CPC-EX/BPU

VB-43415/A with CPC-EX/NPU

### Feature Changes

#### Summary

- Transfer Ringing heard During External Call Forward - No Answer on ISDN
- Station Message Detail Recording (SMDR) not Printing Long Distance Calls
- Caller-ID Automatic Number Identification (ANI) is not Sent to the Applications Programming Interface (API) when the Incoming Trunk is ISDN
- SLTA Repeating Digits
- Call Forward Outside Call was Recalled After Recall Timer expired
- System Speed Bins 257-500 Unavailable

#### Change Details

##### **Transfer Ringing heard During External Call Forward - No Answer on ISDN**

In the previous versions, if an incoming ISDN call was transferred to a station that was Call Forward Outside, the called party only heard transfer ringing when the outgoing call from the call forwarded station was answered. The calling party heard talking and transfer ringing. This problem is fixed in version 2.32

**Programming Considerations**

None

**Station Message Detail Recording (SMDR) not Printing Long Distance Calls**

Previously if FF1 2# 2# 7# was set for long distance only, when a long distance call was placed, it was not recorded by SMDR. SMDR now correctly prints out long distance calls.

**Programming Considerations**

FF1 2# 2# 7#

**Caller-ID Automatic Number Identification (ANI) is not Sent to the Applications Programming Interface (API) when the Incoming Trunk is ISDN**

In previous versions, Caller-ID (ANI) information was not sent to the API when the incoming trunk was ISDN. In this release, the Caller-ID (ANI) information is sent to the API.

**Programming Considerations**

None

**SLTA Repeating Digits**

Repeating digits were sent when an SLTA was used on a T1 circuit to call another T1-Network node, or to call out of another T1 node to a CO. If an SLTA was used, to call on a T1 circuit, to another node or out of another node to a CO trunk, once the call was established, if digits were sent from the SLTA, the digits would be repeated.

Example: If you dial 12345 from an SLT, the called party receives 1122334455)

This problem is corrected with this release.

**Programming Considerations**

None

**Call Forward Outside Call was Recalled After Recall Timer expired**

Previously, if an incoming call was transferred from Station A to Station B (which was set for Call Forward Outside), the following events occurred--when Station A's Call Forward No Answer Timer expired (after the call was

established with an outside CO), the outside connection was terminated, and the call was recalled to Station A. This problem is resolved in this version.

***Programming Considerations***

None

**System Speed Bins 257- 500 Unavailable**

Previously, if a System Speed Dial (SSD) number of 257 or greater was used, System Speed Dial numbers 001 through 256 were reprogrammed. System Speed Dial Bins 257 - 500 are now available.

***Programming Considerations***

None



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