Panasonic®

DBS
Digital Business System

Section 530 ISDN Reference Manual

for CPC-EX Version 2.3

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About This Manual

Overview

This manual provides an overview of the DBS ISDN Interface, along with installation and programming instructions when used with CPC-EX Version 2.2. **Appendix A provides updates for CPC-EX version 2.3 as well.**

The following table summarizes each chapter contained in this manual.

Chapter	Title	Purpose
1	Introduction to the ISDN Interface	Provides an overview of the DBS ISDN Interface, plus information on pre-installation requirements.
2	Installation	Provides step-by-step instructions on installing the DBS ISDN hardware.
3	Quick-Start Programming	Summarizes the programs that are essential to ISDN installation.
4	Programming Reference	Contains a complete list of ISDN programming commands. Each command description includes a list of the available options and the associated programming addresses.
A	CPC-EX 2.3 Updates	Contains a description of enhanced features and software corrections provided with CPC-EX 2.3.

Related Documents

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

Chapter 1. Introduction to the ISDN Interface

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

The following table summarizes the topics contained in this chapter.

Overview

Description of the ISDN Interface

The ISDN Interface is a Primary Rate Interface (PRI) digital trunk card that provides 23 voice channels (“B” channels) and a control channel (“D” channel) over a four-wire circuit.

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

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

Framing Options

The ISDN Interface takes an 8-bit sample from each of the 23 voice channels. These samples are grouped into 23 bearer time slots, and 1 data channel time slot.

Since each of the 24 time slots contains 8 bits, the number of sampling bits in each frame equals 192 (24 x 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 ISDN 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.

ESF Framing Formats

The extended superframe (ESF) format transmits the sampling frames in groups of 24 with 23B (bearer) channels at 64 Kbps and 1D (Data) channel at 64 Kbps. With the addition of 2.0 Kbps error checking CRC, 2.0 Kbps framing, and 4.0 Kbps datalink facility, the total capacity is 1.544 Mbps.

Pre-Installation Requirements

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

Ordering ISDN

The ISDN PRI provides a flexible method of providing access to the PSTN (Public Switched Telephone Network). Because of the numerous ways that an ISDN span can be configured by the CO, it is essential that the DBS configuration and the provisioning of the CO be compatible. The following tables are provided to identify the critical parameters that must be set for proper operation. The following tables provides a list of information that must be gathered about the CO as well as the type of information which the CO will need to know regarding the DBS system.

#	Information Needed from CO	Comments / Examples
1	Manufacture of CO and software load	5E11 (5ESS with load 11), DMS-100 with NA008
2	Is local dialing 7 digits, 10 digits or a combination.	
3	For long distance dialing does the CO want to see a leading “1” or not.	**1**-770-555-1212 or 770-555-1212
4	For international dialing does the CO want to see the leading “011” or not.	**011**-(15-digit number) or (15-digit number)

#	Typical Information for CO	Comments (Examples)
1	Installation Address	
2	Is this a new installation?	
3	Extended wiring beyond telephone room?	
4	Main telephone number of installation	
5	Contact person for installation	
	Contact for order information	
6	Billing name	
7	Billing address	
8	Long distance Carrier InterLATA (PIC)	This identifies the carrier who will provide long distance access.

9	Long distance Carrier (IntraLATA) (LPIC)	This identifies the carrier who will provide access for connections, which are not local but are still within the local LATA.
10	Request date of installation	
11	Facility type	ISDN PRI
12	Facility quantity	1 or 2 spans
NOTE THAT THE FOLLOWING ITEMS MUST BE PROVIDED ON A PER SPAN BASIS		
13	Signaling code	DS-1 (1.544 Mbps)
14	Line coding	B8ZS (Binary 8 Zero Substitution)
15	Framing Format	ESF (Extended Superframe)
16	Bearer configuration	Voice or Voice/Data (see note on page 1-3)
17	Quantity of B (bearer) channels	23B + 1D - Max. setting (must have 1 D channel) Or XB + 1D where X is 1-23 for a fractional span
18	Call type	Two Way
19	Quantity of phone numbers	Block of 20 numbers are generally assigned. With DID, note that the total number of telephone numbers will exceed the total number of B channels.
20	Number of incoming digits to CPE (Customer Premise Equipment – DBS)	Select 4 digits. This is used with DID.
21	ISDN PRI Protocol	5ESS Custom or DMS-100 Custom (NTNAPRI) or 4ESS
22	Glare Resolution	CPE yield to CO
23	Channel selection used by CO	High-to-Low B-channel selection
24	Source of Calling Party Number	Calling Party Number must be sourced by the CO.
25	Service Options	ANI – Automatic Numbering Indication Hunt group - MegaCom –only for 4ESS operation

Note: 1- If two spans are implemented, each must have a separate D channel, i.e. D channel sharing is NOT permitted.

Copy the following tables for each site and span that is to be installed. Complete all information and use for future reference. Note that certain parameters are shown with default values.

#	Information Needed from CO	Site Information
1	Manufacture of CO and software load	
2	Is local dialing 7 digits, 10 digits or a combination.	
3	For long distance dialing does the CO want to see a leading “1” or not.	
4	For international dialing does the CO want to see the leading “011” or not.	

#	Typical Information for CO	Site Information
1	Installation Address	
2	Is this a new installation?	
3	Extended wiring beyond telephone room?	
4	Main telephone number of installation	
5	Contact person for installation	
	Contact for order information	
6	Billing name	
7	Billing address	
8	Long distance Carrier InterLATA (PIC)	
9	Long distance Carrier (IntraLATA) (LPIC)	
10	Request date of installation	
1 1	Facility type	ISDN PRI
12	Facility quantity	

	Span Item	Master Cabinet Span	Slave Cabinet Span
13	Signaling code	DS-1	DS-1
14	Line coding	B8ZS	B8ZS
15	Framing Format	ESF	ESF
16	Bearer configuration	Voice or Voice/Data	Voice or Voice/Data
17	Quantity of B (bearer) channels		
18	Call type	Two-way	Two-way
19	Quantity of phone numbers		
20	Number of incoming digits to CPE (Customer Premise Equipment –DBS)	4 digits	4 digits
21	ISDN PRI Protocol		
22	Glare Resolution	CPE yield to CO	CPE yield to CO
23	Channel selection used by CO	High-to-Low B-channel selection	High-to-Low B-channel selection
24	Source of Calling Party Number	Calling Party Number sourced by the CO.	Calling Party Number sourced by the CO.
25	Service Options		

What You Must Purchase

The following items must be purchased to install ISDN.

DBS Equipment

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

Table 1-1. ISDN Hardware requirements for single-cabinet systems

CPC-EX (VB-43415)	***SCC-B*** (VB-43421)	***ISDN Trunk Card*** (VB-43571)	***MDF Card*** (VB-43562)	***Sync Unit*** (VB-43563)
1	1 (See Note 1.)	1 (See Note 3.)	1	1

Notes:

1. SCC-B with ROM 1.3 or later is required if the central office does not provide ISDN dial tone.
2. Fractional (per port) Assignments requires the VB-43511A version of the loop start trunk card.
3. COP 1.07 or later is required with ISDN PRI Trunk Card VB-43571 for CPC-EX 2.2.

Table 1-2. ISDN Hardware requirements for double-cabinet systems

ISDN Location	***CPC-EX*** (VB-43415)	***SCC-B*** (VB-43421) (See Note 1)	***ISDN Trunk Card*** (VB-43571) (See Note 3.)	***MDF Card*** (VB-43562)	***Sync Unit*** (VB-43563)	***ISDN Cable*** (VB-43564)	***Cable Kit*** (VB-43110) (See Note 2.)
ISDN in the Master	1	1	1	1	1	0	1
ISDN in the Slave	1	1	1	1	1	1	1
ISDN in both Master and Slave	1	1	2	2	1	1	1

Notes:

1. SCC-B with ROM 1.3 or later is required if the central office does not provide ISDN dial tone.
2. Version 1.2 of the Cable Kit is required for ISDN.
3. Fractional (per port) Assignments requires the VB-43511A version of the loop start trunk card.
4. COP 1.07 or later is required with ISDN PRI Trunk Card VB-43571 for CPC-EX 2.2.

CSU Equipment

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

The CSU equipment must meet the specifications contained in Table 1-3. See page 2-12 for instructions on installing the CSU.

Table 1-3. CSU equipment required for ISDN

Item	Specifications	Vendors
CSU	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.	The following CSUs have been used successfully with the DBS ISDN. Kentrox Kentrox T-SERV II ® or Kentrox T-SMART ® (Kentrox can be contacted at 1-800-733-5511.)
CSU Cabling	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 ISDN MDF card. **For Kentrox CSUs** 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. To simplify installation, you can order the prefabricated cables shown in the "Vendors" column. If you fabricate your own ISDN cables, you should use 24 AWG stranded cable that includes shielding for each pair. For best results, use the cable listed under "Vendors." **For Premier CSUs** 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 ISDN MDF card and to four screw-down terminals on the CSU. For both cables, use 24 AWG stranded cable that includes shielding for each pair. For best results, use the cable listed under "Vendors."	**For Kentrox CSUs** 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. If you fabricate your own cables, use 24 AWG stranded cable that includes shielding for each pair. Belden (Richmond, IN) offers stranded cable that complies with these specifications. Order part number 8723.

Chapter 2. Installation

This section describes guidelines and procedures for installing the ISDN Interface. Once the ISDN Interface is installed, refer to Chapter 3 - "*Quick Start Programming*" or Chapter 4 - "*Programming Reference*" for programming instructions.

This chapter covers the following topics.

Guidelines

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

Hardware Requirements

- The system configuration determines what cards and cables must be purchased for ISDN. See “DBS Equipment” on page 1-8 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 1-9 for details on purchasing CSUs.

Maximums

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

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

Table 2-1. EC/TRK slot usage for ISDN

System Size	EC/TRK Slot Usage for ISDN	
	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 ISDN* can be used when fewer than 23 ISDN trunks are needed. Fractional ISDN allows you to use only a portion of the 23 channels provided on the ISDN card.

- Fractional ISDN *per port* assignments require the VB-43511A version of the loop start trunk card. The older VB-43511 version may be used with fractional ISDN but requires that the trunks be assigned in blocks of 8.

- Though each ISDN Interface provides 23 trunk channels, ISDN trunks do not increase the overall trunk capacity of the DBS. Each ISDN channel subtracts from the total number of analog trunks that can be installed. The number of analog trunks that can be used are decremented in quantities of 1 for each ISDN channel user.

  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." ISDN 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 ISDN and analog trunks is installed, and you must also specify how many ISDN channels are used.

- Fractional ISDN *per port* assignments require the VB-43511A version of the loop start trunk card. The older VB-43511 version may be used with fractional ISDN but requires that the trunks be assigned in blocks of 8.

Table 2-2. ISDN and analog trunk assignments, DBS 40

Trunk Number	Fractional ISDN using 16 Channels	Fractional ISDN using 8 Channels
1 ↓ 8	ISDN channel 16 ↓ ISDN channel 9	Analog trunk 1 ↓ Analog trunk 8
9 ↓ 16	ISDN channel 8 ↓ ISDN channel 1	ISDN channel 8 ↓ ISDN channel 1
Note: Since the DBS 40 supports a maximum of 16 trunks, all 23 channels of the ISDN cannot be used.		

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

Trunk Number	23-Channel ISDN	Fractional ISDN using 16 Channels	Fractional ISDN using 8 Channels
1	Analog trunk 1	Analog trunk 1	Analog trunk 1
2 ↓ 8	ISDN channel 23 ↓ ISDN channel 17	Analog trunk 2 ↓ Analog trunk 8	Analog trunk 2 ↓ Analog trunk 8
9 ↓ 16	ISDN channel 16 ↓ ISDN channel 9	ISDN channel 16 ↓ ISDN channel 9	Analog trunk 9 ↓ Analog trunk 16
17 ↓ 24	ISDN channel 8 ↓ ISDN channel 1	ISDN channel 8 ↓ ISDN channel 1	ISDN channel 8 ↓ ISDN channel 1

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

Trunk Number	23-Channel ISDN	Fractional ISDN using 16 Channels	Fractional ISDN using 8 Channels
1 ↓ 8	Analog trunk 1 ↓ Analog trunk 8	Analog trunk 1 ↓ Analog trunk 8	Analog trunk 1 ↓ Analog trunk 8
9 10 ↓ 16	Analog trunk 9 ISDN channel 23 ↓ ISDN channel 17	Analog trunk 9 ↓ Analog trunk 16	Analog trunk 9 ↓ Analog trunk 16
17 ↓ 24	ISDN channel 16 ↓ ISDN channel 9	ISDN channel 16 ↓ ISDN channel 9	Analog trunk 17 ↓ Analog trunk 24
25 ↓ 32	ISDN channel 8 ↓ ISDN channel 1	ISDN channel 8 ↓ ISDN channel 1	ISDN channel 8 ↓ ISDN channel 1

Trunk Assignments for Double-Cabinet Systems

- When ISDN is used in a two-cabinet system, the number of ISDN channels that can be assigned in each cabinet depends on the master/slave designation.
- Fractional ISDN *per port* assignments require the VB-43511A version of the loop start trunk card. The older VB-43511 version may be used with fractional ISDN but requires that the trunks be assigned in blocks of 8.

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

Table 2-5. Maximum ISDN assignments for two-cabinet systems

System Size	Master	Slave
DBS 40 + DBS 40	8 analog trunks	16 ISDN trunks
DBS 72 + DBS 72	16 analog trunks	23 ISDN trunks 1 analog trunk
DBS 96 + DBS 40	23 ISDN trunks 9 analog trunks	16 ISDN trunks
DBS 96 + DBS 72	23 ISDN trunks 9 analog trunks	23 ISDN trunks 1 analog trunk
DBS 96 + DBS 96	23 ISDN trunks 9 analog trunks	23 ISDN trunks 9 analog trunks

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

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

Trunk Number	Master Cabinet	Slave Cabinet
1 ↓ 8	Analog trunk 1 ↓ Analog trunk 8	N/A
9 ↓ 16	N/A	ISDN channel 16 ↓ ISDN channel 9
17 ↓ 24	N/A	ISDN channel 8 ↓ ISDN channel 1

Table 2-7. ISDN and analog trunk assignments, DBS 72 + DBS 72 (23-channel ISDN in the slave)

Trunk Number	Master Cabinet	Slave Cabinet
1 ↓ 8	Analog trunk 1 ↓ Analog trunk 8	N/A
9 ↓ 16	Analog trunk 9 ↓ Analog trunk 16	N/A
17 18 ↓ 24	N/A	Analog trunk 1 ISDN channel 23 ↓ ISDN channel 17
33 ↓ 40	N/A	ISDN channel 16 ↓ ISDN channel 9
41 ↓ 48	N/A	ISDN channel 8 ↓ ISDN channel 1

Table 2-8. ISDN and analog trunk assignments, DBS 96 + DBS 40 (23-channel ISDN in the master; 16-channel ISDN in the slave)

Trunk Number	Master Cabinet	Slave Cabinet
1 ↓ 8	Analog trunk 1 ↓ Analog trunk 8	N/A
9 10 ↓ 16	Analog trunk 9 ISDN channel 23 ↓ ISDN channel 17	N/A
17 ↓ 24	ISDN channel 16 ↓ ISDN channel 9	N/A
25 ↓ 32	ISDN channel 8 ↓ ISDN channel 1	N/A
33 ↓ 40	N/A	ISDN channel 16 ↓ ISDN channel 9
41 ↓ 48	N/A	ISDN channel 8 ↓ ISDN channel 1

Table 2-9. ISDN and analog trunk assignments, DBS 96 + DBS 72 (23-channel ISDN in the master; 23-channel ISDN in the slave)

Trunk Number	Master Cabinet	Slave Cabinet
1 ↓ 8	Analog trunk 1 ↓ Analog trunk 8	N/A
9 10 ↓ 16	Analog trunk 9 ISDN channel 23 ↓ ISDN channel 17	N/A
17 ↓ 24	ISDN channel 16 ↓ ISDN channel 9	N/A
25 ↓ 32	ISDN channel 8 ↓ ISDN channel 1	N/A
33 34 ↓ 40	N/A	Analog trunk 1 ISDN channel 23 ↓ ISDN channel 17
41 ↓ 48	N/A	ISDN channel 16 ↓ ISDN channel 9
49 ↓ 56	N/A	ISDN channel 8 ↓ ISDN channel 1

Table 2-10. ISDN and analog trunk assignments, DBS 96 + DBS 96 (23-channel ISDN in the master; 23-channel ISDN in the slave)

Trunk Number	Master Cabinet	Slave Cabinet
1 ↓ 8	Analog trunk 1 ↓ Analog trunk 8	N/A
9 10 ↓ 16	Analog trunk 9 ISDN channel 23 ↓ ISDN channel 17	N/A
17 ↓ 24	ISDN channel 16 ↓ ISDN channel 9	N/A
25 ↓ 32	ISDN channel 8 ↓ ISDN channel 1	N/A
33 ↓ 40	N/A	Analog trunk 1 ↓ Analog trunk 8
41 42 ↓ 48	N/A	Analog trunk 9 ISDN channel 23 ↓ ISDN channel 17
49 ↓ 56	N/A	ISDN channel 16 ↓ ISDN channel 9
57 ↓ 64	N/A	ISDN channel 8 ↓ ISDN channel 1

Installation Procedures

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

If you're installing ...	Use this procedure...
A ISDN in a single cabinet	"Installing an ISDN in a Single Cabinet" (page 2-14)
One ISDN in a double cabinet, with the ISDN located in the master	"Installing an ISDN in a Single Cabinet" (page 2-14)
One ISDN in a double cabinets, with the ISDN located in the slave	"Installing an ISDN in a Double Cabinet with the ISDN in the Slave" (page 2-21)
ISDNs in both the master and slave	"Installing an ISDN in a Double Cabinet with ISDNs in the Master and Slave" (page 2-23)

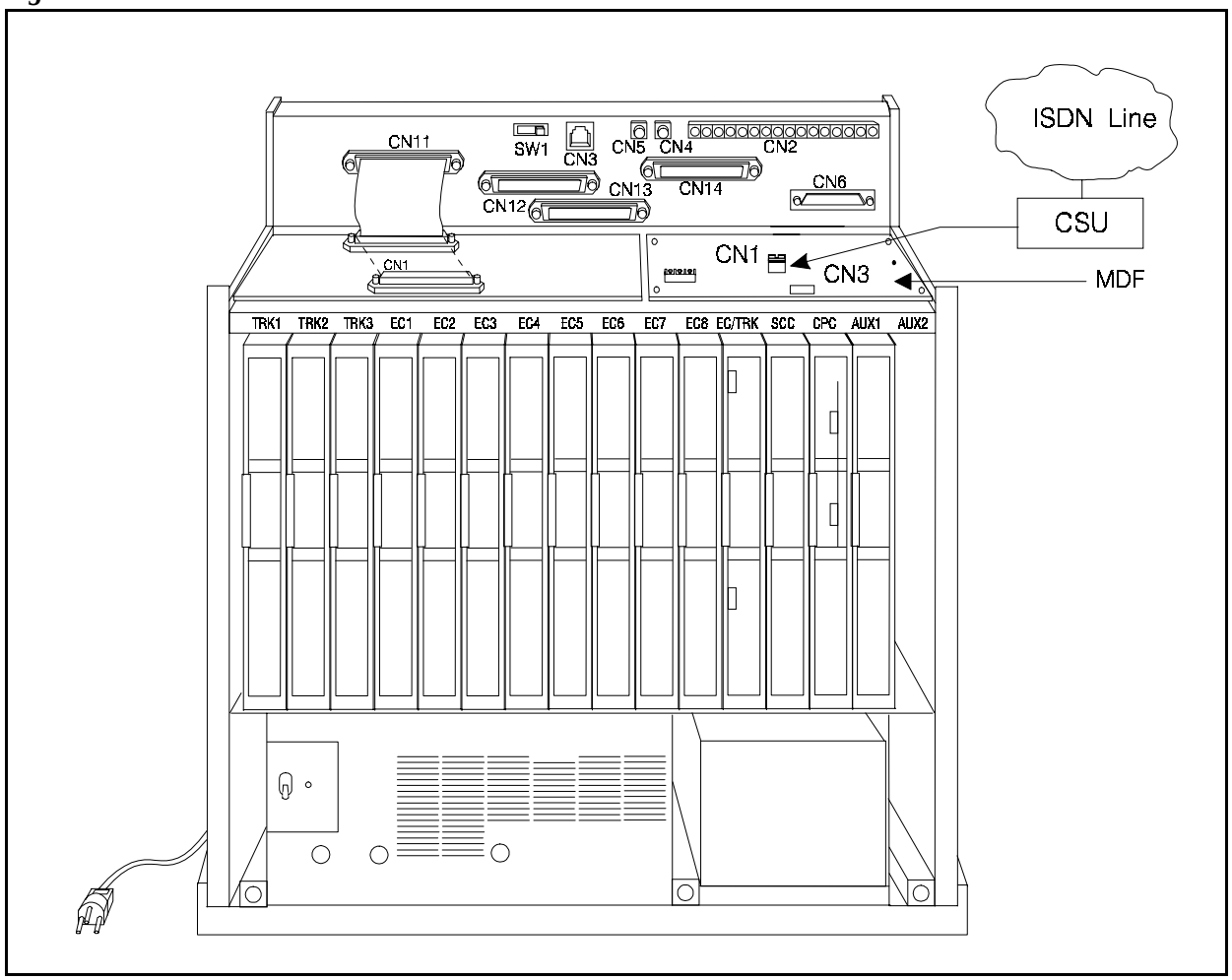
Installing the CSU

The following instructions explain how to install the CSU. See "CSU Equipment" on page 1-9 for specifications on CSUs and CSU cabling.

Note: The CSU can be powered locally or through the CO line. Also, a locally powered 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 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	4-16
ISDN Trunk Type	4-28

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 ISDN 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 an ISDN in a Single Cabinet

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

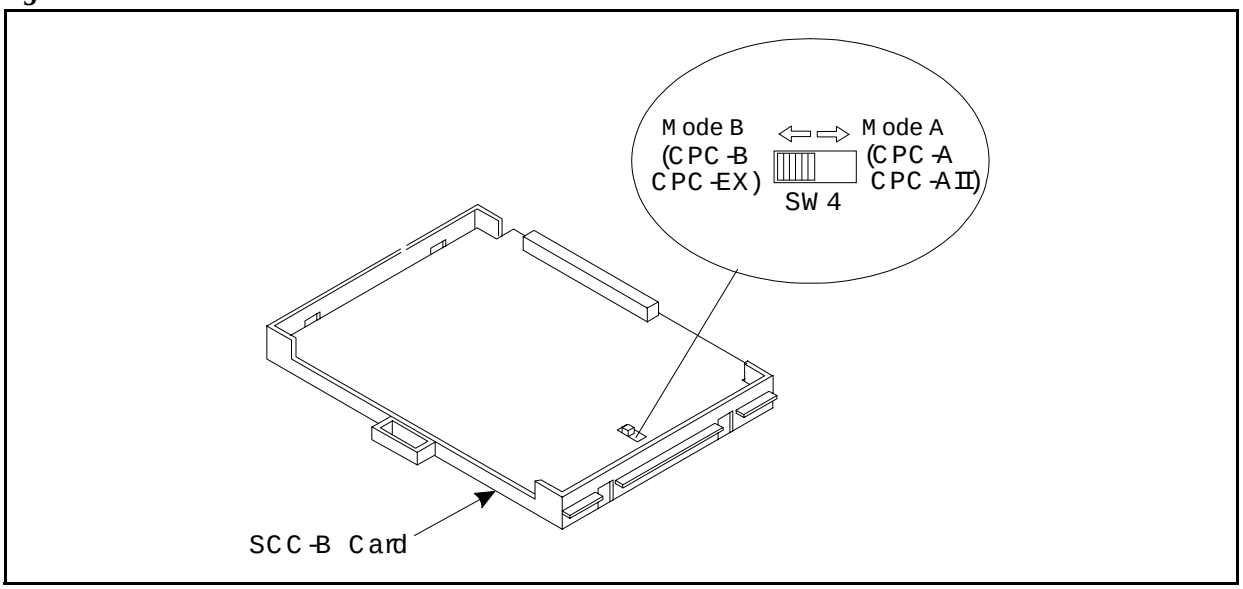
If only one ISDN is installed in a two-cabinet system, it must be installed in the cabinet specified in Table 2-1 on page 2-3.

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

1. Before beginning ISDN installation, perform the "ISDN Function Reset" command (FF1 9# 1# 1#). ***This command must be issued before the ISDN can be installed properly.***

2. Check SW4 on the SCC-B card. Be sure it is set to "Mode B."

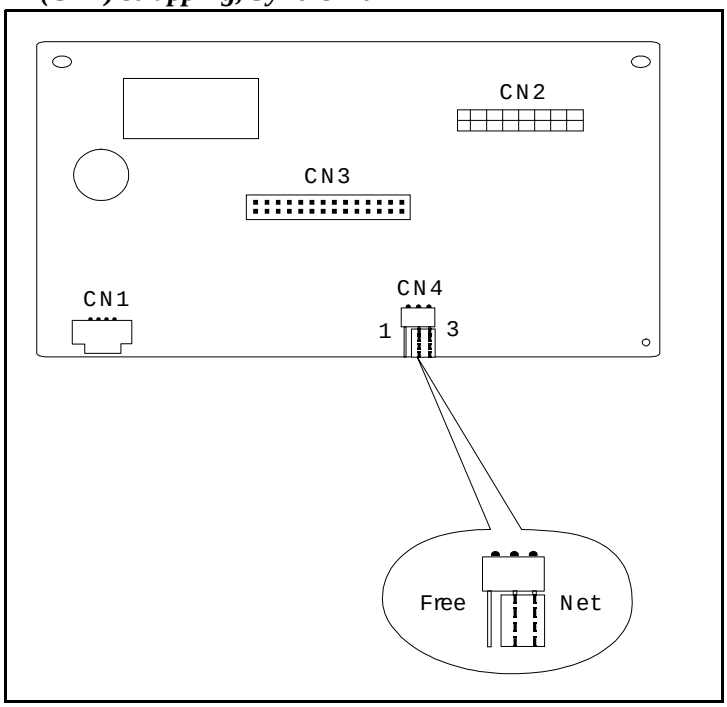
Figure 2-2. SCC-B Switch 4



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 ISDN card with the signaling provided by the public network.

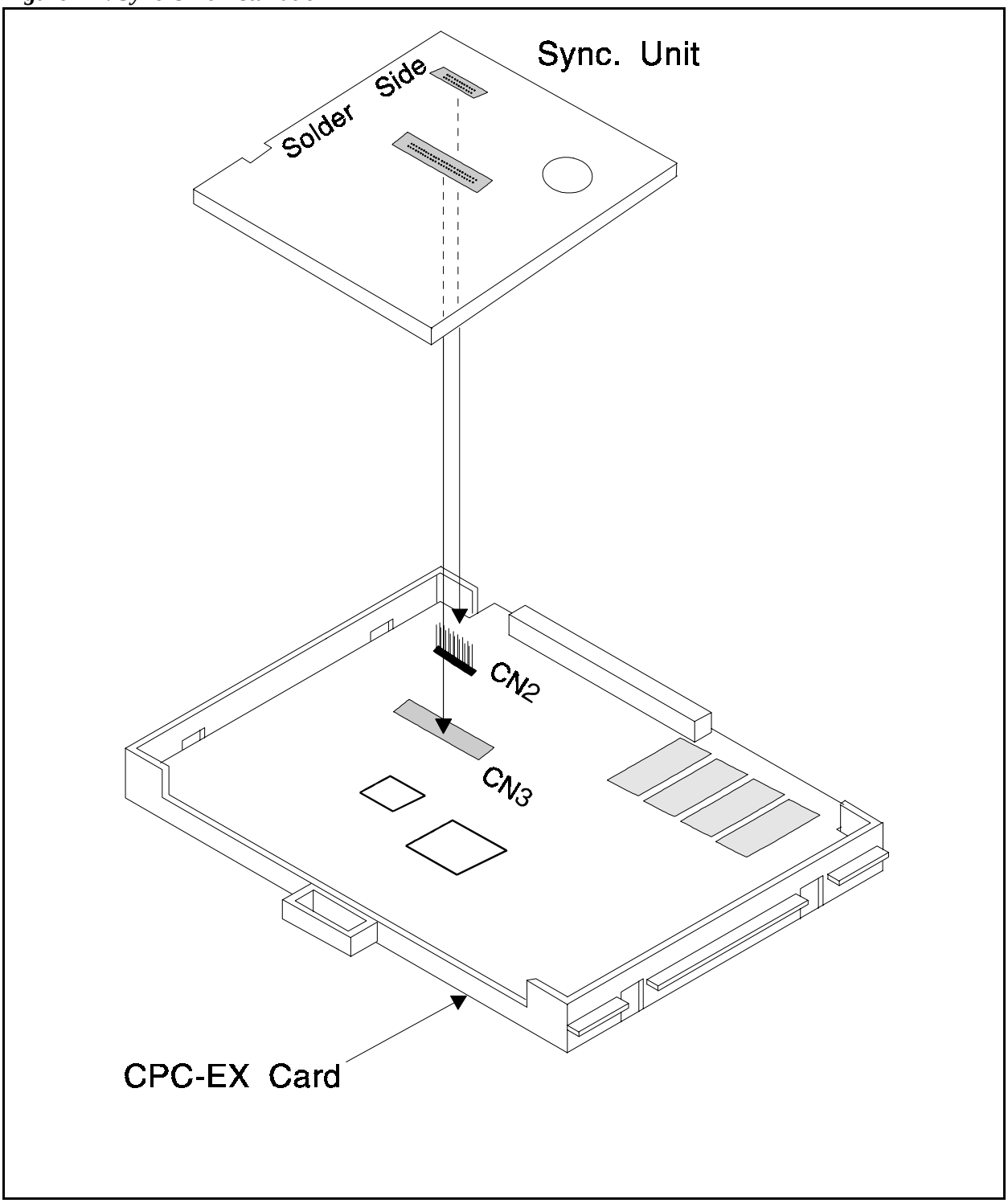
Figure 2-3. Connector 4 (CN4) strapping, Sync Unit



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

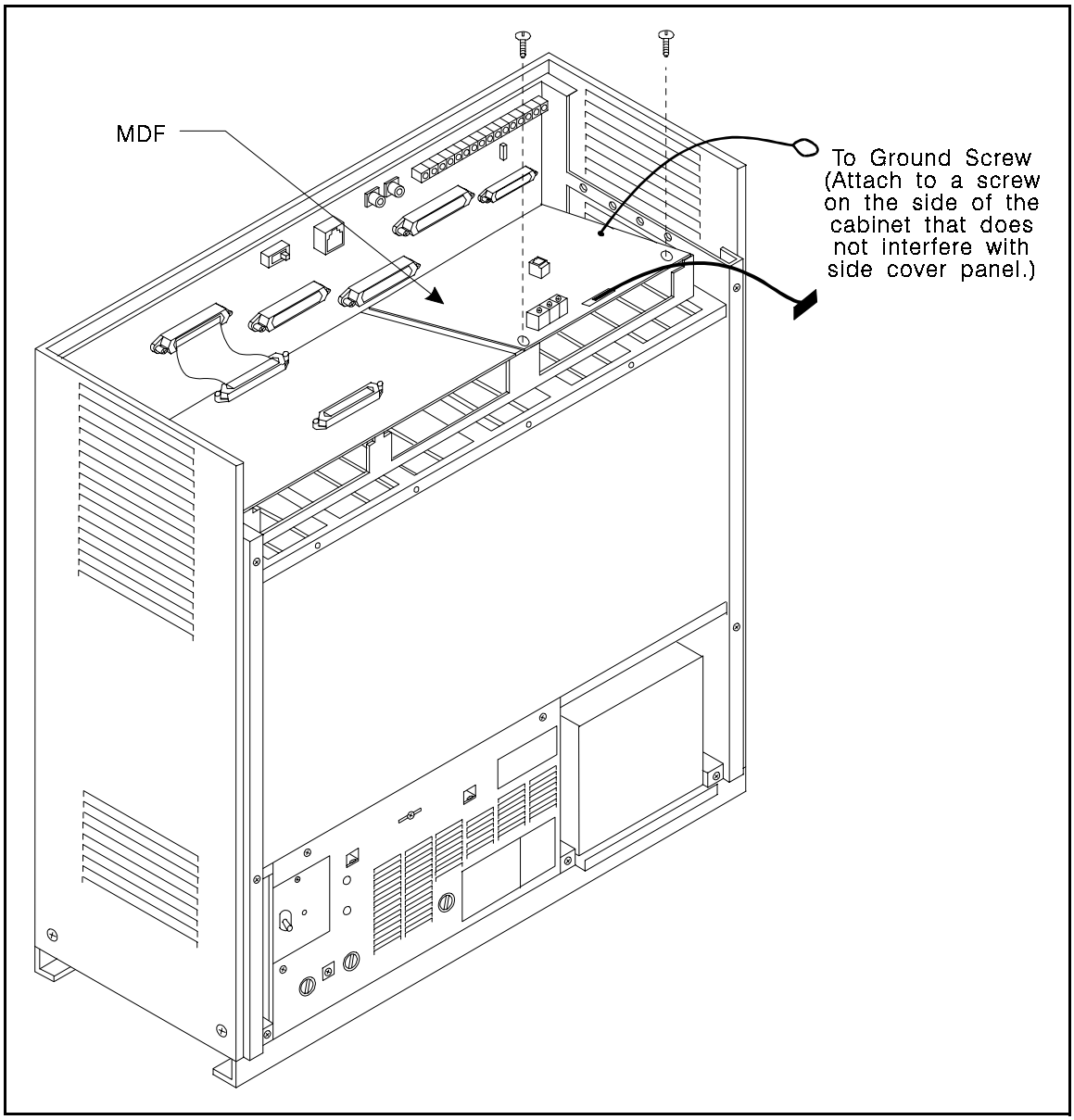
Note: Before attaching the Sync Unit, insert the three spacers provided with the unit and remove the jumpers from CN2 of the CPC-EX card.

Figure 2-4. Sync Unit installation



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

Figure 2-5. MDF card installation



6. Set SW1 on the ISDN 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.

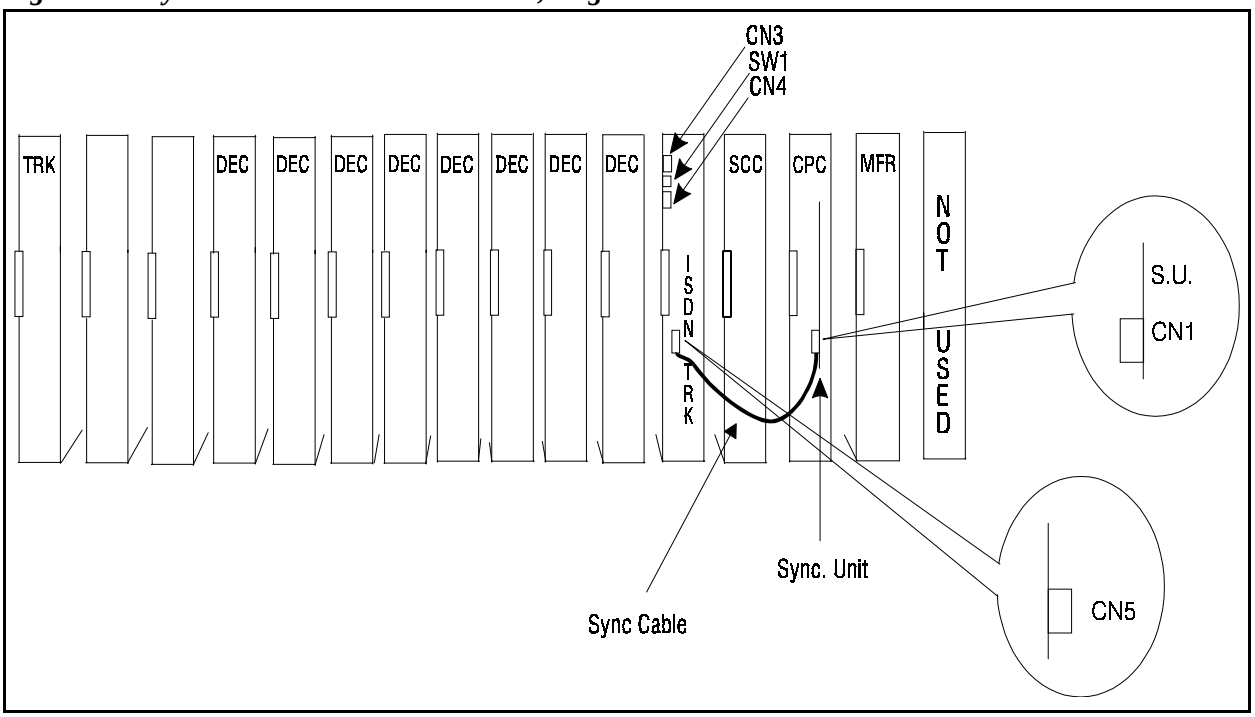
Table 2-11. Switch settings for SW1 on the ISDN card

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 ISDN card in the “EC/TRK” slot

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

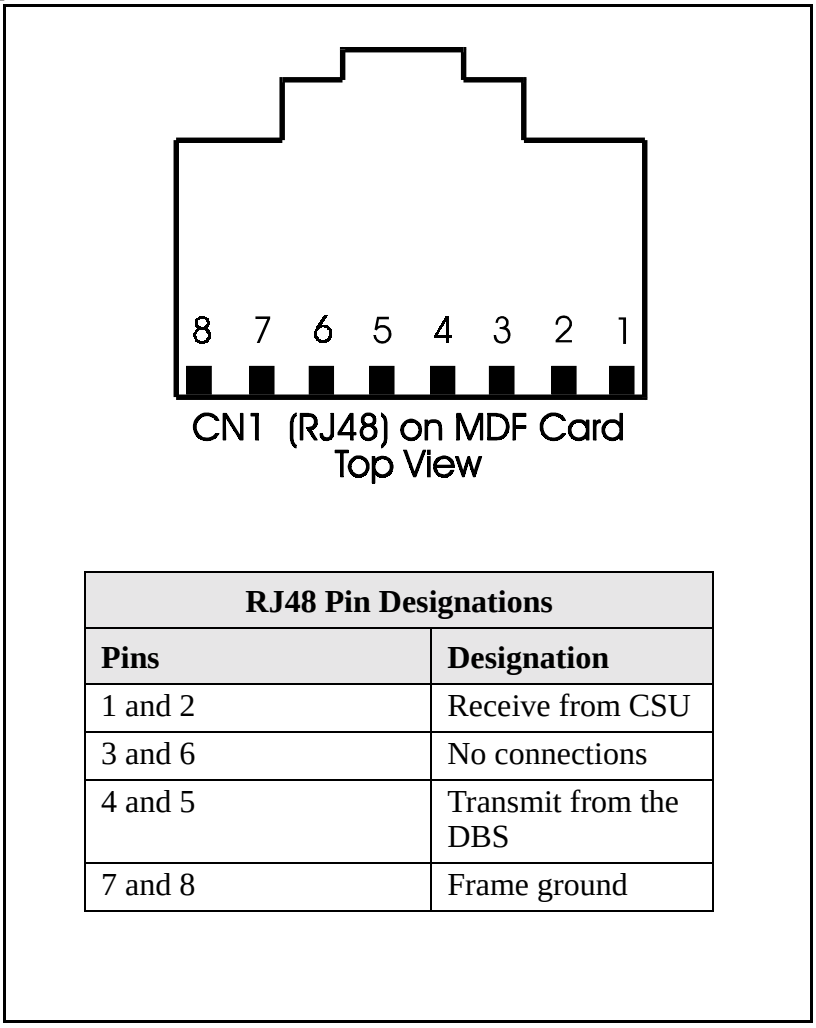
Figure 2-6. Sync Unit and ISDN connection, single-cabinet installation



9. Connect the cable attached to CN3 on the MDF card to CN3 on the ISDN card (Figure 2-8).

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

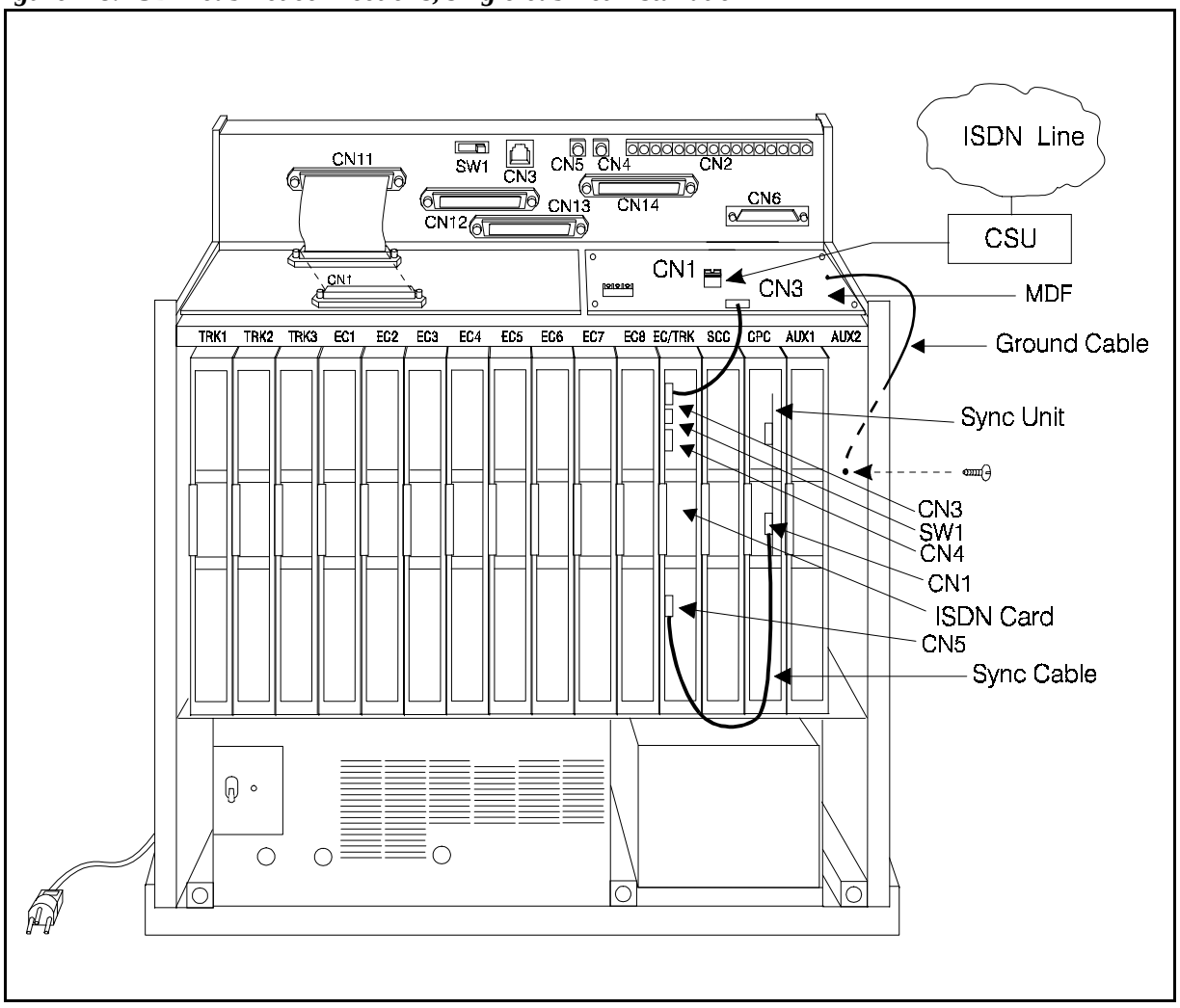
Figure 2-7. RJ48 pinouts, CN1 connector



RJ48 Pin Designations	
Pins	**Designation**
1 and 2	Receive from CSU
3 and 6	No connections
4 and 5	Transmit from the DBS
7 and 8	Frame ground

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

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



Installing ISDN in a Double Cabinet with the ISDN in the Slave

1. Before beginning ISDN installation, perform the "ISDN Function Reset" command (FF1 9# 1# 1#). ***This command must be issued before the ISDN 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 2-15 and 2-15.

4. Install an MDF card in the slave cabinet. (See Step 5 on page 2-17.)

5. Set Switch 1 on the ISDN card. (See Step 6 on page 2-18.)

6. Install an ISDN 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 ISDN card (Figure 2-9).

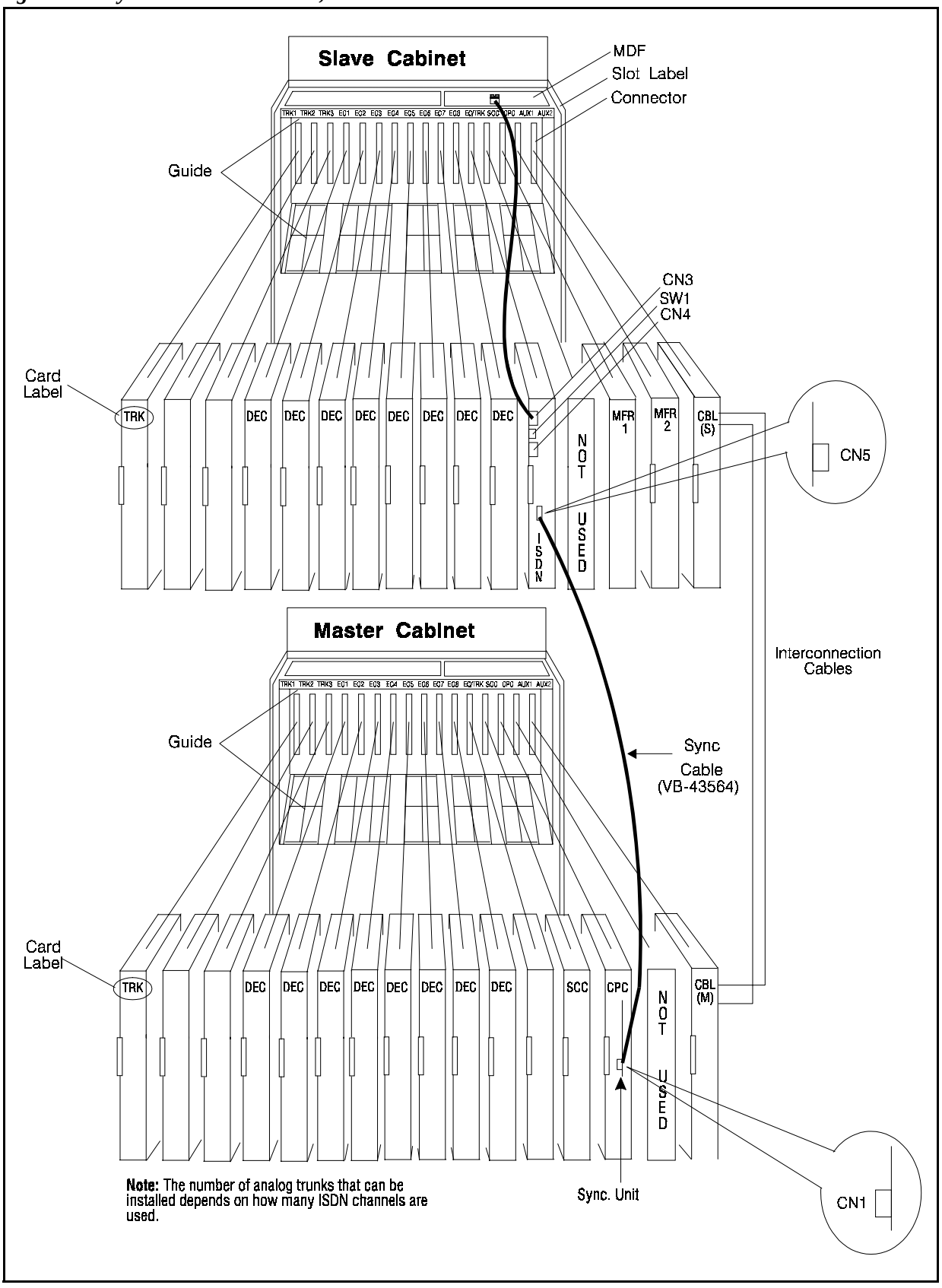
   Note: Part Number VB-43564 is used for the Sync Cable when an ISDN is installed only in the slave cabinet of a two-cabinet system.

8. At the slave cabinet, connect the cable attached to CN3 on the MDF card to CN3 on the ISDN card (Figure 2-8).

9. Using an RJ48 cable, connect CN1 of the MDF card to the CSU. (See Figure 2-7 for RJ48 pinouts.)

10. At the slave cabinet, connect the ground cable on the MDF card as shown in Figure 2-8 on page 2-20.

Figure 2-9. Sync cable connections, double-cabinet with an ISDN in the slave



Installing ISDN in a Double Cabinet with ISDNs in the Master and Slave

1. Before beginning ISDN installation, perform the "ISDN Function Reset" command (FF1 9# 1# 1#). ***This command must be issued before the ISDN 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 2-15 and 2-15.

4. Install an MDF card in each cabinet. (See Step 5 on page 2-17.)

5. Set Switch 1 on the ISDN cards. (See Step 6 on page 2-18.)

6. Install an ISDN card in each "EC/TRK" slot.

7. Connect the Clock Sync Cable from CN4 on the master-cabinet ISDN to CN5 on the slave-cabinet ISDN, as shown in Figure 2-10.

   Note: Part Number VB-43564 is used for the Clock Sync Cable when ISDNs are installed in the master and slave cabinets.

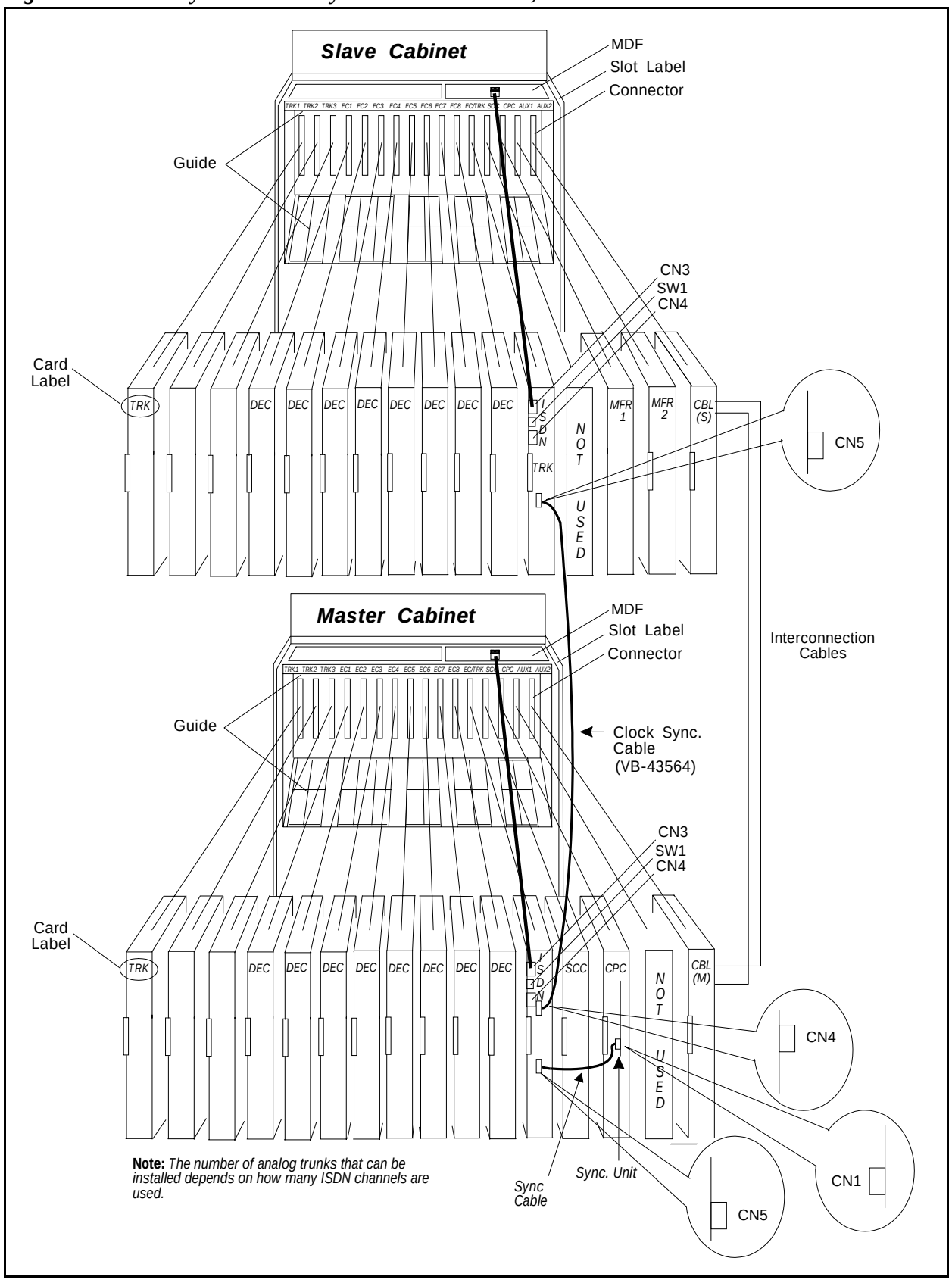
8. At the master cabinet, connect the Sync Cable from CN1 on the Sync Unit to CN5 on the ISDN card (Figure 2-10).

9. At each cabinet, connect the cable attached to CN3 on the MDF card to CN3 on the ISDN card (Figure 2-8).

10. Using an RJ48 cable, connect CN1 of each MDF card to a CSU. (See Figure 2-7 for RJ48 pinouts.)

11. For both cabinets, connect the ground cable from the 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



Chapter 3. Quick-Start Programming

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

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

The following table shows the topics that are described in this chapter. For detailed descriptions of all the ISDN programs, see Chapter 4 - "*Programming Reference*."

Before You Begin

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

The ISDN Data Reset command. If you are installing ISDN while you are upgrading to a new DBS release, perform the “ISDN Data Reset” before you begin ISDN programming.

Manually Resetting the DBS. Many of the ISDN 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.

Note:COP 1.07 or later is required on the PRI Card with CPC-EX 2.2 or later.

Programming Initial ISDN Options

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

Minimum Programming

Note:Option settings are in parenthesis ( ).

1. Set the system for ISDN operation.

Address	FF1 2# 1# 44# (1)#
Options	**0= T1 Operation** 1=ISDN Operation

2. If you are installing the ISDN while upgrading to a new DBS release, perform the "ISDN Data Reset" command (page 4-28).

   Note: DID settings are not maintained after the reset function.

Address	FF1 9# 1# (1)#
Options	**0=No (retain settings)** 1=Yes (clear settings)

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

Address	FF1 9# 4# 1# 1# (0-8)#
Options	**0=DBS 40** 1=DBS 72 2=DBS 96 3=DBS 40 + DBS 40 (ISDN must be in the slave cabinet.) 4=DBS 72 + DBS 40 (ISDN is not supported.) 5=DBS 72 + DBS 72 (ISDN must be in the slave cabinet.) 6=DBS 96 + DBS 40 7=DBS 96 + DBS 72 8=DBS 96 + DBS 96

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

Addresses	Sync Source 1: FF1 9# 4# 1# 2# (1-3)# Sync Source 2: FF1 9# 4# 1# 3# (0-3)# Sync Source 3: FF1 9# 4# 1# 4# (0-3)#
Options	Sync Source 1: 1=ISDN of the master cabinet 2=ISDN of the slave cabinet **3=Free run (internal clocking)** Sync Source 2: **0=None** 1=ISDN of the master cabinet 2=ISDN of the slave cabinet 3=Free run (internal clocking) Sync Source 3: **0=None** 1=ISDN of the master cabinet 2=ISDN of the slave cabinet 3=Free run (internal clocking)
Examples	In most cases, set the sync sources as follows: ISDN in a single cabinet or ISDN in a master cabinet: Source 1=1 (ISDN of the master cabinet) Source 2=3 (Free run) Source 3=0 (None) ISDN in a slave cabinet Source 1=2 (ISDN of the slave cabinet) Source 2=3 (Free run) Source 3=0 (None) ISDNs in the master and slave Source 1=1 (ISDN of the master cabinet) Source 2=2 (ISDN of the slave cabinet) Source 3=3 (Free run)

5. Power the system **OFF** then **ON**.

6. Specify the number of ISDN channels (page 4-16) per cabinet.

Addresses	Master cabinet: FF1 9# 4# 4# 1# 2# (0-23)# Slave cabinet: FF1 9# 4# 5# 1# 2# (0-23)#
Options	0-23 **(0)**

7. Specify which trunk channels are used for ISDN (page 4-28).

Address	FF2 (1-64)# 21# (5)#
Options	**0= Loop start** 1=Ground start 2=DID 3=T1 4=CID 5=ISDN

Master Cabinet Setup

Note:Refer to “Typical Central Office Configurations” on page 3-10 for setting below options. Default setting are in **BOLD**.

8. Set up master span:

Address	FF1 9# 4# 4# 5# 1# (0-1)# Network Type
Options	**0-Public** 1-Private

Address	FF1 9# 4# 4# 5# 2# (0-1)# Auto Progress
Options	**0-Disable** 1-Enable

Address	FF1 9# 4# 4# 5# 3# (0-2)# NSF
Options	**0-None** 1-SDN 2-MegaCom

Address	FF1 9# 4# 4# 5# 4# (0-3)# ISDN CO Type
Options	0-4ESS 1-5ESS 2- Reserved **3- DMS100**

Address	FF1 9# 4# 4# 5# 5# (0-1)# ISDN International Dial Code Deduction
Options	**0-Send as is** 1-Deduct 011 from the code

Address	FF1 9# 4# 4# 5# 6# (0-1)# ISDN Long Distance Code“1”Deduction
Options	**0-Send as is** 1-Deduct “1” from the code

Address	FF1 9# 4# 4# 5# 7# (0-1)# ISDN Type and Plan Option
Options	**0-Determine Type and Plan** 1-Always Type and Plan set to Unknown/Unknown

Slave Cabinet Set-Up

Note:Refer to “Typical Central Office Configurations” on page 3-10 for setting below options. Default setting are *In **BOLD***

Special Installation for adding second cabinet. If you are adding a second cabinet (slave) to an existing installation that has a Primary Rate span configured, you must re-enter the configuration settings for the ISDN channels in the Master cabinet. The re-dimensioning of the system to the new double cabinet (master/slave) configuration causes the address of FF1 9# 4# 4# 1# 2# (0-23) to be reset to the default value of zero (0).

9. Set up slave span:

Address	FF1 9# 4# 5# 5# 1# (0-1)# Network Type
Options	**0-Public** 1-Private

Address	FF1 9# 4# 5# 5# 2# (0-1)# Auto Progress
Options	**0-Disable** 1-Enable

Address	FF1 9# 4# 5# 5# 3# (0-2)# NSF
Options	**0-None** 1-SDN 2-MegaCom

Address	FF1 9# 4# 5# 5# 4# (0-3)# ISDN CO Type
Options	0-4ESS 1-5ESS 2- Reserved **3- DMS100**

Address	FF1 9# 4# 5# 5# 5# (0-1)# ISDN International Dial Code Deduction
Options	**0-Send as is** 1-Deduct 011 from the code

Address	FF1 9# 4# 5# 5# 6# (0-1)# ISDN Long Distance Code“1”Deduction
Options	**0-Send as is** 1-Deduct “1” from the code

Address	FF1 9# 4# 5# 5# 7# (0-1)# ISDN Type and Plan Option
Options	**0-Determine Type and Plan** 1-Always Type and Plan set to Unknown/Unknown

10. Program DIDs.

Address	FF1 9# 4# 6# (1-64)# 1# (0000-9999)#

11. Power the system **OFF** then **ON**.

12. Specify the extension number to call for each ISDN incoming DID number (page 4-29).

Address	FF1 9# 3# (0000-9999)# (100-699)#

13. Some ISDN lines provide Automatic Number Identification (ANI). This service is similar to Caller ID by providing the number of the calling party. For DID calls with ANI information provided, determine if ANI data or DID data is displayed on the called telephone..

Address	FF3 (Ext Port)# 54# (0-1)#
Options	**0=DID data on display** 1=ANI data on display

14. If you need to program multiple extensions to ring with DIDs, go to the instructions under “Slave Cabinet Set-UpMultiple DID Programming.”

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

Multiple DID Programming

1. If you wish to assign the same DID number to more than one station, enable Multiple DID/DNIS numbering (page 4-33).

Address	FF1 2# 1# 32# (0-1)#
Options	**0=Off** 1=On

2. Assign the ISDN DID numbers to stations (page 4-29).

Address	FF1 9# 3# (0000-9999)# (10-69 or 100-699)#

3. Reset the DBS by turning it off then on again.

Typical Central Office Configurations

Note:Unless stated all other default values are correct.

Lucent (AT&T) 4ESS

CO Type (0) 4ESS

NSF- None(0) or MegaCom(2) – Depends on service requested from CO.

ISDN international code deduct "011" - Set to (1) Deduct "011" from being sent in Setup message to CO.

ISDN Long Distance "1"Code Deduction - Set to (1) Deduct "1" from being sent in Setup message to CO.

Lucent (AT&T) 5ESS

CO Type (1) 5ESS

ISDN international code deduct "011" - Set to (1) Deduct "011" from being sent in Setup message to CO.

Nortel (NT) DMS-100

CO Type (3) DMS100 This is the default setting.

Chapter 4. Programming Reference

This chapter describes programming parameters for the ISDN 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.

ISDN System Settings

System Size

Parameter	System Configuration
Description	Identifies the system size. **Note:** For changes to this parameter to take effect, the system must be powered down, then back up again.
Programming	FF1 9# 4# 1# 1# (0-8)#
Options	**0=DBS 40** 1=DBS 72 2=DBS 96 3=DBS 40 + DBS 40 (ISDN must be in the slave cabinet.) 4=DBS 72 + DBS 40 (ISDN is not supported.) 5=DBS 72 + DBS 72 (ISDN must be in the slave cabinet.) 6=DBS 96 + DBS 40 7=DBS 96 + DBS 72 8=DBS 96 + DBS 96

T1/ISDN

Parameter	T1/ISDN
Description	Configures the system for either T1 or ISDN.
Programming	FF1 2# 1# 44# (0-1)#
Options	**0=T1** 1=ISDN

Clock Settings

Parameter	Sync Source 1
Description	The Sync Card (installed on the CPC-EX) 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). The system considers a clock source to have failed when the slip rate error counter is exceeded within a 24-hour period. (See page 4-23 for instructions on setting the slip rate error counter.) 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. **Notes:** 1. The "free run" setting is the only setting that can be entered for more than one sync source. 2. For changes to this parameter to take effect, the system must be powered down, then back up again.
Programming	FF1 9# 4# 1# 2# (1-3)#
Options	1=ISDN of the master cabinet (synchronizes clocking with the public network) 2=ISDN of the slave cabinet (synchronizes clocking with the public network) **3=Free run (internal clocking)**

Parameter	Sync Source 2
Description	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). If the second source fails and the first source is not working, the system will switch to the third source. In most cases, a system with one ISDN has the 2nd sync source set to “3.” Systems with two Signs 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. One of the three sync sources should be set to “3” (free run). A free-run setting is needed, so the DBS ISDN can provide its own clocking if the network clock fails. (See “1st sync” for an introduction to clock synchronization.) **Notes:** 1. The “free run” setting is the only setting that can be entered for more than one sync source. 2. For changes to this parameter to take effect, the system must be powered down, then back up again.
Programming	FF1 9# 4# 1# 3# (0-3)#
Options	**0=None** 1=ISDN of the master cabinet (synchronizes clocking with the public network) 2=ISDN of the slave cabinet (synchronizes clocking with the public network) 3=Free run (internal clocking)

Parameter	Sync Source 3
Description	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). In most cases, a system with one ISDN has the 3rd sync source set to “0.” Systems with two ISDNs 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. One of the three sync sources should be set to “3” (free run). A free-run setting is needed, so the DBS ISDN can provide its own clocking if the network clock fails. (See “Sync Source 1” on page 4-4 for an introduction to clock synchronization.) **Notes:** 1. The “free run” setting is the only setting that can be entered for more than one sync source. 2. For changes to this parameter to take effect, the system must be powered down, then back up again.
Programming	FF1 9# 4# 1# 4# (0-3)#
Options	**0=None** 1=ISDN of the master cabinet (synchronizes clocking with the public network) 2=ISDN of the slave cabinet (synchronizes clocking with the public network) 3=Free run (internal clocking)

System-Wide Timers

Parameter	Network Re-sync Timer
Description	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. 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. 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. 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. **Note:** When the system attempts to go back to the first clock source, existing calls will be disconnected.
Programming	FF1 9# 4# 2# 1# (0-25)#
Options	0-25 0=immediate (DBS returns to the first clock immediately.) 1-24=hours (Determines how often the DBS attempts to return to the first clock.) **25=no retries** (DBS does not attempt to go back to the first clock.)

Parameter	Ringing Timer (T301)
Description	Determines how long the called party will ring before the DBS will disconnect the call.
Programming	FF1 9# 4# 2# 2# (0-15)#
Options	0-10 0=180 sec. 1=20 sec. 2=40 sec. 3=60 sec. . . . 11=220 sec. 12=240 sec. 13=240 sec. 14=240 sec. **15=Infinite**

Parameter	Call Setup Timer (T303)
Description	Determines the time limit for a CO to respond to an outgoing call attempt.
Programming	FF1 9# 4# 2# 3# (0-10)#
Options	0-10 **0=4 sec.** 1=1 sec. 2=2 sec. 3=3 sec. 4=4 sec. 5=5 sec. 6=6 sec. 7=7 sec. 8=8 sec. 9=9 sec. 10=10 sec.

Parameter	Disconnect Request Timer (AT&T) (T305)
Description	Determines the time allocated for the CO to disconnect a call before the DBS disconnects the call.
Programming	FF1 9# 4# 2# 4# (0-10)#
Options	0-10 **0=4 sec.** 1=1 sec. 2=2 sec. 3=3 sec. 4=4 sec. 5=5 sec. 6=6 sec. 7=7 sec. 8=8 sec. 9=9 sec. 10=10 sec.

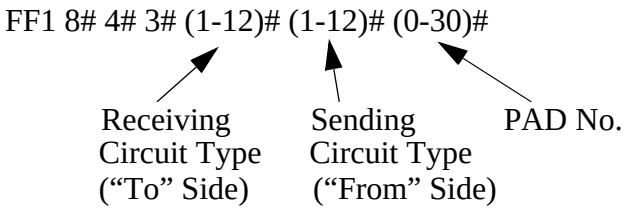
Parameter	Disconnect Request Timer (NTI) (T305)
Description	Determines the time allocated for the CO to disconnect a call before the DBS disconnects the call.
Programming	FF1 9# 4# 2# 5# (0-10)#
Options	0-10 **0=30 sec.** 1=10 sec. 2=20 sec. 3=30 sec. 4=40 sec. 5=50 sec. 6=60 sec. 7=70 sec. 8=80 sec. 9=90 sec. 10=100 sec.

Parameter	Release Request Timer (T308)
Description	Determines the time allocated for the CO to acknowledge a disconnect/release.
Programming	FF1 9# 4# 2# 6# (0-10)#
Options	0-10 **0=4 sec.** 1=1 sec. 2=2 sec. 3=3 sec. 4=4 sec. 5=5 sec. 6=6 sec. 7=7 sec. 8=8 sec. 9=9 sec. 10=10 sec.

Parameter	Outbound Call Processing Timer (T310)
Description	Determines the time allocated for the CO to deliver a call. If the call is not delivered, the DBS will clear the call.
Programming	FF1 9# 4# 2# 7# (0-15)#
Options	0-15 0=10 sec. 1=1 sec. 2=2 sec. 3=3 sec. . . . 14=14 sec. **15=Infinite**

Parameter	Connect Request Timer (T313)
Description	Determines the time the DBS waits for the CO to acknowledge that a call has been connected.
Programming	FF1 9# 4# 2# 8# (0-15)#
Options	0-10 **0=4 sec.** 1=1 sec. 2=2 sec. 3=3 sec. 4=4 sec. 5=5 sec. 6=6 sec. 7=7 sec. 8=8 sec. 9=9 sec. 10=10 sec.

Digital Pad Settings

Parameter	Digital Pad Settings
Description	Adjusts the volume of connections made via the ISDN. Default volume levels are included for connections between different types of terminals or circuits. For example, a K-TEL to ISDN connection may use one volume setting, while an SLT-to-ISDN connection may use another. 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.
Programming	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 4-13.  (Note: This uses the same address as T1 programming.) ***Figure 4-1. Circuit-type numbers*** Circuit Types / No. K-TEL 1 SLT 2 DATA# 3 Analog CO Trk 4 ISDN Master 5 ISDN Slave 6 OPTION 1* 7 OPTION 2* 8 DTMF# 9 CONF (SCC)# 10 TONE1 (MFR1)# 11 TONE2 (MFR2)# 12 **Notes:** #Circuit Types 3 and 9-12 are reserved for future use. *****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.

Options

Figure 4-2 shows the default values for the most common ISDN connections. Figure 4-3 lists the adjustments provided by each pad number.

Figure 4-2. Default pad values

From	To	Setting	Value
ISDN #1	K-TEL	16	-2 dB
ISDN #2	K-TEL	16	-2 dB
ISDN #1	SLT	16	-2 dB
ISDN #2	SLT	16	-2 dB
K-TEL	ISDN #1	16	-2 dB
K-TEL	ISDN #2	16	-2 dB
SLT	ISDN #1	16	-2 dB
SLT	ISDN #2	16	-2 dB

Note: ISDN #1=master
ISDN #2=slave

Figure 4-3. Pad Nos.

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

Example

If calls to SLTs via a master ISDN have low volume levels, the PAD level for connections *from* the master ISDN *to* all SLTs can be changed.

By referring to Figure 4-2, you can see that the default pad setting for connections *from* the master ISDN *to* all SLTs is 16. You can also tell by Figure 4-2 that the default pad value for setting 16 is -2 dB.

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.)

The following example shows the programming required to change the value to 0 dB:

FF1 8# 4# 3# 2# 5# 0#

2=Circuit type number for SLTs (Figure 4-1).

5=Circuit type number for the ISDN in the master cabinet (Figure 4-1).

0=Pad number for 0 dB loss/gain (Figure 4-3).

Extension Port Settings

Parameter	Station Port Class
Description	By default, DBS phones are assigned a circuit type, based on whether they are KTELs or SLTs. The circuit type is used with digital pad settings to determine the loss/gain settings for connections to the ISDN. (See “Digital Pad Setting” on page 4-12.) The Port Class parameter is provided in case a specific phone or group of phones needs a unique pad level. 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. **Note:** Circuit types are also provided for trunk ports. See Figure 4-1 on page 4-12 for a definition of circuit types.
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	By default, DBS trunks are assigned a circuit type, based on whether they are analog or ISDN. The circuit type is used with digital pad settings to determine the loss/gain settings for connections to the ISDN. (See “Digital Pad Setting” on page 4-12.) The Port Class parameter is provided in case a specific trunk or group of trunks needs a unique pad level. For example, an ISDN in a slave cabinet is assigned by default as “circuit type 6.” However, if a specific ISDN trunk in a slave has inadequate volume levels, the circuit type for the ISDN 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. **Note:** Circuit types are also provided for station ports. See Figure 4-1 on page 4-12 for a definition of circuit types.
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 ISDN 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	Number of ISDN Channels
Description	Determines how many ISDN channels are used. Though each ISDN Interface provides 23 trunk channels, ISDN trunks do not increase the overall trunk capacity of the DBS. Each ISDN channel subtracts from the total number of analog trunks that can be installed. The number of analog trunks that can be used are always decremented in quantities of 1. See "Trunk Assignments for Single-Cabinet Systems" (page 2-5) and "Trunk Assignments for Double-Cabinet Systems" (page 2-6) for possible ISDN and analog trunk channel combinations. **Note:** For changes to this parameter to take effect, the system must be powered down, then back up again.
Programming	Master cabinet: FF1 9# 4# 4# 1# 2# (0-23)# Slave cabinet: FF1 9# 4# 5# 1# 2# (0-23)#
Options	0-23 **(0)** **Note:** In most cases, ISDN channels are assigned in increments of 8.

Trunk Signaling

Parameter	Failure Mode
Description	Determines the way the system responds to alarms. **Note:** For changes to this parameter to take effect, the system must be powered down, then back up again.
Programming	Master cabinet: FF1 9# 4# 4# 1# 5# (0-1)# Slave cabinet: FF1 9# 4# 5# 1# 5# (0-1)#
Options	**0=Mode 1 (ISDN stays in operation even if errors are detected.)** 1=Mode 2 (ISDN shuts down if errors are detected.)

Alarm Settings

Alarm Descriptions

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

Table 4-1. ISDN 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 ISDN card Alarm relay on the ISDN MDF card
Yellow	A yellow alarm is sent to the distant end of the ISDN 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 ISDN card Alarm relay on the ISDN 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 ISDN card CFA LED on the ISDN card Alarm relay on the ISDN 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 ISDN card SLIP LED on the ISDN 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 ISDN card CFA LED on the ISDN 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 4-37).	AIS LED on the ISDN card OOF LED on the ISDN card CFA LED on the ISDN card Alarm relay on the ISDN card

Loss of Signal	The DBS activates a loss of signal alarm when the incoming ISDN signal is not received for more than 150 ms.	FF key (after the counter is exceeded) CFA LED on the ISDN card OOF LED on the ISDN card
Note: The LEDs on the ISDN card are normally steadily lit during an alarm condition. However, SLIP alarms cause the SLIP LED to blink rather than light.		

Table 4-2. Alarm-related programs

Parameter	Address	Function
Yellow Alarms		
Yellow Alarm Send	FF1 9# 4# 4# 1# 7# (0-1)# FF1 9# 4# 5# 1# 7# (0-1)#	Determines whether the DBS sends a yellow alarm to the CO.
Yellow Alarm Counter	FF1 9# 4# 4# 3# 6# (0-9000)# FF1 9# 4# 5# 3# 6# (0-9000)#	Error counter for the Yellow Alarm FF key.
Yellow Alarm Relay	FF1 9# 4# 4# 4# 1# (0-1)# FF1 9# 4# 5# 4# 1# (0-1)#	Determines if the alarm relay on the ISDN MDF card closes in the event of yellow alarms.
Red Alarms		
Red Alarm Detection	FF1 9# 4# 4# 2# 1# (0-15)# FF1 9# 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 ISDN card lights, and the alarm relay on the ISDN MDF card closes.
Red Alarm Recovery	FF1 9# 4# 4# 2# 2# (0-15)# FF1 9# 4# 5# 2# 2# (0-15)#	Determines how long the DBS tries to recover from a red alarm before it re-syncs the ISDN trunk.
Red Alarm Counter	FF1 9# 4# 4# 3# 3# (0-9000)# FF1 9# 4# 5# 3# 3# (0-9000)#	Error counter for the Red Alarm FF key.
Red Alarm Relay	FF1 9# 4# 4# 4# 2# (0-1)# FF1 9# 4# 5# 4# 2# (0-1)#	Determines if the alarm relay on the ISDN MDF card closes in the event of red alarms.
Alarm Indication Signal		
AIS Relay	FF1 9# 4# 4# 4# 5# (0-1)# FF1 9# 4# 5# 4# 5# (0-1)#	Determines if the alarm relay on the ISDN MDF card closes in the event of an alarm indication signal. An alarm indication signal is comprised of all 1's and is unframed.
Frame Loss Alarms		
Frame Loss Counter	FF1 9# 4# 4# 3# 1# (0-9000)# FF1 9# 4# 5# 3# 1# (0-9000)#	Error counter for the Frame Loss FF key.
Frame Loss Relay	FF1 9# 4# 4# 4# 4# (0-1)# FF1 9# 4# 5# 4# 4# (0-1)#	Determines if the alarm relay on the ISDN MDF card closes in the event of frame loss alarms.

Parameter	Address	Function
	Slip Alarms	
Slip Counter	FF1 9# 4# 4# 3# 2# (0-9000)# FF1 9# 4# 5# 3# 2# (0-9000)#	Error counter for the Slip FF key.
	Signal Loss Alarms	
Loss of Signal Counter	FF1 9# 4# 4# 3# 4# (0-9000)# FF1 9# 4# 5# 3# 4# (0-9000)#	Error counter for the Signal Loss FF key.
	Sync Loss Alarms	
Sync Loss Counter	FF1 9# 4# 4# 3# 5# (0-9000)# FF1 9# 4# 5# 3# 5# (0-9000)#	Error counter for the Sync Loss FF key.
Sync Loss Relay	FF1 9# 4# 4# 4# 3# (0-1)# FF1 9# 4# 5# 4# 3# (0-1)#	Determines if the alarm relay on the ISDN MDF card closes in the event of sync loss alarms.
	Relay Control	
Relay Reset	FF1 9# 4# 4# 4# 6# (0-1)# FF1 9# 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 9# 4# 4# 1# 7# (0-1)# Slave cabinet: FF1 9# 4# 5# 1# 7# (0-1)#
Options	0=No **1=Yes**

Parameter	Red Alarm Detection
Description	The default value for this parameter is determined by network specifications. It should **not** be changed. If a red alarm occurs, the "CFA" LED on the ISDN card lights. Also, if the "Red Alm Relay" parameter (page 4-25) is turned on, the alarm relay on the ISDN MDF card closes. **Note:** For changes to this parameter to take effect, the system must be powered down, then back up again.
Programming	Master cabinet: FF1 9# 4# 4# 2#1# (0-5)# Slave cabinet: FF1 9# 4# 5# 2# 1# (0-5)#
Options	0-5
Values	0=4 1=6 **2=8** 3=10 4=12 5=14

Alarm Timers

Parameter	Red Alarm Recovery	
Description	Determines how long the DBS tries to recover from a red alarm before it re-syncs the ISDN trunk. **Note:** For changes to this parameter to take effect, the system must be powered down, then back up again.	
Programming	Master cabinet: FF1 9# 4# 4# 2# 2# (0-15)# Slave cabinet: FF1 9# 4# 5# 2# 2# (0-15)#	
Options	0-15	
Values	0=0 ms	8=80 ms
	1=10 ms	9=90 ms
	2=20 ms	10=110 ms
	3=30 ms	11=120 ms
	4=40 ms	12=130 ms
	5=50 ms	13=140 ms
	6=60 ms	14=150 ms
	7=70 ms	15=160 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 4-35.

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 4-38.

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 4-35 for instructions on programming ISDN alarm keys.)
Programming	Master cabinet: FF1 9# 4# 4# 3# 1# (0-9000)# Slave cabinet: FF1 9# 4# 5# 3# 1# (0-9000)#
Options	0-9000/24 hours **(9000)**

Parameter	Slip Counter
Description	Determines how many slips occur before a Slip FF key is lit. The FF key lights when the counter exceeds the specified number within a 24-hour period. 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. Slips are losses of data bits due to framing errors. (See page 4-35 for instructions on programming FF alarm keys.)
Programming	Master cabinet: FF1 9# 4# 4# 3# 2# (0-9000)# Slave cabinet: FF1 9# 4# 5# 3# 2# (0-9000)#
Options	0-9000/24 hours **(9000)**

Parameter	Red Alarm Counter
Description	Determines how many red alarms occur before a Red Alarm FF key is lit. The FF key lights when the counter exceeds the specified number within a 24-hour period. (See page 4-35 for instructions on programming FF alarm keys.)
Programming	Master cabinet: FF1 9# 4# 4# 3# 3# (0-9000)# Slave cabinet: FF1 9# 4# 5# 3# 3# (0-9000)#
Options	0-9000/24 hours **(9000)**

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 4-35 for instructions on programming ISDN FF keys.)
Programming	Master cabinet: FF1 9# 4# 4# 3# 4# (0-9000)# Slave cabinet: FF1 9# 4# 5# 3# 4# (0-9000)#
Options	0-9000/24 hours **(9000)**

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 4-35 for instructions on programming FF alarm keys.)
Programming	Master cabinet: FF1 9# 4# 4# 3# 5# (0-9000)# Slave cabinet: FF1 9# 4# 5# 3# 5# (0-9000)#
Options	0-9000/24 hours **(9000)**

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 4-35 for instructions on programming FF alarm keys.)
Programming	Master cabinet: FF1 9# 4# 4# 3# 6# (0-9000)# Slave cabinet: FF1 9# 4# 5# 3# 6# (0-9000)#
Options	0-9000/24 hours **(9000)**

Alarm Relay Controls

Parameter	Yellow Alarm Relay
Description	Determines whether the system closes the alarm relay on the ISDN MDF card in the event of yellow alarms. 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 ISDN. (The "Yel Alm Det" parameter on page 4-21 determines how many yellow alarms occur before the relay closes.)
Programming	Master cabinet: FF1 9# 4# 4# 4# 1# (0-1)# Slave cabinet: FF1 9# 4# 5# 4# 1# (0-1)#
Options	**0=Off (Alarm relay does not close.)** 1=On (Alarm relay closes.)

Parameter	Red Alarm Relay
Description	Determines whether the system closes the alarm relay on the ISDN MDF card in the event of red alarms. 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 ISDN. A red alarm indicates a loss of frame (OOF) or loss of signal has continued for over 2.5 seconds. (The "Red Alm Det" parameter on page 4-21 determines how many red alarms occur before the relay closes.)
Programming	Master cabinet: FF1 9# 4# 4# 4# 2# (0-1)# Slave cabinet: FF1 9# 4# 5# 4# 2# (0-1)#
Options	**0=Off (Alarm relay does not close.)** 1=On (Alarm relay closes.)

Parameter	Sync Loss Relay
Description	Determines whether the system closes the alarm relay on the ISDN MDF card in the event of sync loss alarms. 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 ISDN. Sync-loss alarms result from clocking errors.
Programming	Master cabinet: FF1 9# 4# 4# 4# 3# (0-1)# Slave cabinet: FF1 9# 4# 5# 4# 3# (0-1)#
Options	**0=Off (Alarm relay does not close.)** 1=On (Alarm relay closes.)

Parameter	Frame Loss Relay
Description	Determines whether the system closes the alarm relay on the ISDN MDF card in the event of frame loss alarms. 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 ISDN.
Programming	Master cabinet: FF1 9# 4# 4# 4# 4# (0-1)# Slave cabinet: FF1 9# 4# 5# 4# 4# (0-1)#
Options	**0=Off (Alarm relay does not close.)** 1=On (Alarm relay closes.)

Parameter	AIS Relay
Description	Determines whether the system closes the alarm relay on the ISDN MDF card in the event of alarm indication signals. An alarm indication signal is comprised of all 1’s and is unframed. 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 ISDN.
Programming	Master cabinet: FF1 9# 4# 4# 4# 5# (0-1)# Slave cabinet: FF1 9# 4# 5# 4# 5# (0-1)#
Options	**0=Off (Alarm relay does not close.)** 1=On (Alarm relay closes.)

Parameter	Relay Reset
Description	Determines whether the ISDN alarm relay is cleared (opened) automatically or manually. If cleared automatically, the relay is opened approximately one second after the alarm condition ceases. If cleared manually, the relay can be opened by entering the Alarm Relay Clear code. To enter the Alarm Relay Clear code, first enter the programming authorization code (#98 9999), then enter one of the following codes: (Master cabinet: ON/OFF #94 8) (Slave cabinet: ON/OFF #95 8)
Programming	Master cabinet: FF1 9# 4# 4# 4# 6# (0-1)# Slave cabinet: FF1 9# 4# 5# 4# 6# (0-1)#
Options	**0=Auto** 1=Manual

Trunk Settings

Parameter	Trunk Type
Description	Determines whether the trunk circuit is an analog loop start, analog ground start, analog DID, T1, CID, or ISDN. **Note:** For changes to this parameter to take effect, the system must be powered down, then back up again.
Programming	FF2 (1-64)# 21# (0-5)#
Options	**0= Loop start** 1=Ground start 2=DID 3=T1 4=CID 5=ISDN

Parameter	ISDN Data Reset
Description	Resets the ISDN settings stored in SRAM (Static Random Access Memory). The reset restores these settings to default values.
Programming	FF1 9# 1# (0-1)# **Note:** If you enter a "1," the following display appears: CONFIRM 0: NO 1: YES 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. **0=Do not reset** 1=Reset
Options	**0=No (retain settings)** 1=Yes (clear settings)

Parameter	Clear ISDN DID Assignments
Description	Removes all DID assignments for ISDN.
Programming	FF1 9# 2# (0/1)#
Options	0 - Do not clear assignments 1 - Clear assignments

Parameter	Inbound ISDN DID Assignment
Description	Assigns an extension to each ISDN incoming DID number.
Programming	FF1 9# 3# (0000-9999)# (100-699)#

Parameter	Default DID Assignments
Description	Assigns an extension to ring if no DID number is received on a trunk port.
Programming	FF1 9# 4# 6# (1-64)# 1# (0000-9999)#

Parameter	Calling Information
Description	Assigns a number to display for each trunk rung when no DID is supplied.
Programming	FF1 9# 4# 6# (1-64)# 2# (0000-9999)#
Note	If ANI is provided, the ANI information will display instead.

Parameter	Network Type
Description	Specifies the type of network connected to the ISDN span per master cabinet or slave cabinet; either private network or public network.
Programming	FF1 9# 4# 4# 5# 1# (0-1)# (master cabinet) FF1 9# 4# 5# 5# 1# (0-1)# (slave cabinet)
Options	**0 - Public network** 1 - Private network

Parameter	Auto Progress Setting
Description	Specifies whether progress messages are supplied by the DBS to the ISDN span (master or slave cabinet).
Programming	FF1 9# 4# 4# 5# 2# (0-1)# (master cabinet) FF1 9# 4# 5# 5# 2# (0-1)# (slave cabinet)
Options	**0 - Disable** 1 - Enable

Parameter	Network Facility Setting
Description	Determines if a call is a Software Defined Network (SDN) call (AT&T option) or general Megacom call.
Programming	FF1 9# 4# 4# 5# 3# (0-1)# (master cabinet) FF1 9# 4# 5# 5# 3# (0-1)# (slave cabinet)
Options	**0 - None** 1 - SDN 2 - Megacom

Parameter	ISDN CO Type
Description	Specifies the type of CO connected to the ISDN span.
Programming	FF1 9# 4# 4# 5# 4# (0-3)# (master cabinet) FF1 9# 4# 5# 5# 4# (0-3)# (slave cabinet)
Options	0 - 4ESS 1 - 5ESS 2 - Reserved **3 - DMS100**

Parameter	ISDN International Dial Code Deduction
Description	Specifies if the 011 is sent with an international call or if the 011 is deleted.
Programming	FF1 9# 4# 4# 5# 5# (0-1)# (master cabinet) FF1 9# 4# 5# 5# 5# (0-1)# (slave cabinet)
Options	**0 - Send as is (with 011)** 1 - Do not send 011

Parameter	ISDN Long Distance Code “1” Deduction
Description	Specifies if the leading “1” is sent with a long distance call or if the leading “1” is deleted.
Programming	FF1 9# 4# 4# 5# 6# (0-1)# (master cabinet) FF1 9# 4# 5# 5# 6# (0-1)# (slave cabinet)
Options	**0 - Send as is (with leading 1)** 1 - Do not send leading 1

Parameter	ISDN Type and Plan Option
Description	Specifies if the ISDN Type and Plan are determined or unknown.
Programming	FF1 9# 4# 4# 5# 7# (0-1)# (master cabinet) FF1 9# 4# 5# 5# 7# (0-1)# (slave cabinet)
Options	**0 - Determine Type and Plan** 1 - Always Type and Plan set to Unknown/Unknown

Parameter	ISDN DID Flexible Ringing Assignments
Description	This parameter enables or disables ringing for specific ISDN Inbound DID numbers during Day, Night, Delayed Day and Delayed Night modes.
Programming	FF1 9# 5# (0000-9999)# (100-699)# (000000-111111)#
Options	0=Disable ringing 1=Enable ringing Where the entry position determines the ringing as follows:  The default entry is **111000** (day and night ringing enabled, delayed day and delayed night ringing disabled.

Parameter	Multiple DID/DNIS
Description	This programming address controls two functions. 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. If ISDN trunks are used, a "1" also turns on multiple Inbound ISDN DID numbering. Multiple Inbound DNIS numbering allows the assignment of one ISDN DID number to multiple extensions. If one ISDN 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. Up to 500 DID numbers can be assigned in each system; also, up to 500 Inbound ISDN DID numbers can be assigned. When Inbound ISDN DID numbering is used, both the Inbound DID number table and the DID table are used. See "Inbound ISDN DID Assignment" on page 4-29 for more information on assigning DNIS numbers.
Programming	FF1 2# 1# 32# (0-1)#
Options	**0=Off** 1=On

Extension Settings

Parameter	ANI Display Assignment
Description	Some ISDN lines provide Automatic Number Identification (ANI). This service is similar to Caller ID by providing the number of the calling party. For DID calls with ANI information provided, this parameter determines if ANI number or DID number is displayed on the called telephone.
Address	FF3 (1-144)# 54# (0-1)#
Options	**0=DID data on display** 1=ANI data on display
Notes	If the DID number called is not in the DID ring table, the call will ring the default DID assignment (see below) and the ANI number will display when the ANI information is provided. If no ANI information is provided, the DID number is displayed.

FF Key Settings

Parameter	FF Alarm keys
Description	This command dedicates FF keys for ISDN alarms. The FF key lights when alarm occurrences exceed a specified number within a 24-hour period. 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.
Assignment	**Note:** 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. Alarms from ISDN in the master cabinet: ON/OFF PROG FFkey (101-107)# HOLD Alarms from ISDN in the slave cabinet: ON/OFF PROG FFkey (121-127)# HOLD
Options	Keys can be assigned for the following alarms: • Red alarms • Yellow alarms • Sync loss • Signal loss • Frame loss • Slips The following table shows alarm key addresses. The addresses differ depending on whether alarms are generated from the master or slave cabinet.

Alarm	Master ISDN	Slave ISDN
Red	103#	123#
Yellow	107#	127#
Sync loss	105#	125#
Signal loss	104#	124#
Frame loss	101#	121#
Slips	102#	122#

Special ISDN Function Codes

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

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

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

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

Parameter	Remote Loopback
Description	This command only applies to a DBS within a private network. The command is entered at one DBS in order to loopback through another DBS. For example, to initiate a loopback from DBS "B" to DBS "A," this command would be entered at DBS "B." In order for the loopback to work, DBS "A" must have the "Remote Loopback" option turned on in system programming. Notes: 1. The clock source of the DBS that issues this command must be set to "free run." 2. Before executing this command, you must first enter the programming authorization code (#98 9999). This command only applies to a DBS within a private network. The command is entered at one DBS in order to loopback through another DBS. For example, to initiate a loopback from DBS "B" to DBS "A," this command would be entered at DBS "B." In order for the loopback to work, DBS "A" must have the "Remote Loopback" option (page 4-37) turned on in system programming. **Notes:** 1. The clock source of the DBS that issues this command must be set to "free run." 2. Before executing this command, you must first enter the programming authorization code (#98 9999).
Execution	Master: ON/OFF #94 3 (0 or 1) Slave: ON/OFF #95 3 (0 or 1)
Options	**0=Off** 1=On

Parameter	AIS Signal Transmission
Description	Transmits an AIS signal (all 1s) to the CO. **Note:** Before executing this code, you must first enter the programming authorization code (#98 9999).
Execution	Master: ON/OFF #94 4 (0 or 1) Slave: ON/OFF #95 4 (0 or 1)
Options	**0=Off** 1=On

Parameter	Forced Re-synchronization
Description	Re-synchronizes the DBS ISDN with the public network. **Notes:** 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: • yellow • red • framing loss • slip rate • loss of signal • sync loss **Note:** 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 ISDN MDF card. **Note:** 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 2.3 Updates

This Appendix describes the feature additions and software corrections for the DBS phone system with CPC-EX Version 2.3. Note that not all features described in this Appendix relate specifically to ISDN functionality, but rather to the DBS CPC-EX overall system.

However, several of these updates do directly pertain to ISDN and should be noted accordingly.

New Features

- **Bus Monitor Time Print Change** - Bus Monitor now prints the time every one minute.
- **Sixteen-Port Voice Mail/API Enhancement** - In addition to the current 8-port API integration, this software change allows the DBS to support up to sixteen-port API Integration.
- **Off-Hook Voice Announce/API Enhancement** - This feature provides support of the DBS Off-Hook Voice Announce feature via the API.
- **44-Series Small LCD Key Telephone Soft Key Support (VB-44XXXX)** - This enhancement allows the Small Liquid Crystal Display (LCD) K-TEL to use the softkeys when accessing the Voice Mail application.
- **Call Record via API** - This enhancement provides support for the Call Record feature via the API.

Note: The following features, UNA Transfer, UNA Call Reversion, Forwarding to UNA for CO Held Calls, All Ring Group, Private Password, Additional RAI Access, and All Ring Group features have been fully tested in our laboratory but not in live Beta trials. These features are to be considered *Beta-level* features. If you have any difficulty with these new features please call the BTSD Hotline in Secaucus, New Jersey, at (800) 822-0909.

***UNA Transfer** - Adds the ability for a user, automated attendant, etc., to transfer a call to Universal Night Answer (UNA) by dialing the access code *78. The call may then be retrieved by dialing the UNA pickup code (78).

***UNA Call Reversion** - Adds the ability for calls, that have reverted to the attendant and are unanswered, to revert to UNA.

***Forwarding to UNA for CO Held Call**s - An extension can be set so that certain calls are forwarded to UNA. If an inside extension (such as an automated attendant) receives a CO call, places the call on hold and dials the forwarding extension, then the call will forward to UNA.

***All Ring Group** - A call transferred to an “All Ring Group” rings all phones in the group at the same time. This makes the call available to multiple locations, including UNA, simultaneously.

***Private Password** - The private password feature allows a user to enter programming and access to all programming parameters including the system and remote passwords. The private password may always be used to enter the system.

***Additional Remote Administration Interface (RAI) Access Method** - In addition to the existing RAI access, a new RAI access method has been added. The RAI access allows an incoming call to be transferred to the RAI (either manually or by Automated Attendant) and then the caller enters the remote or private password.

ISDN Programming Flexibility - The existing ISDN programming has been enhanced to allow programming flexibility in the following areas: Network Type, Auto Progress, NSF, ISDN CO Type, ISDN International Dial Code Deduction, ISDN Long Distance Code 1 Deduction, and ISDN Type and Plan Option.

Software Corrections

SMDR Stopped Printing - In earlier versions, the SMDR output from the DBS would stop printing and not reset. This problem has been corrected with this version.

SMDR Header Printed More Often Than Every 60 Lines - In earlier versions, the SMDR header printed more than every 60 lines. In this version, the SMDR header now correctly prints out every 60 lines.

Last Digit of Voice Mail One Touch Key Was Truncated - In earlier versions, if a Voice Mail One-Touch Access key was programmed when the key was viewed with the Conf. Function, the last digit of the programmed information could not be seen.

Previously Unable to restrict 800+ Numbers for TRS types 5 and 6 - In the previous version if an 800-xxx number was entered in the special area and special office code tables with the new North American Numbering Plan (NANP) activated TRS types 5 and 6, it did not restrict the call. This problem has been corrected in this version.

Override Toll Restriction with SSD Numbers Address Was Not Available - In the previous version, the programming address FF1 2#1#4# could not be accessed. The address is now available in this version.

DID Call to a Voice Mailbox Received Main Greeting - In the previous version, in a Non-Integrated Digital PanaVOICE environment, if a DID/DNIS call was directed directly to a voice mail box, the caller was sent to the main greeting instead of the correct voice mail box. This problem has been corrected with this version.

Unusual First Ring on Incoming ISDN Calls - Previously incoming calls on ISDN line had a long ringing pattern (6 seconds ON or more, then OFF). This only occurred on the first ring. After the first ring, the ringing pattern returned to normal. The ringing pattern for incoming ISDN calls now rings as expected.

Calling Party Could be Heard Between Rings - In the previous version, when an ISDN call was transferred, the station receiving the call could hear the calling party between rings. This problem has been corrected in this version.

Dial Tone Received After Placing Call - Previously, when placing an outgoing call after dialing the number, the caller would receive another dial tone. This problem has been corrected in this version.

ISDN Calls Disconnected - Previously if an ISDN-to-ISDN call was attempted, and the called party was busy, instead of receiving CO Busy the call was dropped. This problem has been corrected in this version.

16-Port Voice Mail Support via API

Description

This feature allows up to sixteen (16) voice mail ports via API integration.

Programming

The new programming for this enhancement consists of a continuation of the existing programming of the current 8-port API set up. Previously for the 8-port API the telephone type settings (FF3 (ext#)# 2# (telephone type)# ranged from 41-48 for integrated VM. These values have been extended and they now range from 41-56. See below:

From port 1-8FF3 (ExtPort)# 2# (41-48)#[Same as current]

From port 9-16 FF3 (ExtPort)# 2# (49-56)#[New]

Operation

N/A

Notes

- All additional voicemail programming must be completed on the entire 16 ports for the voice mail to function properly.
- Voice mail ports should be on consecutive AEC or DEC cards.

Off-Hook Voice Announce (OHVA) via API

Description

This feature provides support of the DBS Off-Hook Voice Announce feature via the API. This API feature addition allows applications that utilize API integration with the DBS to have access to the OHVA feature.

Programming

No new programming is required.

Operation

N/A

Note

The OHVA feature via the API has the same feature limitations as listed in the DBS manual.

Small LCD Soft Key Support via API

Description

This enhancement allows the 44-Series Small LCD Key-Telephone (VB-44XXXX) K-TEL to use the softkeys when accessing the Voice Mail application.

Programming

No new programming is required.

Operation

N/A

Note

The OHVA feature via the API has the same feature limitations as listed in the DBS manual.

Call Record (OHVA) via API

Description

This feature provides support of the DBS Call Record feature via the API. This API feature addition allows applications that utilize API integration with the DBS to have access to the Call Record feature.

Programming

No new programming is required.

Operation

N/A

Notes

- The Call Record feature via the API has the same feature limitations as described for DBS CPC-EX ver. 2.1.

Special Features

The following features marked with an "*", UNA Transfer, UNA Call Reversion, Forwarding to UNA for CO Held Calls, All Ring Group, Private Password, Additional RAI Access, and All Ring Group features have been fully tested in our laboratory but not in live Beta trials. These features are to be considered as *Beta-level* features. If you have any difficulty with these new features please call the BTSD Hotline in Secaucus, New Jersey, at (800) 822-0909.

*UNA Transfer

Description

The UNA transfer feature allows a trunk call to be transferred to the UNA. The call may be transferred manually or via a device such as an automated attendant.

Programming

No programming is required for this feature.

Operation

To transfer a trunk call to UNA:

1. Hookflash or press **HOLD** to place the trunk call on hold.
2. Dial ***78**. After ***78** is dialed, dial tone is heard indicating that the call has successfully been transferred.
3. Hang up.

To answer a UNA call:

1. Go offhook.
2. Dial **78**.

or

1. Directly pick up the UNA held trunk by pressing the dedicated trunk key.

Notes

- When a call is transferred to UNA, the trunk caller hears the selected hold sound source.
- When a call is transferred to UNA, the UNA continues to ring until the call is answered (by dialing **78** or direct trunk access) or the caller hangs up.
- If multiple callers ring the UNA, the UNA calls are picked up on a first-in/ first-out method.
- The UNA cannot be a member of a hunt group.
- The UNA can be a member of an All Ring Group. (See "*Forwarding to UNA for CO Held Call*".)

*UNA Call Reversion

Description

The UNA call reversion feature allows calls that revert to the attendant (but are unanswered) to revert to UNA.

Programming

Table A-1 UNA Call Revision Timer Values

Setting	Value
0	No reversion (default)
1	10 seconds
2	20 seconds
3	30 seconds
4	40 seconds
5	50 seconds
6	60 seconds
7	70 seconds
8	80 seconds
9	90 seconds
10	100 seconds
11	110 seconds
12	120 seconds

Operation

When the UNA Reversion Timer is set to **0**, a call that reverts to the attendant and is not answered, continues to ring at the attendant. It does not revert to UNA. When the UNA Reversion Timer is set to a value other than 0, a call that reverts to the attendant and is not answered within the specified time reverts to UNA.

To answer a UNA call:

1. Go off-hook.

2. Dial **78**.

or

1. Directly pick up the trunk by pressing the dedicated trunk key.

Notes

- When a call reverts to UNA, the UNA will continue to ring until the call is answered (by dialing **78** or by direct trunk access) or the caller hangs up.
- If multiple callers ring the UNA, the UNA calls are picked up on a first-in/ first-out method.
- The Call Reversion Timer must be set to “revert calls to the attendant” position for unanswered calls to then be reverted to UNA.

*Forwarding to UNA for CO Held Call

Description

An extension can forward certain calls to UNA. If an inside extension (such as an automated attendant) receives a CO call, it places the CO call on hold and dials the forwarding extension. Then, the call will forward to UNA.

Internal calls, direct calls to the forwarding extension, or T1 network calls ring the extension. They do not forward to UNA.

This feature is particularly useful in a situation when calls come into an automated attendant and then, on caller selection, may transfer to an extension such as the attendant. When the extension user goes on break etc., the calls can be forwarded to UNA to ensure that the call is handled.

Programming

No new programming required. However, the Class of Service for the forwarding station must allow Call Forwarding to be Set/Reset for this feature to operate.

Operation

To set UNA forwarding:

1. At the forwarding extension, go off-hook or press **ON/OFF**.
2. Dial **725**.
3. Hang up or press **ON/OFF**.

To cancel UNA forwarding:

1. At the forwarding extension, go off-hook or press **ON/OFF**.
2. Dial **72**.
3. Hang up or press **ON/OFF**.

To transfer a CO call to an UNA forwarding extension:

1. Place the CO call on hold by pressing the **HOLD** key or by hookflashing.
2. Dial the UNA forwarding extension. The call immediately forwards, you hear dial tone and the display reads **FWD UNA**.
3. Hang up or press **ON/OFF**.

Notes

- When a call rings UNA, the UNA will continue to ring until the call is answered (by dialing **78** or by direct trunk access) or the caller hangs up.
- If multiple callers ring the UNA, the UNA calls are picked up on a first-in/first-out method.
- Internal calls, direct calls to the forwarding extension, or T1 network calls ring the extension. They do not forward to UNA.
- A DISA caller will not be forwarded to UNA, but will ring the forwarding extension.
- The held CO will hear the call hold tone until the call is answered.
- If permanent call forwarding is also set in the forwarding extension, CO held calls will forward to UNA. However, all other calls will follow the permanent call forwarding.

- An extension user can only set “Do Not Disturb” or one type of call forwarding at a time including call forwarding to UNA. When the user sets DND or a call forwarding type, the previously set DND or call forwarding type is cleared.
- Call forward to UNA cannot be assigned to an FF-Key.

*All Ring Group

Description

A new type of ringing group has been added - the All Ring Group. A call transferred to an All Ring Group rings all key telephones in the group at the same time. This makes the call available to multiple locations simultaneously. Once the call is answered, all other key telephones in the group stop ringing.

A common use for this feature is to have an Automated Attendant transfer a CO call to an All Ring Group on a selected input by the caller.

Up to four (4) All Ring Groups may be assigned. Up to 16 key telephone members may be in each group. In addition to the 16 key telephone members, the UNA may also be assigned to an All Ring Group.

Programming

The All Ring Group feature utilizes existing Multiple DID Ringing to set up the All Ring Group. All members of the All Ring Group are set in standard DID programming (FF1 8# 3# (DID No.)# (Ext. No.)#. However, since calls cannot be transferred to a DID number, an All Ring Group Pilot number is first established and this pilot number is then linked to a DID number. In total, four programming addresses must be set for the All Ring Group feature to operate. These include:

Operation

To transfer a CO call to an All Ring Group:

1. Place the call on hold by pressing **HOLD** (key telephone) or flashing the hookswitch (SLT).

2. Dial the All Ring Group Pilot Number. After the call is transferred to the All Ring Group, dial tone is heard.

When a call is transferred to the All Ring Group, every phone in the All Ring Group rings. When any phone in the group is answered, all phones stop ringing.

Notes

- The All Ring Group may include the UNA (780).
- The original call must be a CO call. An internal call cannot be transferred to an All Ring Group. If you attempt to transfer an internal call to an All Ring Group, you will receive busy tone.
- A call presented to an All Ring Group will not recall or revert. The call must be answered or the caller must hang up.
- All Ring Groups cannot be chained together. In other words, an All Ring Group Pilot Number cannot be assigned as a member of another All Ring Group.
- Extensions may be a member of multiple All Ring Groups.
- If the DBS is part of a networked system, the All Ring Group members must be extensions on the local node.
- Only one call at a time may ring at a key telephone if non-appearing (lights the EXT LED).

*Private Password

Description

A new private password has been added to allow entry into system programming at any time. This is useful if the normal system and/or remote password is forgotten, lost, mis-entered, or intentionally changed by an unauthorized person.

SPECIAL NOTICE: The private password should be changed from the default setting after system installation, recorded and kept confidential by the system manager.

***SPECIAL NOTICE*:** The system must be entered using the private password to view the private password programming address.

Programming

Programming Address

FF1 6# 3# [NNNN]#

Default Password: **6789**

Notes

- You must enter programming using the private password to view the private password address. The private password address will not appear and is not accessible if programming is entered using the system or remote password.
- If the system or remote password is set to the same value as the private password, then the private password address will not be accessible. You must first change the system or remote password to another value and then log in again using the private password to have access to the private password address.
- If you are at an attendant key telephone when entering programming, you must first enter **#98** followed by the 4-digit private password before entering programming (*see below*). Otherwise, the private password is not accessible.

Operation

To access the system using the private password at any display key telephone (including an attendant telephone):

1. Go off-hook or press **ON/OFF** key.

2. Dial **#98** followed by the 4-digit private password.

3. Press **PROG** followed by ##.

4. To exit system programming, hang up or press the **ON/OFF** key.

Terminal Programming Through a Direct Connection

When programming from a terminal connected to the RS-232C (SMDR) port, perform the following steps:

1. Make certain the cables are configured and connected as outlined in Section 300.

2. Make certain the DBS is in the SMDR mode by entering the following code from the attendant port:

   ON/OFF #93

3. Enter your terminal communications program and make sure your PC's data communications settings match those of the DBS.

4. From your terminal communications program, type the following command:

#99xxxx (where xxxx = the site's private password)

5. After the DBS responds, type **P** and then press **Enter**.

6. Follow the directions on the screen to access the desired program. (See "*Terminal Programming Commands*.")

Terminal Programming Through DISA

Note: The DBS must be equipped with an MFR card and an RAI card to allow terminal programming using this method.

When programming through a DISA trunk, perform the following steps:

1. Dial into the DBS through a DISA trunk.

2. Once you are connected, type **#6** followed by the private password from your terminal communications program.

3. After the DBS responds with REMT>, type **P** and then press **Enter**.

4. Follow the directions on the screen to access the desired program. (See "*Terminal Programming Commands*.")

Terminal Programming Through a CO Trunk and Operator Transfer

Note: The DBS must be equipped with an MFR card and an RAI card to allow terminal programming using this method.

SPECIAL NOTICE: If you use the following method, the private password must be given to the attendant. Use the new RAI access method instead. (See "*Additional RAI Access Method*")

When programming through a normal trunk, perform the following steps:

1. Dial into the DBS through a normal trunk.

2. Ask the operator to place you on hold and dial **#6** followed by the private password to transfer you into remote programming.

3. After the DBS responds with REMT>, type **P** and then press **Enter**.

4. Follow the directions on the screen to access the desired program. (See "*Terminal Programming Commands*.")

Terminal Programming Through Additional RAI Access Method

(See "*Additional RAI Access Method*".)

Terminal Programming Commands

Use the following commands to navigate terminal programming:

Command	Description
~01	Access System parameters
~02	Access Trunk parameters
~03	Access Extension parameters
~04	Access Ring assignments
~05	Access FF-key assignments
~06	Access Name assignments
~07	Access Toll Restriction data
~08	Access Least Cost Routing data
~09	Access Copy mode
~10	Access Speed Dial data
~B	Back to previous address
~b	Back to previous port
~F	Forward to next address
~f	Forward to next port
~R	Return to provide mode
~Ctrl-Z	Quit

*Additional RAI Access Method

Description

In addition to the existing RAI access method, a new RAI access method has been added. A new access code, **#97******, has been added to the DBS. When this code is dialed, a held call is transferred to the RAI modem. The system then sends a <PASSWORD> prompt and the remote or private password must be entered to connect to terminal programming. This allows more security for passwords since the password does not have to be used by the transferring person or device.

Programming

No additional programming is required for the DBS. However, if an automated attendant or other device performs the transfer, the automated attendant or other device must be set up to transfer your call by dialing **#97******.

Operation

To access the system using the new RAI Access method:

Note: The following procedure uses a preprogrammed automated attendant to transfer a call to the RAI.

1. At the PC terminal program, dial into the DBS through a normal trunk.

2. Follow the appropriate method to transfer to the RAI modem.

   Normally, an automated attendant will be configured to answer your call, play a message prompting a response (dial 1 to access Sales, 2 to ...etc.) where one of the responses will place you on hold and dial the #97**** access code to reach the RAI.

3. Wait a few seconds for the RAI modem to return the modem tone and for your terminal program to connect.

4. If **Password>** is not displayed, press the **Enter** key.

5. When **Password>** is displayed, dial the 4-digit remote or private password.

6. After the DBS responds with **REMT>**, type **P** and then press **Enter**.

7. Follow the directions on the screen to access the desired program. (See "*Terminal Programming Commands*".)

Note: The following procedure has the attendant manually transfer a call to the RAI.

1. Start your PC terminal program.

2. With a telephone connected to the modem, manually dial into the DBS through a normal trunk.

3. When the attendant answers, ask the attendant to dial **#97****** to transfer your call to the RAI modem.

4. When you hear modem tone, enable your terminal program to connect (usually be selecting **Connect**).

5. If after a few seconds **Password>** is not displayed, press the **Enter** key.

6. When **Password>** is displayed, type the 4-digit remote or private password.

7. After the DBS responds with **REMT>**, type **P** and then press **Enter**.

8. Follow the directions on the screen to access the desired program. (See "*Terminal Programming Commands*".)

ISDN Programming Flexibility

Description

The previous versions did not allow the programming flexibility to accommodate certain central office ISDN configurations. This enhancement allows the flexibility in programming to set the DBS parameters to match certain central office provisioning.

Programming

The following programming addresses are no longer valid:

Name	Key Sequence
ISDN CO Type	FF1 9# 4# 1# 5# (0-3)#
Network Type	FF1 9# 4# 6# (1-64)# 3# (0-1)#
Auto Progress	FF1 9# 4# 6# (1-64)# 4# (0-1)#
SDN/MEGACOM	FF1 9# 4# 6# (1-64)# 5# (0-1)#

ISDN Upgrade Procedure:

1. New COP 1.07A is required on Primary Rate card(s).

2. Set system for ISDN function:

FF1 2# 1# 44# (1)#

3. Perform ISDN reset function:

FF1 9# 1# (1)#

Note: DID settings are not maintained after reset function.

4. Set system configuration:

FF1 9# 4# 1# 1# (0-8)#

5. Set the clock synchronization sources:

Sync Source 1:

FF1 9# 4# 1# 2# (1-3)#

Sync Source 2:

FF1 9# 4# 1# 3# (1-3)#

Sync Source 3:

FF1 9# 4# 1# 4# (1-3)#

6. Cycle the unit's power switch.

7. Configure number of “B” channels per cabinet:

Master:

FF1 9# 4# 4# 1# 2# (0-23)#

Slave:

FF1 9# 4# 5# 1# 2# (0-23)#

8. Set trunk type per channel for ISDN:

FF2 (trunk number)# 2 1# (5)#

Master Cabinet Set-Up:

Refer to “Typical Central Office Configurations” for setting the following options. Default settings are bold.

Set up master span:

FF1 9# 4# 4# 5# 1# (0-1)# Network Type

0-Public

1-Private

FF1 9# 4# 4# 5# 2# (0-1)# Auto Progress

0-Disable
1-Enable

FF1 9# 4# 4# 5# 3# (0-2)# NSF

0-None
1-SDN
2-MegaCom

FF1 9# 4# 4# 5# 4# (0-3)# ISDN CO Type

0-4ESS
1-5ESS
2- Reserved
3- DMS100

FF1 9# 4# 4# 5# 5# (0-1)# ISDN International Dial Code Deduction

0-Send as is
1-Deduct **0 1 1** from the code:

FF1 9# 4# 4# 5# 6# (0-1)# ISDN Long Distance Code

0-Send as is
1-Deduct **1** from the code

FF1 9# 4# 4# 5# 7# (0-1)# ISDN Type and Plan Option

0-Determine Type and Plan
1-Type and Plan always set to Unknown/Unknown

Slave Cabinet Set-Up

Refer to “Typical Central Office Configurations” for setting the following options. Default settings are bold.

Note: Observe the following Special Installation Note when adding a second cabinet:

If you are adding a second cabinet (slave) to an existing installation that has a Primary Rate span configured, you must re-database the number of ISDN channels in the Master cabinet. The re-dimensioning of the system to the new double cabinet (master/slave) configuration

causes FF1 9# 4# 4# 1# 2#

(0-23) to be reset to the default value of zero (0).

Set up Slave Span

FF1 9# 4# 5# 5# 1# (0-1)# Network Type

0-Public
1-Private

FF1 9# 4# 5# 5# 2# (0-1)# Auto Progress

0-Disable
1-Enable

FF1 9# 4# 5# 5# 3# (0-2)# NSF

0-None
1-SDN
2-MegaCom

FF1 9# 4# 5# 5# 4# (0-3)# - ISDN CO Type

0- 4ESS
1- 5ESS
2- Reserved
3- DMS-100

FF1 9# 4# 5# 5# 5# (0-1)# ISDN International Dial Code Deduction

0-Send as is
1-Deduct **0 1 1** from the code

FF1 9# 4# 5# 5# 6# (0-1)# ISDN Long Distance 1 Code Deduction

0-Send as is
1-Deduct **1** from the code

FF1 9# 4# 5# 5# 7# (0-1)# ISDN Type and Plan Option

0-Determine Type and Plan
1-Type and Plan always set to Unknown/Unknown
Reprogram the DIDs:

FF1 9# 4# 6# (1-64) # 1# (0000-9999) #

Turn the power switch OFF, and then back ON again

Operation

N/A

Notes

UNLESS STATED ALL OTHER DEFAULT VALUES ARE CORRECT.

Typical Central Office Configurations

Lucent (AT&T) 4ESS

- CO Type (0) 4ESS
- NSF- None (0) or MegaCom (2) - Depends on service requested from CO.
- ISDN International Code Deduct **0 1 1**
  - Set to (1) to deduct **0 1 1** from the CO Setup message.
- ISDN Long Distance **1** Code Deduction
- Set to (1) to deduct **1** from the CO Setup message.

Lucent (AT&T) 5ESS

- CO Type (1) 5ESS

- ISDN International Code Deduct **0 1 1**
- Set to (1) to deduct **0 1 1** from the CO Setup message.

Nortel (NT) DMS100

CO Type (3) DMS100 (This is the default setting.)

The ISDN PRI provides a flexible method of providing access to the Public Switched Telephone Network (PSTN). Because of the many ways that the CO can configure an ISDN span, it is essential that the DBS configuration and the provisioning of the CO are compatible. The following tables identify the critical parameters that must be set for proper operation. These tables also provide a list of information that must be gathered on the CO, as well as the type of information that the CO needs to know about the DBS system.

#	Info Needed from CO	Comments (examples)
1	Manufacture of CO and software load	5E11 (5ESS with load 11), DMS-100 with NA008
2	Is local dialing 7 digits, 10 digits or a combination?	
3	For long distance dialing, does the CO want to see the leading **1** ?	1-770-555-1212, or 770-555-1212
4	For international dialing, does the CO want to see the leading **0 1 1** ?	**0 1 1** -(15-digit number) or (15-digit number)

#	Typical Info for CO	Comments (examples)
1	Installation Address	
2	Is this a new installation?	
3	Extended wiring beyond phone room?	
4	Main phone number of installation	
5	Contact person for installation	
	Contact for order information	
6	Billing name	
7	Billing address	

#	Typical Info for CO	Comments (examples)
8	Long distance Carrier InterLATA (PIC)	Identifies the carrier who will provide long distance access.
9	Long distance Carrier (IntraLATA) (LPIC)	Identifies the carrier who provides access for connections that are not local but are still within the local LATA.
10	Request date of installation	
11	Facility type	ISDN PRI
12	Facility quantity	1 or 2 spans
***NOTE**: The following items must be provided on a per span basis.*		
13	Signaling code	DS-1 (1.544 Mbps)
14	Line coding	B8ZS (Binary 8 Zero Substitution)
15	Framing Format	ESF (Extended Superframe)
16	Bearer configuration	Voice or Voice/Data
17	Quantity of B (bearer) channels	23B + 1D - Max. setting (must have 1 D channel) Or XB + 1D where X is 1-23 for a fractional span
18	Call type	Two Way
1	Quantity of phone numbers	A block of 20 numbers is generally assigned.
9		***Note**: With DID, the total number of telephones will exceed the total number of B channels.*
20	Number of incoming digits to CPE (Customer Premise Equipment - DBS)	Select 4 digits. Used with DID
21	ISDN PRI Protocol	5ESS Custom, DMS-100 Custom (NTNAPRI) or 4ESS
22	Glare Resolution	CPE yield to CO
23	Channel selection used by CO	High-to-Low B-channel selection

#	Typical Info for CO	Comments (examples)
24	Source of Calling Party Number	The CO must source the Calling Party Number.
25	Service Options	ANI - Automatic Numbering Indication Hunt group - MegaCom -only for 4ESS operation

Note: If two spans are implemented, each span has a separate D channel (D channel sharing is NOT permitted).

CPC-EX Version 2.3.2

This section contains the CPC-EX Version 2.32 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.

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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