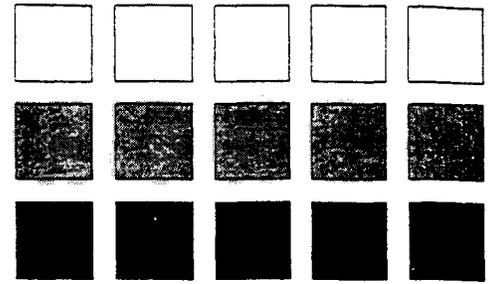


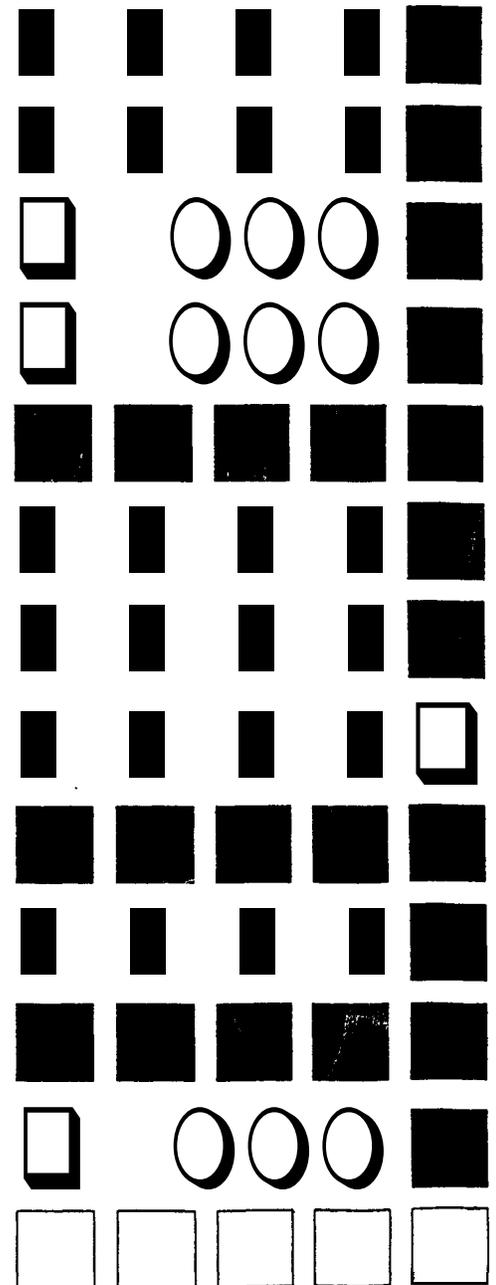
Panasonic®

DBS

Digital Business System



Section 300 Installation



Reissued 5/22/97

Doc. No. DBS-70-300



Warning: This service information is designed for experienced repair technicians only and is not designed for use by the general public. It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product. Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

FCC Warning

This equipment generates, uses, and can radiate radio frequency energy, and, if not installed and used properly, that is, in strict accordance with the instruction manual, may cause interference to radio and television reception. This equipment has been tested and found to comply with the limits for a Class A computing device in Subject J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference by one or more of the following measures:

1. Reorient the receiving antenna,
2. Relocate the key service unit and key telephones with respect to the receiver,
3. Move the equipment from the receiver,
4. Plug the key service unit into a different outlet so that the equipment and receiver are on different branch circuits.

Battery Recycling Statement



The following statement applies if you purchased backup batteries with your system.

THE PRODUCT YOU HAVE PURCHASED MAY CONTAIN SEALED LEAD ACID BATTERIES WHICH ARE RECYCLABLE. AT THE END OF THEIR USEFUL LIFE, UNDER VARIOUS STATE AND LOCAL LAWS, IT IS ILLEGAL TO DISPOSE OF THESE BATTERIES INTO YOUR MUNICIPAL WASTE STREAM. PLEASE CALL 1-800-SAV-LEAD FOR INFORMATION ON HOW TO RECYCLE THESE BATTERIES.

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Table of Contents

Purpose	x
Related Documentsx

Chapter 1. Requirements * 1-1

Model Numbers	1-3
FCC Requirements	1-3
General Requirements	1-3
DID Requirements	1-4
T1 Requirements	1-5
Environmental Requirements	1-5
Cleaning	1-6

Chapter 2. System Overview * 2-1

Cabinet Description	2-3
Configurations	2-5
Printed Circuit Cards	2-6
Processor Description	2-9

Chapter 3. Cabinet Installation 3-1

Wall-Mounting the Cabinet	3-3
Guidelines	3-3
Installation	3-3
Grounding	3-5
Guidelines	3-5
Installation	3-5
Card Installation	3-6
Guidelines	3-6
Installation	3-8
Battery Backup	3-9
Guidelines	3-9
Installation for the DBS 40	3-10
Installation for the DBS 72 and 96	3-11
Key Phone Wall Mounting	3-13
DSL/T Wall Mounting	3-15
System Initialization	3-17
Test Phone	3-1s
Guidelines	3-18
Installation	3-1s

Chapter 4. Trunks and Lines4-1

Trunks	4-3
Trunk Connectors	4-3
Trunk Connector Pinouts	4-4
Loop-Start Trunks	4-7
Ground Start and DID Trunks	4-9
T1 Interface	4-11
Lines	4-31
Extension Connectors	4-31
Extension Connector Pinouts	4-32
Analog Extensions	4-37
Digital Extensions	4-40
Trunk and Line Expansion	4-43

Chapter 5. Peripheral Equipment* 5-1

Local Terminal or SMDR Device	5-3
Guidelines	5-3
Installation	5-4
Remote Administration Interface (RAI)	5-6
Guidelines	5-6
Installation	5-6
Background Music/Music-On-Hold	5-8
Guidelines	5-8
Installation	5-8
Off-Premises Adaptor (OPX)	5-10
Guidelines	5-10
Installation	5-11
Paging	5-14
Guidelines	5-14
External Page Zone Installation	5-14
External General Page/UNA Installation	5-16
External Ringer (UNA Device)	5-17
Guidelines	5-17
Installation	5-18
Power Failure Unit	5-19
Guidelines	5-19
Installation	5-19
Voice Announce Unit (VAU)	5-22
Guidelines	5-22
Installation	5-22
Recording and Playing Messages	5-26
Door Box Adaptor (Trunk Port)	5-27
Guidelines	5-27

Installation	5-28
Door Box Adaptor (Extension Port)	5-31
Single Line Telephone Adaptor	5-34

Chapter 6. Double-Cabinet Systems 6-1

Guidelines	6-3
Installation	6-10

Chapter 7. Specifications 7-1

Electrical Characteristics	7-3
Environmental Requirements	7-4
Resource Maximums	7-5
Cabling Specifications	7-13
Communication Parameters	7-14
Signaling Characteristics	7-15
Tone Characteristics	7-16

List of Figures

Figure 2-1.	The DBS cabinet (DBS 96 shown)	2-3
Figure 2-2.	The DBS cabinet (DBS 96 shown)	2-3
Figure 2-3.	Trunk, line, and peripheral connections	2-4
Figure 2-4..	Slot labels for printed circuit packages	2-9
Figure 3-1.	Cover removal	3-3
Figure 3-2.	Cabinet mounting bracket	3-4
Figure 3-3.	Cabinet wall-mounting	3-4
Figure 3-4.	Cabinet ground screw	3-5
Figure 3-5.	SCC-B Switch 4	3-6
Figure 3-6.	CPC Strap S1	3-7
Figure 3-7.	Printed circuit card installation	3-8
Figure 3-8.	Battery location, DBS 40	3-10
Figure 3-9.	Battery tray, DBS 72 and 96	3-11
Figure 3- 10.	Battery pack connection, DBS 72 and 96	3-12
Figure 3- 11.	Wall-mount adaptor removal	3-13
Figure 3- 12.	Wall-mount adaptor replacement	3-14
Figure 3-13.	Handset guide insertion for wall-mounting, key phone	3-14
Figure 3- 14.	Desk stand removal for DSLT wall mounting	3-15
Figure 3-1 5.	Desk stand attachment for DSLT wall mounting	3-16
Figure 3- 16.	Handset guide insertion for wall-mounting, DSLT	3-16
Figure 3-17.	CPC memory clear switch	3-17
Figure 3-18.	Test telephone connection	3-19
Figure 4- 1.	DBS trunk connections (DBS 96)	1-3
Figure 4-2.	L-TRK Card Strap J1 and Switch Locations	4-7
Figure 4-3.	Attaching Caller ID Card to the L-TRK Card	4-8
Figure 4-4.	-48Vpower supply installation	4-10
Figure 4-5.	Connector 4 (CN4) strapping, Sync Unit	4-21
Figure 4-6.	T1 Sync Unit installation	4-22
Figure 4-7.	T1 MDF card installation	4-23
Figure 4-8.	Sync Unit and T1 connection, single-cabinet installation	4-24
Figure 4-9.	RJ48 pinouts, CN1 connector	3-25
Figure 4- 10.	T1 cabinet connections, single-cabinet installation	4-26
Figure 4- 11.	Sync cable connections, double-cabinet with a T1 in the slave	4-28
Figure 4-12.	Clock sync cable and sync cable connections, double-cabinet installation ..	4-30
Figure 4- 13.	DBS extension connections	4-3 1
Figure 4- 14.	SLT ringer box installation	4-38
Figure 4- 15.	EM1 filter installation (DBS 40 only)	4-39
Figure 4- 16.	DSS/72 connection using one cable with two pairs.....	4-41
Figure 4- 17.	EM/24 connection using one cable with two pairs	4-42
Figure 4- 18.	Trunk or extension expansion	4-44
Figure 5-1.	RS-232C connection	5-4

Figure 5-2.	SMDR Format for CPC-AII and CPC-B Version 3.1 or higher	5-5
Figure 5-3.	RAI connection	5-7
Figure 5-4.	Installation of music-on-hold and background music	5-9
Figure 5-5.	Cable punch-out plate, OPX Adaptor	5-11
Figure 5-6.	OPX installation	5-13
Figure 5-7.	External zone paging installation	5-15
Figure 5-8.	External general page/UNA installation	5-16
Figure 5-9.	External ringer (UNA device) installation	5-18
Figure 5-10.	Cable punch-out plate, Power Failure Unit	5-20
Figure 5-11.	Power Failure Unit (PFU) installation	5-21
Figure 5-12.	Cable punch-out plate, Voice Announce Unit	5-24
Figure 5-13.	Extension cord connection to the VAU	5-25
Figure 5-14.	Voice Announce Unit (VAU) installation	5-25
Figure 5-15.	Cable punch-out plate, Door Box Adaptor	5-29
Figure 5-16.	Installation of the door box, door opener, and door sensor	5-30
Figure 5-17.	Cable punch-out plate, Door Box Adaptor	5-31
Figure 5-18.	Installation of the door box, door opener	5-32
Figure 5-19.	Connections to the Door Box Adaptor	5-33
Figure 5-20.	Cable punch-out plate, SLTA	5-34
Figure 5-21.	SLTA installation	5-36
Figure 6-1.	Slot usage for two-cabinet systems, DBS 40 + DBS 40	6-4
Figure 6-2.	Slot usage for two-cabinet systems, DBS 72 + DBS 40	6-5
Figure 6-3.	Slot usage for two-cabinet systems, DBS 72 + DBS 72	6-6
Figure 6-4.	Slot usage for two-cabinet systems, DBS 96 + DBS 40	6-7
Figure 6-5.	Slot usage for two-cabinet systems, DBS 96 + DBS 72	6-8
Figure 6-6.	Slot usage for two-cabinet systems, DBS 96 to DBS 96	6-9
Figure 6-7.	Strap 3, MFR card	6-10
Figure 6-8.	Double-cabinet installation	6-11
Figure 6-9.	CBL-S to Connector Panel connection, slave cabinet	6-11

List of Tables

Table 1- 1.	DBS model numbers	1-3
Table 1-2.	FCC information	1-3
Table 1-3.	Interface information	1-4
Table 2- 1.	Trunk and extension capacities according to system size	2-5
Table 2-2..	Printed circuit card descriptions and maximums	2-6
Table 2-3.	Printed circuit package slot usage	2-8
Table 2-4.	CPC/SCC features	2-9
Table 3-1.	Battery backup packages for the DBS 40, 72, and 96	3-9
Table 4- 1.	Main trunks and expansion trunks provided with each system type	4-4
Table 4-2.	Pinouts and trunk numbers for the main trunk connector	4-5
Table 4-3.	Pinouts and trunk numbers for trunk expansion connector CN1	4-6
Table 4-4.	-48V current consumption for ground-start and DID trunks	4-9
Table 4-5.	-48V power supplies tested with the DBS	4-9
Table 4-6.	T1 Hardware requirements for single-cabinet systems	4-11
Table 4-7.	T1 Hardware requirements for double-cabinet systems	4-12
Table 4-8.	T1 slot usage for two-cabinet systems	4-13
Table 4-9.	T1 and analog trunk assignments, DBS 40	4-14
Table 4- 10.	T1 and analog trunk assignments, DBS 72	4-14
Table 4- 11.	T1 and analog trunk assignments, DBS 96	4-15
Table 4- 12.	Maximum T1 assignments for two-cabinet systems	4-15
Table 4-13.	T1 and analog trunk assignments, DBS 40 + 40	4-16
Table 4- 14.	T1 and analog trunk assignments, DBS 72 + DBS 72	4-16
Table 4-15.	T1 and analog trunk assignments, DBS 96 + DBS 40	4-17
Table 4-16.	T1 and analog trunk assignments, DBS 96 + DBS 72	4-18
Table 4- 17.	T1 and analog trunk assignments, DBS 96 + DBS 96	4-19
Table 4- 18.	Extension ports provided with each system	4-32
Table 4- 19.	Pinouts and color codes for extension connector CN12	4-33
Table 4-20.	Pinouts and color codes for extension connector CN13	4-34
Table 4-2 1.	Pinouts and color codes for extension connector CN14	4-35
Table 4-22.	Pinouts and color codes for extension expansion connector CN1	4-36
Table 5- 1.	RS-232C pin designations used for CN6	5-3
Table 5-2.	RAI compatibility	5-6
Table 5-3.	Maximum distances for direct connection to OPX stations	5-10
Table 5-4.	Switch settings for SW1, VAU	5-22
Table 5-5.	Switch settings for delay answer timing, VAU	5-23
Table 5-6.	Switch settings for DTMF detection timing, VAU	5-23
Table 5-7.	Switch settings for wait timing between dialed digits, VAU	5-23
Table 5-8.	Switch settings for abbreviated dialing digit length, VAU	5-24
Table 5-9.	Maximum distances for SLTA installation	5-35
Table 6- 1.	Trunk and extension port maximums for double-cabinet systems	6-3
Table 7-1.	Input power	7-3

Table 7-2.	Power consumption and heat generation	7-3
Table 7-3.	Battery backup capacity	7-3
Table 7-4.	Temperature and humidity requirements	7-4
Table 7-5.	Dimensions and weight, single-cabinet systems and phones	7-3
Table 7-6.	Dimensions for two-cabinet systems	7-4
Table 7-7.	Trunk and line capacities	7-5
Table 7-8.	Feature-related capacities	7-5
Table 7-9.	Hardware maximums for single-cabinet systems	7-7
Table 7-10.	Hardware maximums for double-cabinet systems	7-10
Table 7-11.	Maximum cabling distances	7-13
Table 7-12.	Voice path from KTELS to DBS	7-14
Table 7-13.	Data communications ports	7-14
Table 7-14.	Signaling to CO	7-15
Table 7-15.	Signaling levels	7-15
Table 7-16.	Transmission specifications	7-15
Table 7-17.	Tone Plan	7-16
Table 7-18.	DTMF frequencies	7-17

About This Manual

Purpose

This manual provides installation instructions for the Digital Business System (DBS). The following table summarizes the purpose of each chapter.

Chapter No.	Title	Purpose
1	Requirements	Includes DBS model numbers and FCC information that may be required during installation. In addition, environmental requirements are included to ensure proper operation.
2	System Overview	Provides an overview of the DBS. The overview includes descriptions of the cabinet, system configurations, printed circuit cards, and the call processor.
3	Cabinet Installation	Explains how to install and power up the cabinet. Before, you begin installation, be sure to read Chapter 1 - "Requirements."
4	Trunks and Lines	Describes trunk and line installation. See the "Peripheral Equipment" chapter for instructions on connecting peripheral equipment through trunks or lines.
5	Peripheral Equipment	Describes peripheral equipment installation. Some peripheral equipment also requires trunk and/or line interfaces (door phones or power failure units, for example). For information on trunk and line connections, see Chapter 4.
6	Double-Cabinet Systems	Explains installation procedures for two-cabinet systems.
7	Specifications	Contains frequently referenced DBS specifications.

Related Documents

For instructions on DBS programming, *see Programming Guidance (Section 400)*.

For detailed descriptions of DBS features, *see Feature Operation (Section 700)*.

Chapter 1. Requirements

This chapter includes DBS model numbers and FCC information that may be required during installation. In addition, environmental requirements for proper operation are included.

This chapter covers the following topics:

Topic	Page
Model Numbers	1-3
FCC Requirements	1-3
Environmental Requirements	1-5
Cleaning	1-6

Model Numbers

Table 1-1. DBS model numbers

DBS System	Model Number
DBS 40	VB-43030
DBS 72	VB-43050
DBS 96	VB-43060

FCC Requirements

General Requirements

- The Federal Communications Commission (FCC) has established Rules which permit the DBS to be directly connected to the telephone network. Standardized jacks are used for these connections. This equipment should not be used on party lines or coin lines.
- Key FCC information appears in the following table.

Table 1-2. FCC information

Item	Specification
FCC Registration Number	When used as a key system: ACK4A4-60490-KF-E
	When used as a PBX: ACK4A4-60489-MF-E
Ringer Equivalence	0.5B *
Network Address Signaling Code	E
<p>* The ringer equivalence number (REN) is useful to determine the quantity of devices that you may connect to your telephone line and still have all of those devices ring when your number is called. In most areas, the sum of the RENs of all devices on any one line should not exceed five (5.0). To be certain of the number of devices you may connect to your line, as determined by the REN, you should call your telephone company to determine the maximum REN for your calling area.</p>	

- Before connecting the DBS, provide the telephone company with the following information

Table 1-3. Interface information

Port Type	Type of Interface	USOC Jack Connector	Service Order Code*	Facility Interface Code
Loop Start Trunk	2-wire loop	RJ21X	9.0F	02LS2
Ground Start Trunk	2-wire ground	RJ21X	9.0F	02GS2
DID Trunk	2-wire DID	RJ21X	9.0F	02RV2-T
T1 Trunk	T1	RJ48C	6.0F	04DU9-DN, 04DU9-1SN
OPX Adaptor	OPX	RJ21X (at DBS DBS)	9.0F	0L13A 0L13B 0L13C (recommended)

- This equipment complies with Part 68 of the FCC Rules. On the left cover panel of this equipment is a label that contains, among other information, the FCC registration number and Ringer Equivalence Number (**REN**) for this equipment. If requested, provided this information to your telephone company.
- If the DBS telephone equipment caused harm to the Telephone Network, the Telephone Company may discontinue your service temporarily. If possible, they will notify you in advance. But if advance notice isn't practical, you will be notified as soon as possible. You will be advised of your right to file a complaint with the FCC.
- Under the FCC Rules, no customer is authorized to repair this equipment. This restriction applies regardless of whether the equipment is in or out of warranty.
- The Telephone Company may make changes in its facilities, equipment, operations or procedures, that **could** affect the proper operation of your equipment. If they do, you will be given advance notice so as to give you an opportunity to maintain uninterrupted service.
- The Digital Key Telephones designed for use with this system are hearing aid compatible.
- This equipment is capable of providing users access to interstate providers of operator services through the use of access codes. Modification of this equipment by call aggregators to block access dialing codes is a violation of the Telephone Operator Consumers Act of 1990.
- If you experience trouble with the DBS, please contact Panasonic Communication & Systems Company, Business Telephone Systems Division, Two Panasonic Way Panazip **7B-3, Secaucus**, NJ 07094 (Phone: (1-800-822-

0909) for repair/warranty information. The telephone company may ask you to disconnect this equipment from the network until the problem has been corrected.

DID Requirements

Allowing this equipment to be operated in a manner that does not provide for proper answer supervision is a violation of Part 68 of the FCC Rules. Proper answer supervision occurs if this equipment returns answer supervision to the PSTN when DID calls are:

- Answered by the called station
- Answered by the attendant
- Routed to a recorded announcement that can be administered by the CPE user
- Routed to a dial prompt.

T1 Requirements

This device must only be connected to the T1 network connected behind an FCC Part 68 registered channel service unit. Direct connection is not allowed.

Environmental Requirements

Temperature: The environment should be free from excessive temperatures in order to avoid component damage. Room temperatures should be 32 to 104° F (0 to 40° C).

Humidity: The environment should be free from excessive humidity, which may rust metallic parts and degrade performance. Do not install the system where humidity could condense on its surfaces. Relative humidity ranges should be between 30 and 90 percent.

Ventilation: Adequate ventilation must be provided to allow upward air circulation through the cabinet grille.

Gas and airborne particles: To avoid corrosion or oxidation of electrical contacts, the environment should be free from airborne particles and corrosive gas.

Electrical noise: The environment should be free from excessive electrical noise, which could disturb the operation of digital circuits. The system should be located at least 10 ft. (3 m) away from welders, dimmers, or other high-current machines. Phones connected to the system should not be located near fluorescent lamps, air conditioners, washing machines, TVs, or radios.

Vibration: The environment should be free from excessive vibration, which could loosen components.

Water Exposure: Because the DBS is an electric device, exposure to water is dangerous. Do not place anything containing water on the system. Do not install under overhead plumbing, sprinkler system valves, or in areas that are susceptible to flooding.

Lighting: Sufficient lighting is required for testing and maintenance.

Lightning Protection/Grounding: The system must be properly grounded to protect from lightning damage. The following UL conditions must be met to ensure proper grounding. (For grounding instructions, see page 3-5.)

- Supplemental and independent equipment grounding conductors are to be installed between the system and the wiring system ground.
- One of the equipment grounding conductors must be a conductor that is as large or larger than the ungrounded branch-circuit supply conductors. The equipment grounding conductor is to be installed as part of the circuit that supplies the system and is to be connected to ground at the service equipment. Bare, covered, or insulated grounding conductors are acceptable. Individually covered or insulated grounding conductors should have a continuous outer finish that is either green or green with one or more yellow stripes. The equipment grounding conductor should be connected to ground at the service equipment.
- The other equipment grounding conductor shall comply with the general rules for grounding contained in Article **250** of the **National Electric Code, NFPA 70**, but its connection to ground shall not depend on the cord and plug of the system.
- The attachment-plug receptacles of the same type as that used by the systems that are in the vicinity of the DBS are all to be of a grounding type, and the equipment grounding conductors serving these receptacles are to be connected to earth ground at the service equipment.
- A marking adjacent to the telecommunications jacks must instruct the user to connect a supplementary equipment grounding conductor before any telecommunication lines are connected to the product or system.

Cleaning

- Use a *slightly* damp cloth to clean the phones. The phones should never be cleaned with benzene, paint thinner, or other solvents.

Chapter 2. System Overview

This chapter gives an overview of the Digital Business System (DBS). This overview includes descriptions of the DBS cabinet, system configurations, printed circuit cards, and the call processor.

This chapter covers the following topics::

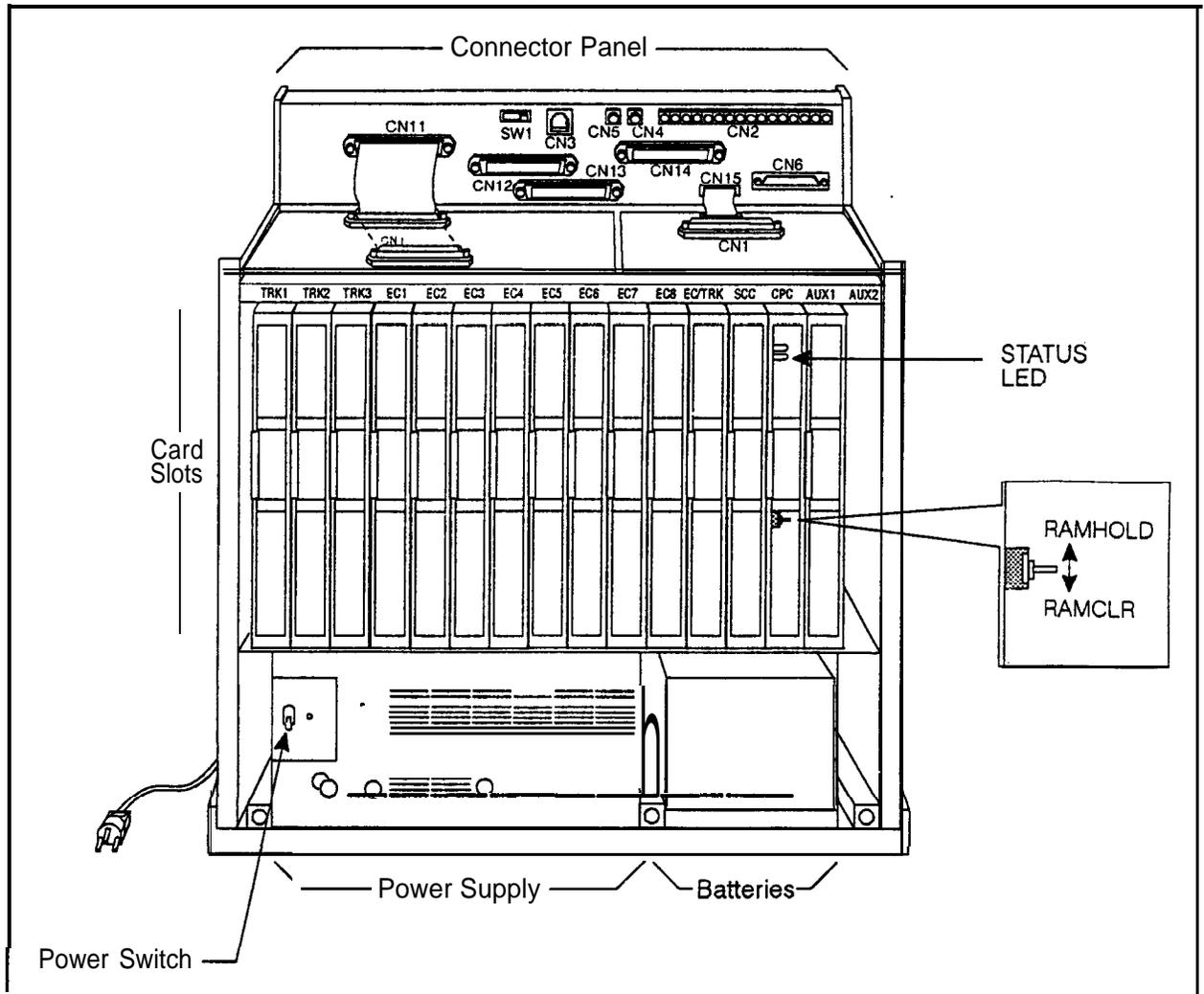
Topic	Page
· Cabinet Description	2-3
Configurations	2-5
Printed Circuit Cards	2-6
Processor Description	2-9

Cabinet Description

Panasonic's Digital Business System (DBS) is a hybrid telephone system that can be used as a key service unit (KSU) or a private branch exchange (PBX).

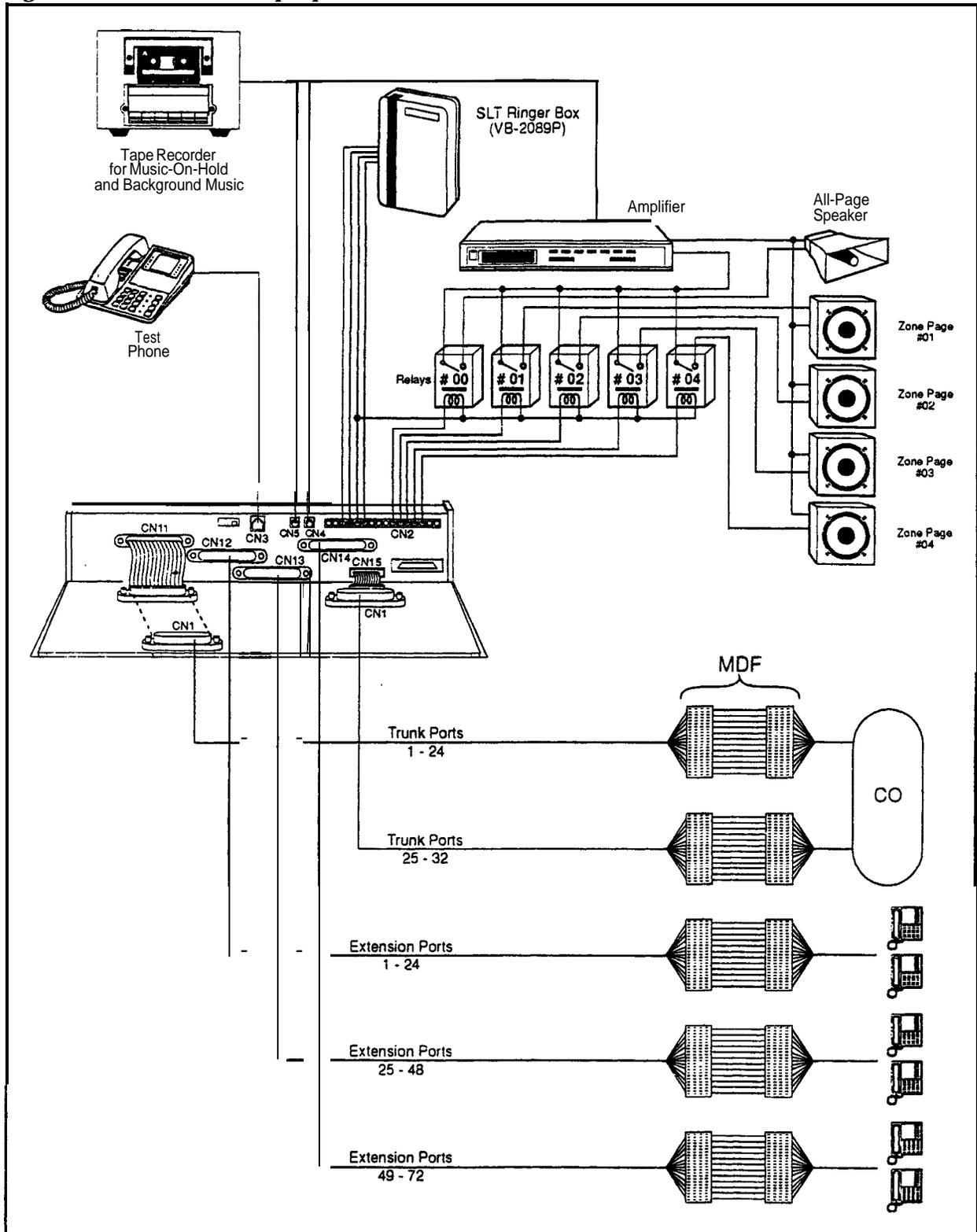
The DBS cabinet includes an AC power supply, backup batteries (optional), dedicated card slots, and a central connector panel for line and trunk connections.

Figure 2-1. The DBS cabinet (DBS 96 shown)



In addition to trunk and line connection, the connector panel is used to connect peripheral equipment such as paging speakers, external ringers, and music-on-hold/background music sources. Figure 2-2 on page 2-4 shows trunk and line connections, as well as some peripheral connections. Peripheral connections are covered in detail in Chapter 5, "Peripheral Equipment."

Figure 2-2. Trunk, line, and peripheral connections



Configurations

The DBS comes in three models, which provide from 40 to 96 ports. Up to two systems can be combined to increase port capacity up to 192 ports (DBS 96 + DBS 96).

In addition to dedicated trunk and extension slots, each system includes one expansion slot (labeled **EC/TRK**) that can be used for either trunks or extensions. The following table shows port capacities for individual systems and for different combinations of systems.

Table 2-1. Trunk and extension capacities according to system size

System Size	Trunk Ports	Extension Ports	Expansion Ports (Trunks or Extensions)
DBS 40	8	24	8
DBS 72	16	48	8
DBS 96	24	64	8
DBS 40 + DBS 40	16	48	8 (See Note 1.)
DBS 72 + DBS 40	24	72	0 (See Note 2.)
DBS 72 + DBS 72	32	96	8 (See Note 1.)
DBS 96 + DBS 40	32	88	16
DBS 96 + DBS 72	40	112	16
DBS 96 + DBS 96	48	128	16
Notes:			
1. The slave cabinet must be used for expansion ports.			
2. When a DBS 72 and DBS 40 are connected, expansion ports cannot be used.			

Printed Circuit Cards

The following table describes the printed circuit cards and other equipment that can be used with the DBS. Also included are brief descriptions of each card and the maximum number that can be installed in each cabinet

Table 2-2. Printed circuit card descriptions and maximums

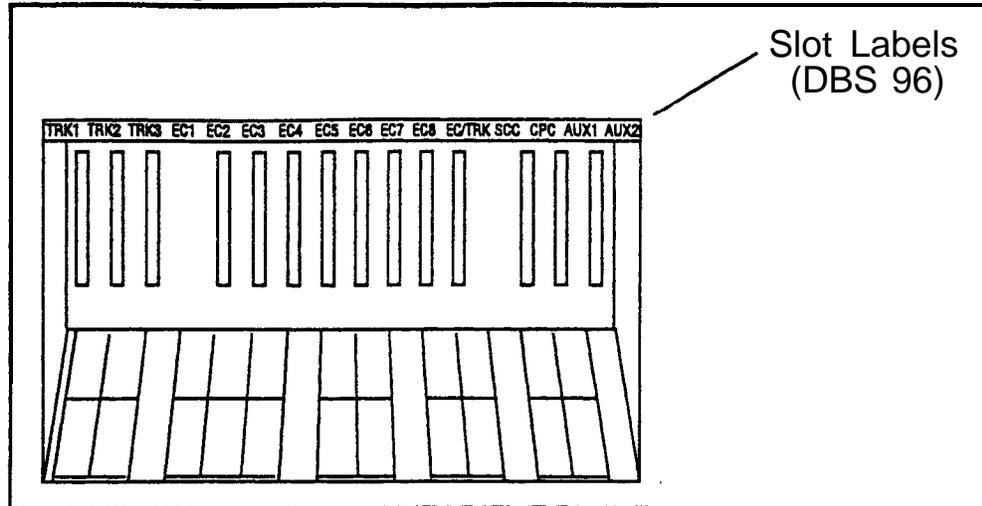
Part No.	Printed Circuit Cards and Other Equipment	Quantity		
		DBS 40	DBS 72	DBS 96
VB-43110	Cable kit for 2-system connection	N/A	N/A	N/A
VB-43410	Call processor card (CPC-A)	1	1	1
VB-43411	Call processor card (CPC-B)			
VB-43412	Call processor card (CPC-AII)			
VB-43420	Service circuit card (SCC-A)	1	1	1
VB-4342 1	Service circuit card (SCC-B)			
VB-4343 1	DTMF signal receiver for 8 SLT lines (MFR/8)	1	1	1
VB-43510A	4-port loop-start trunk card (L-TRK/4)	2	3	4
VB-43511A	8-port loop-start trunk card (L-TRK/8)			
VB-43541	8-port Direct-inward-dialing trunk card (DID)			
VB-4353 1	8-port ground-start trunk card (G-TRK/8)			
VB-43561	T1 Interface	1	1	1
VB-43562	T1 MDF card	1	1	1
VB-43563	T1 Sync Unit	1	1	1
VB-43611	8-port digital extension card (DEC)	4	7	9
VB-43621A	8-port analog extension card (AEC)	3	4	4
Expansion Connectors				
VB-43 120	Trunk expansion connector	1	1	1
VB-43121	Extension expansion connector			
Doorbox Equipment (Trunk)				
VB-43701	2-port Door box adaptor	8"	12*	16*
VB -43705	Door box	16*	24*	32*
Doorbox Equipment (Extension)				
VB -437 11	1-port Extension-Based Door box adaptor	4	4	4
VB-43705	Door box	4	4	4

Part No.	Printed Circuit Cards and Other Equipment	Quantity		
		DBS 40	DBS 72	DBS 96
Optional Equipment				
VB-43706	Remote Administration Interface (RAI-A)	1	1	1
VB-43707	Remote Administration Interface (RAI-B)			
VB-4355 1	8-circuit Caller ID daughter board	1 per VB-43511AAEC	1 per VB-43511A AEC	1 per VB-43511A AEC
V-R-43 130	Built-in system backup battery kit	1	1	1
v-B-43709	Single Line Telephone Adaptor	8	14	18
VB-2089P	SLT ringer box	1	1	1
VA-43703	4-line power failure unit	6	8	8
V-B-43702	Off-premise extension adaptor	8	8	8
VB-43940	Standard Application processor interface (API)	1	1	1
VB-43941	Telephony Services Kit (includes revised API card, described in Telephone Services Documentation)	1	1	1
* Note: These maximums are based on overall trunk capacities and do not allow for trunks used for outside lines.				

Printed circuit cards are installed in dedicated slots in the DBS cabinet. Table 2-3 shows the cards that can be installed in each slot. Figure 2-3 on page 2-9 illustrates slot labels.

Table 2-3. Printed circuit package slot usage

Card Type	Card	Acceptable Slots
Analog Trunks	L-TRK/4	TRK or EC/TRK
	L-TRK/8	
	G-TRK/8	
	DID/8	
Digital Trunks	T1/24	EC/TRK
Digital Lines	DEC/8	EC 1-8 or EC/TRK
Analog Lines	AEC/8	EC 2-8 or EC/TRK
Service Circuits	SCC-A	SCC
	SCC-B	
Processor Cards	CPC-A	CPC
	CPC-B	
	CPC-A11	
DTMF Circuits	MFR/8	AUX1 or AUX2 CPC (See Note 1.)
Interface Cards	API (1 or 2 Circuits)	AUX1 or AUX2 (See Note 2.)
	CBL-M	CPC or AUX2 (See Note 3.)
	CBL-S	
Notes:		
1. With one-cabinet systems, the MFR card can be installed in the AUX1 or AUX2 slot, depending on whether an API card is used. With two-cabinet systems, placement of the MFR cards differs according to the cable kit used. With Cable Kit Version 1.1, one MFR is installed in the Master AUX1, and one MFR is installed in the Slave AUX1. With Cable Kit Version 1.2, both MFR cards are installed in the slave cabinet--one in the CPC slot and one in AUX1. (See page 6- 10 for instructions on installing MFR cards in double-cabinet systems.)		
2. The API card is installed in AUX1 only when a CBL card is used.		
3. Part VB-43 110 includes both the CBL-M and CBL-S cards, as well as the required connecting cables. CBL-M is installed in the master cabinet, CBL-S in the slave cabinet.		

Figure 2-B. Slot labels for *printed circuit packages*

Processor Description

DBS call-processing is controlled by the Call Processor Card (CPC). Three CPC models are available: CPC-A, CPC-B, and CPC-AII.

In most cases, the features provided with the DBS depend on the model and software version of the CPC. However, the availability of some features also depends on the model and version of the Service Circuit Card (SCC).

The following table shows some of the major differences between CPC/SCC features. Other differences are noted throughout this manual when they apply to specific installation instructions. For more details on the features provided with each processor, see *Feature Operation, Section 700*.

Table 2-4. *CPCISCC features*

Feature	CPC/SCC Requirements
Double cabinet system	CPC-B, Version 1.0 or greater plus SCC-B
DID	CPC-B, Version 2.0 or greater plus SCC-B, Version 1.2 or greater
T1 Interface	CPC-B, Version 4.0 or greater plus SCC-B. (The CPC-B must have BPU 1.3 or later. The SCC-B ROM 1.3 or later is required if the CO does not provide dial tone.)

Chapter 3. Cabinet Installation

This chapter explains how to install and power up the cabinet. Before you begin installation, be sure to read the “Requirements” chapter, which begins on page 1-1.

This chapter covers the following topics::

Topic	Page
Wall-Mounting the Cabinet	3-3
Grounding	3-5
Card Installation	3-6
Battery Backup	3-9
Key Phone Wall Mounting	3-13
DSL/T Wall Mounting	3-15
System Initialization	3-17
Test Phone	3-18

Wall-Mounting the Cabinet

Guidelines



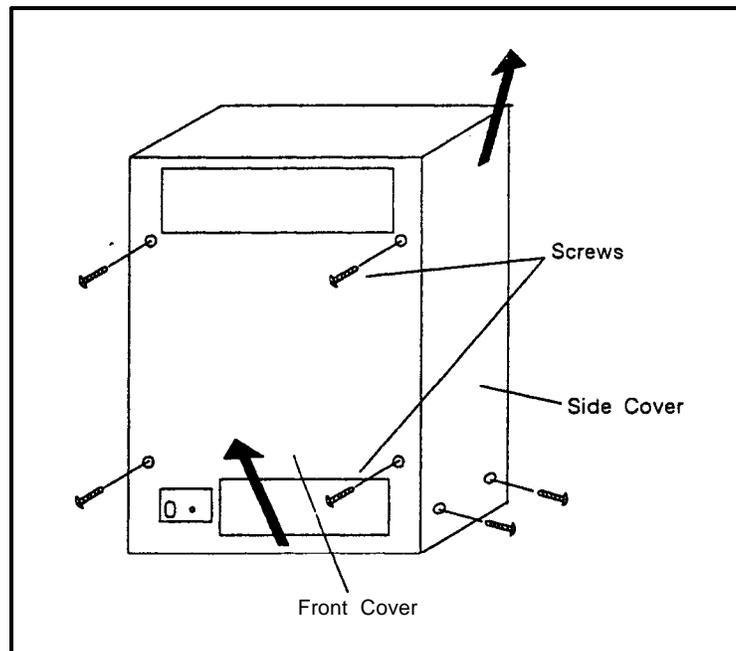
Caution: Always turn the power switch OFF before beginning installation.

- The DBS is shipped with the cover installed to protect components. Before wall-mounting the cabinet, remove the cover.
- Handle the cabinet carefully to avoid damage.

Installation

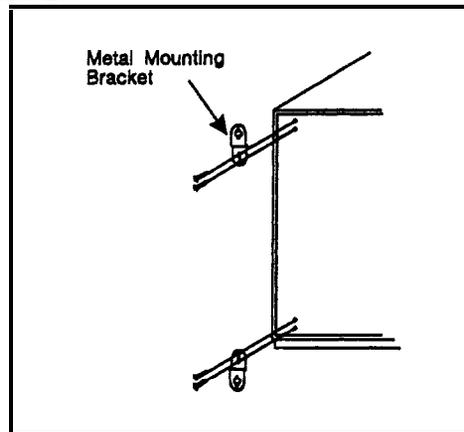
1. Remove the eight screws from the front and sides of the cabinet.
2. Take the front cover off by pulling it from the bottom and lifting it up.
3. Take the side covers off by sliding them up, then away.

Figure 3-1. Cover removal



- Attach the mounting brackets to the four corners of the back side of the cabinet.

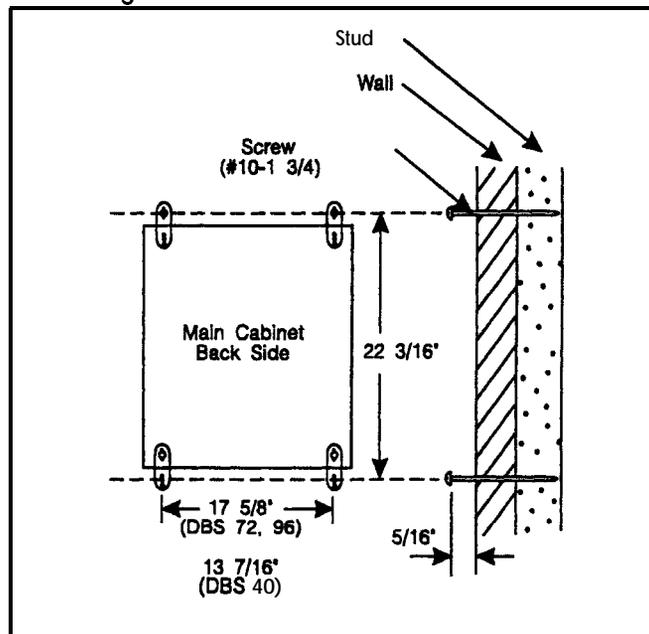
Figure 3-2. Cabinet mounting bracket



- Install four screws in the wall studs according to the dimensions given in Figure 3-3. (Note that the width dimension is different for the DBS 40.)

The screws are used to attach the mounting brackets to the wall. The screws should protrude from the wall $5/16$ in.

Figure 3-3. Cabinet wall-mounting



- Hang the cabinet on the wall by placing the mounting brackets over the screws.
- Tighten the screws to secure the cabinet.

Grounding

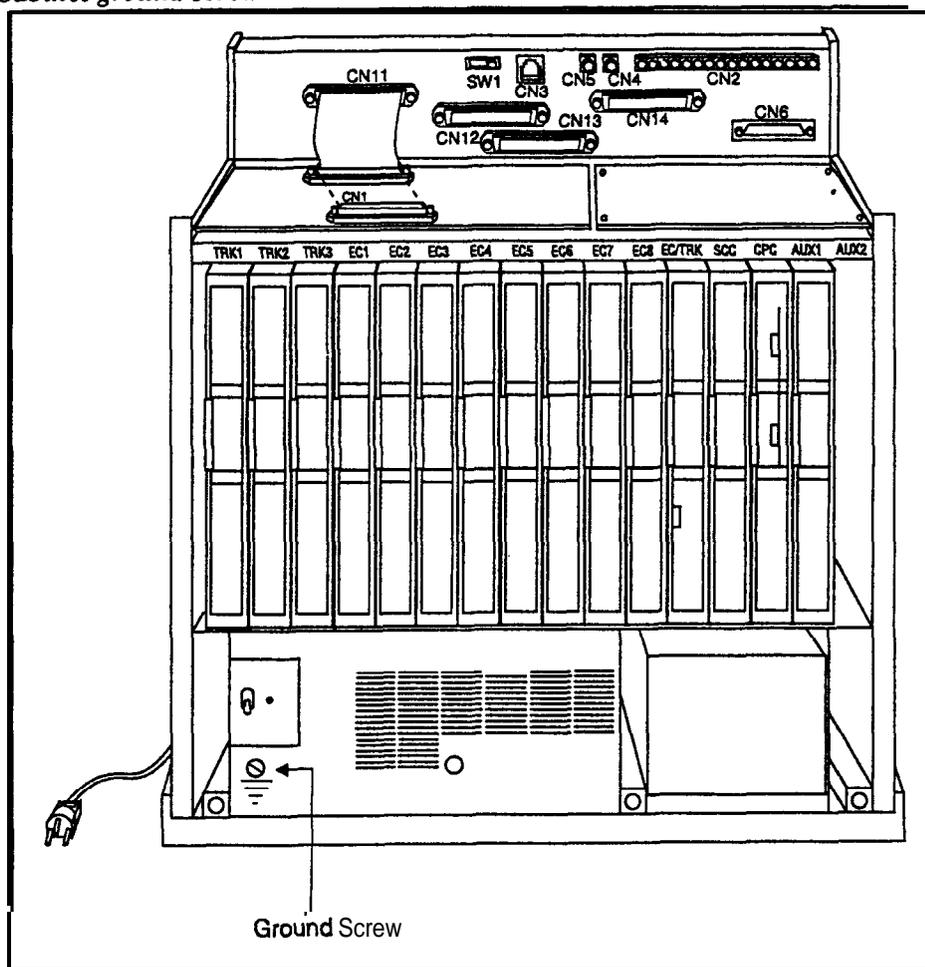
Guidelines

- Before grounding the DBS, read the “Lightning Protection/Grounding” requirements beginning on page 1-6.
- The ground cable must be at least 18 AWG.
- Resistance to ground must be 10 Ohms or less.

Installation

1. Attach the ground cable to the ground screw on the front of the power supply.
2. Connect the ground cable to the building ground.

Figure 3-4. Cabinet ground screw



Card Installation

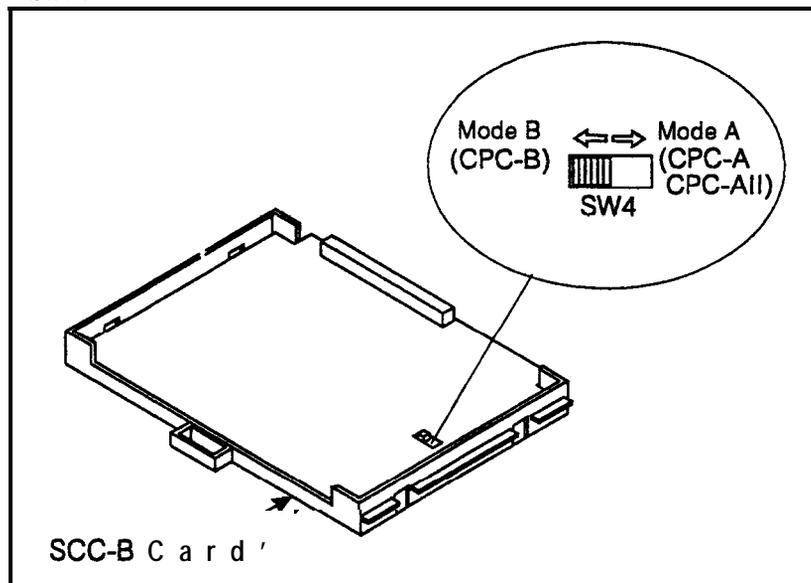
Guidelines



Caution: Before handling printed circuit cards, discharge static electricity by grounding yourself. Static electricity can damage components. Turn off the power before **installing**. Installing cards with the power on can damage components.

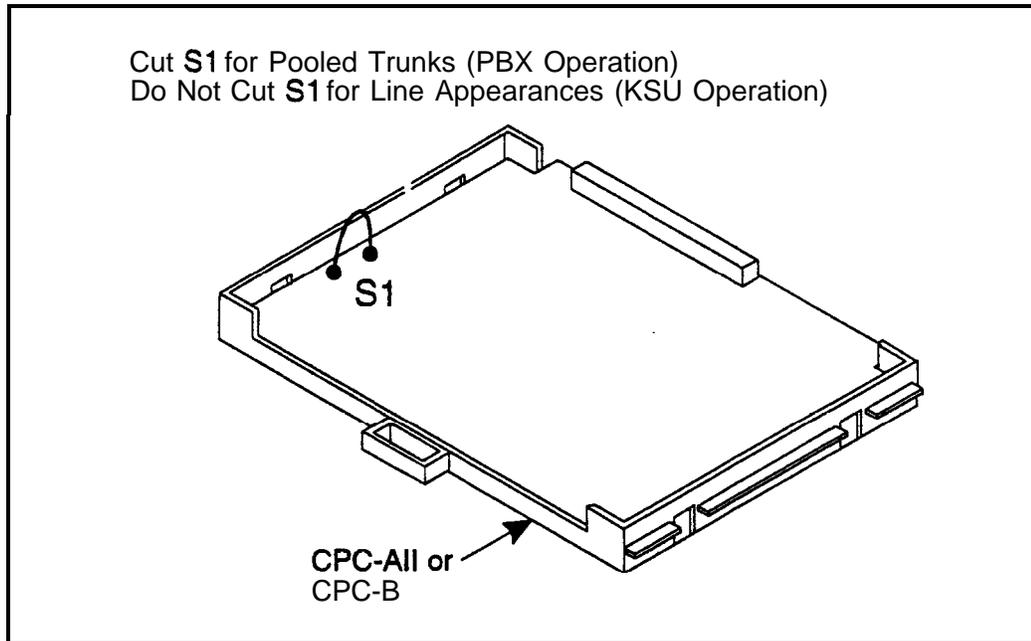
- Install the cards in the following order:
 - TRK
 - DEC
 - AEC or API
 - SCC
 - CPC
 - MFR or CBL
- If you are installing a CPC-A or CPC-AII card with an SCC-B card, set SW4 to “Mode A.” The default setting is “Mode B,” which specifies that CPC-B is used.

Figure 3-5. SCC-B Switch 4



- Before installing the CPC card, determine if the DBS will be used as a KSU or PBX. To use it as a **PBX**, cut **Strap S1** on the CPC. Cutting this strap allows use of pooled trunks as opposed to line appearances.

Figure 3-6. CPC **Strap S1**

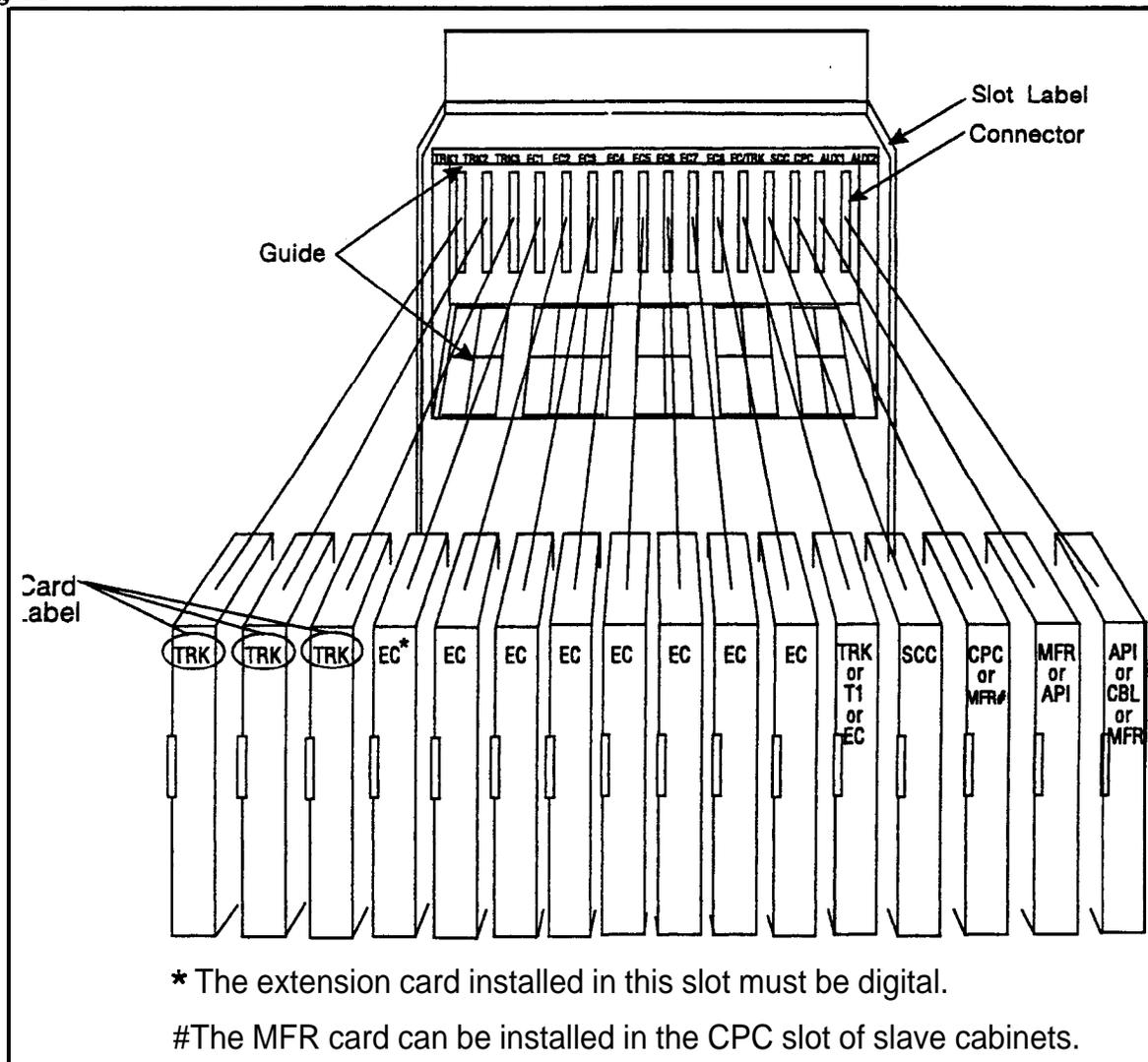


- Install cards only in their dedicated slots. The slot type is marked on the cabinet directly above each slot.

Installation

1. With the lettering on the card pointed up, position the card within the slot guides. (See Figure 3-7.)
2. Hold the card on the top and bottom edges with both hands and carefully push the card into the slot.
3. When the connector at the far end of the card touches the corresponding connector on the backplane, press the card in until it is firmly seated.

Figure 3-7. Printed circuit card installation



Battery Backup

Guidelines

- The DBS 40 uses two 12-volt batteries; the DBS 72 and 96 use four 6-volt batteries or two 12-volt batteries. The following table includes the part numbers for the battery packages.

Table 3-1. Battery backup packages for the DBS 40, 72, and 96

System	Battery Backup Part No.
DBS 40	VB-43130 (some systems may be equipped with VB-2450A-2P)
DBS 72 and 96	VB-43 130 (some systems may be equipped with VB-2650-2P)

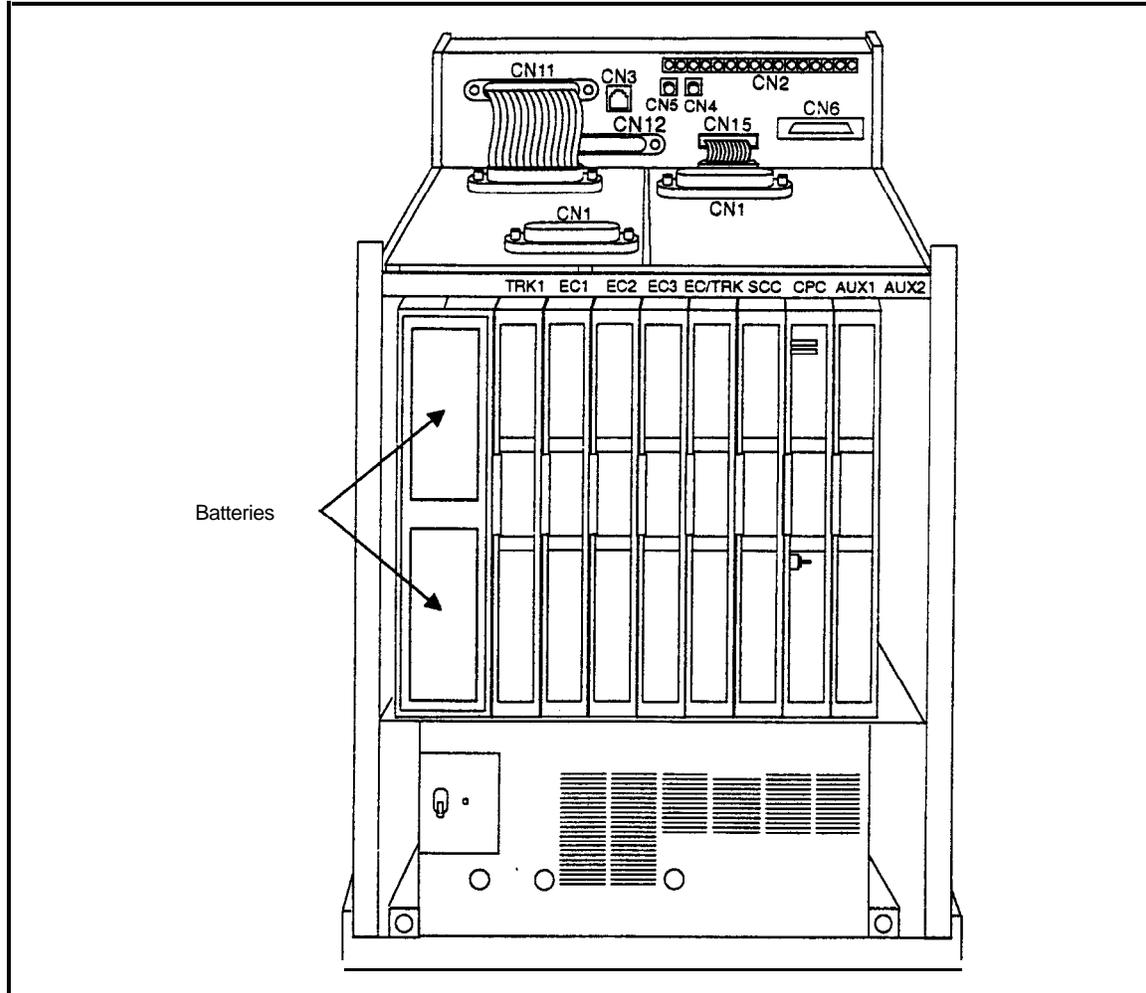
- The backup batteries are connected in a series circuit, using cables provided with the DBS.
- With maximum traffic, the backup batteries last up to 40 minutes for the DBS 40 and 72, and up to 30 minutes for the DBS 96.
- The backup batteries should be replaced about every 3 years.

	<p>THE PRODUCT YOU HAVE PURCHASED MAY CONTAIN SEALED LEAD ACID BATTERIES WHICH ARE RECYCLABLE. AT THE END OF THEIR USEFUL LIFE, UNDER VARIOUS STATE AND LOCAL LAWS, IT IS ILLEGAL TO DISPOSE OF THESE BATTERIES INTO YOUR MUNICIPAL WASTE STREAM. PLEASE CALL 1-800-SAV-LEAD FOR INFORMATION ON HOW TO RECYCLE THESE BATTERIES.</p>
---	---

Installation for the DBS 40

1. Place one battery in the top tray of the battery compartment, the other battery in the bottom tray.

Figure 3-8. Battery location. DBS 40

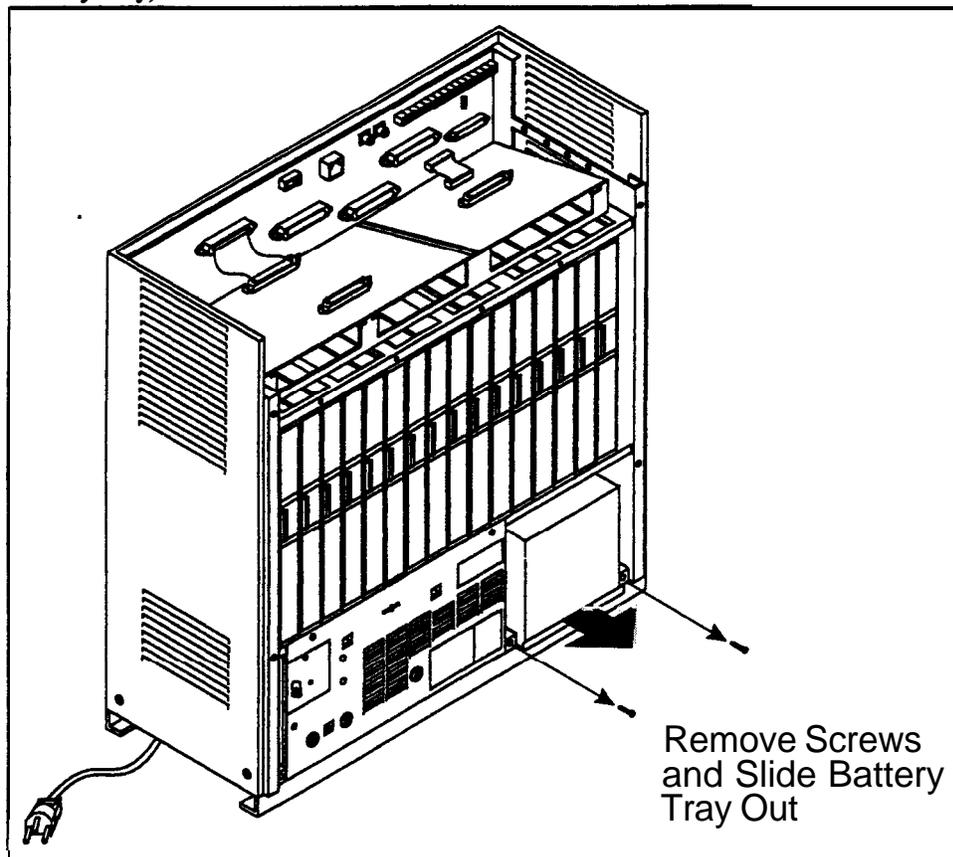


2. Connect the positive cable (red) to the + terminal of the top battery.
3. Connect the connecting cable (white) to the - terminal of the top battery.
4. Connect the negative cable (blue) to the - terminal of the bottom battery.
5. Connect the connecting cable (white) from the top battery to the + terminal on the bottom battery.

Installation for the DBS 72 and 96

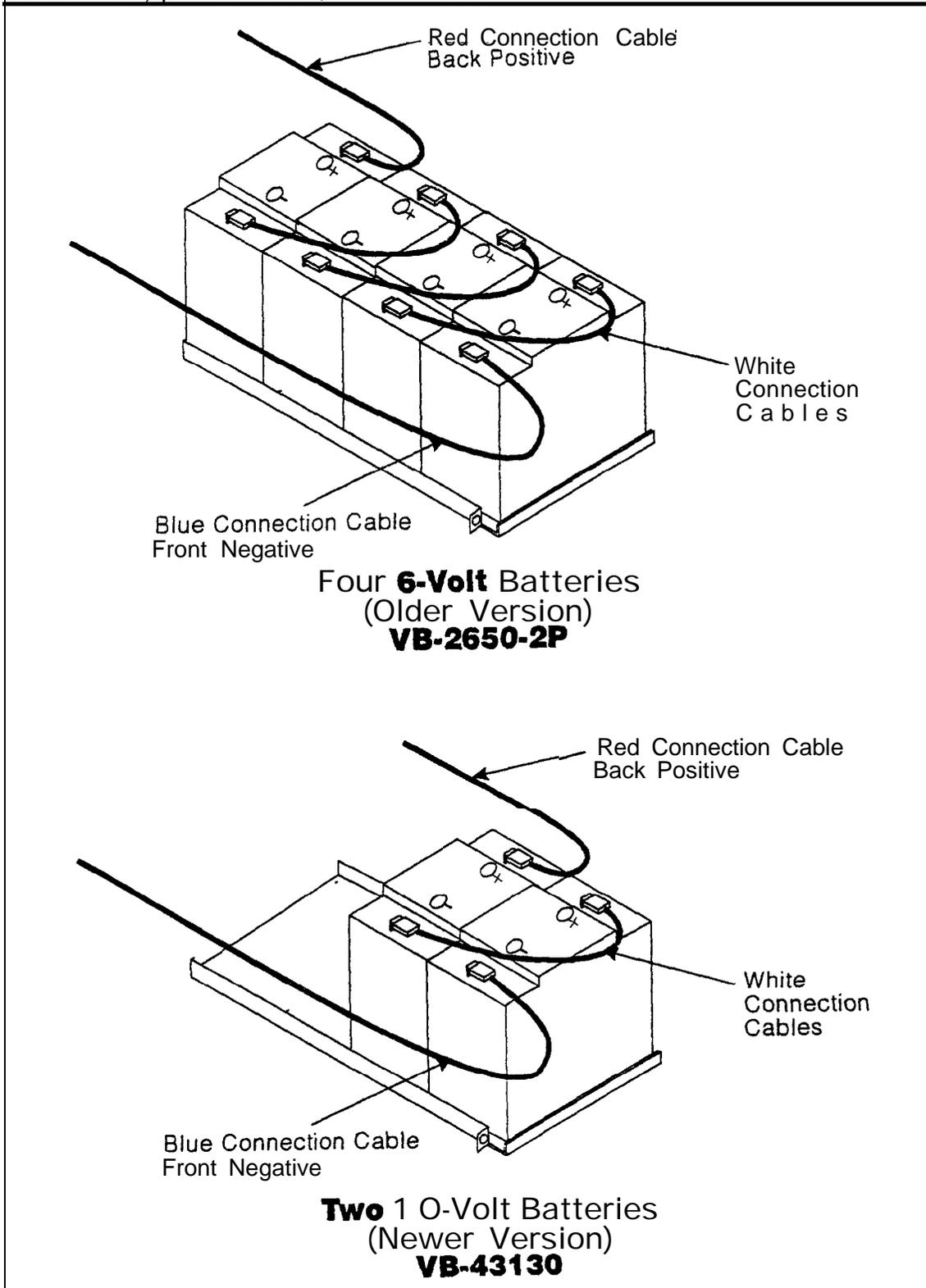
1. Slide the battery compartment out and place the batteries inside the tray.

Figure 3-9. Battery tray, DBS 72 and 96



2. Connect the positive cable (red) to the + terminal on the first battery.
3. Connect the negative cable (blue) to the - terminal on the last battery.
4. Connect the remaining positive and negative terminals with the white connection cables, as shown in Figure 3-10.

Figure 3-10. Battery pack connection, DBS 72 and 96

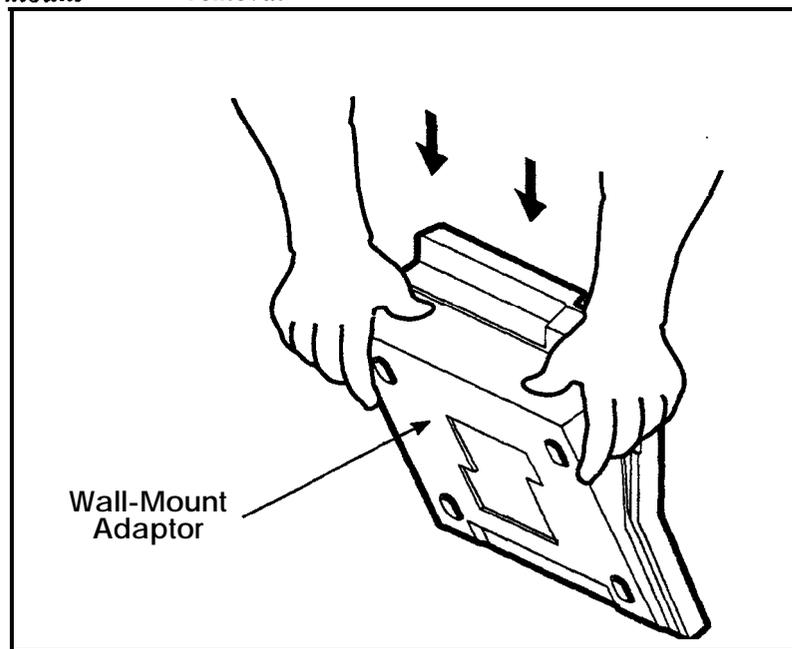


Key Phone Wall Mounting

DBS key phones can be modified for wall mounting by reversing the wall-mount adaptor on the bottom of the phone. The wall-mount adaptor includes a small hole for attaching the phone to a screw inserted in the wall.

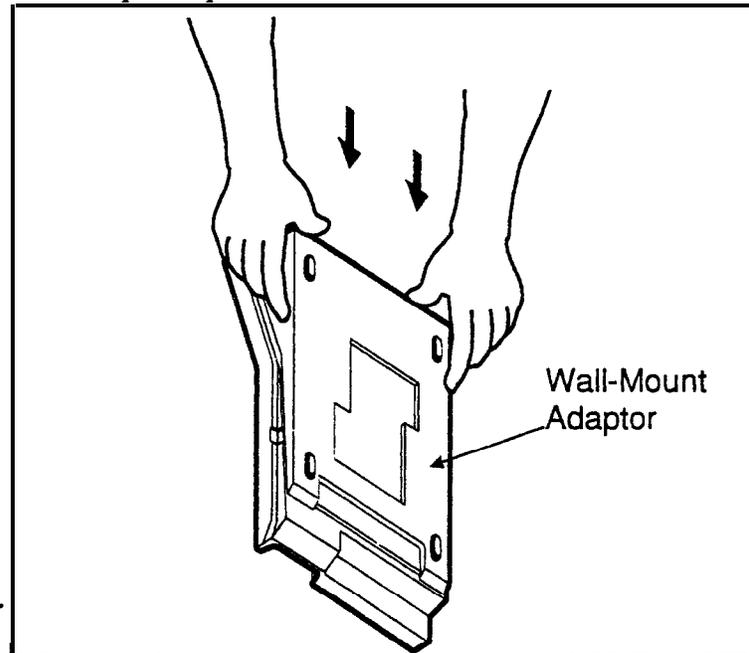
1. Place the bottom edge of the telephone on a desk or other hard surface.
2. Press the wall-mount adaptor down until it detaches from the phone (Figure 3-11).

Figure 3-11. Wall-mount adaptor removal



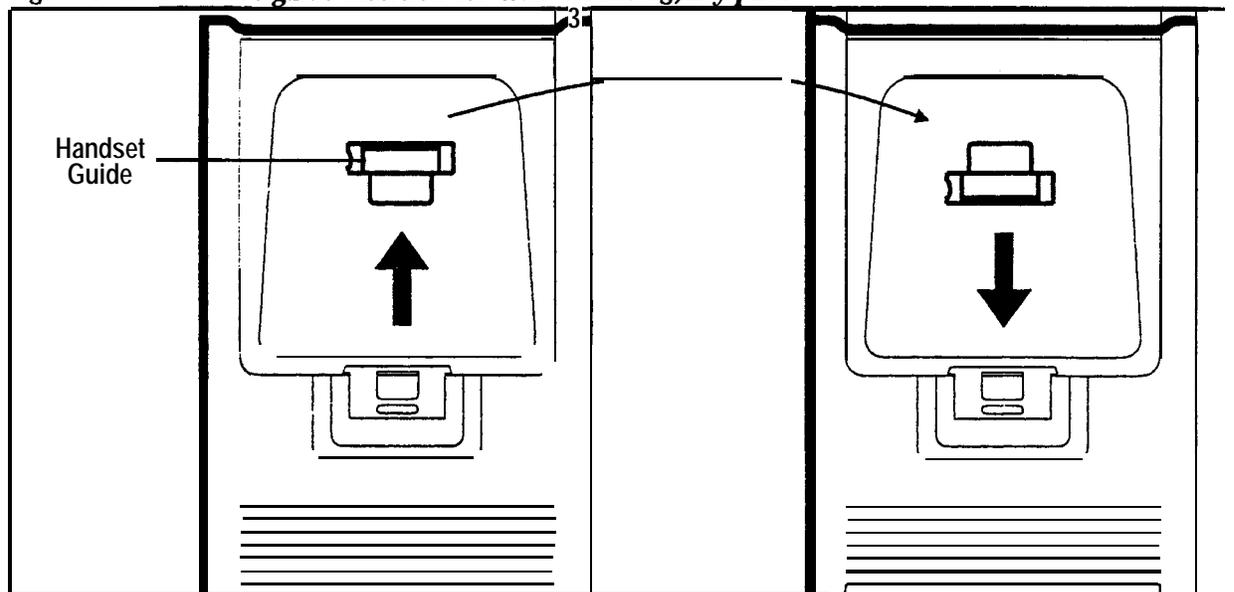
3. Turn the wall-mount adaptor around and re-attach it to the phone.

Figure 3-12. Wall-mount adaptor replacement



4. Remove the handset guide with a small screwdriver, turn it over, and reinsert it into the phone.

Figure 3-13. Handset guide insertion for wall-mounting, key phone

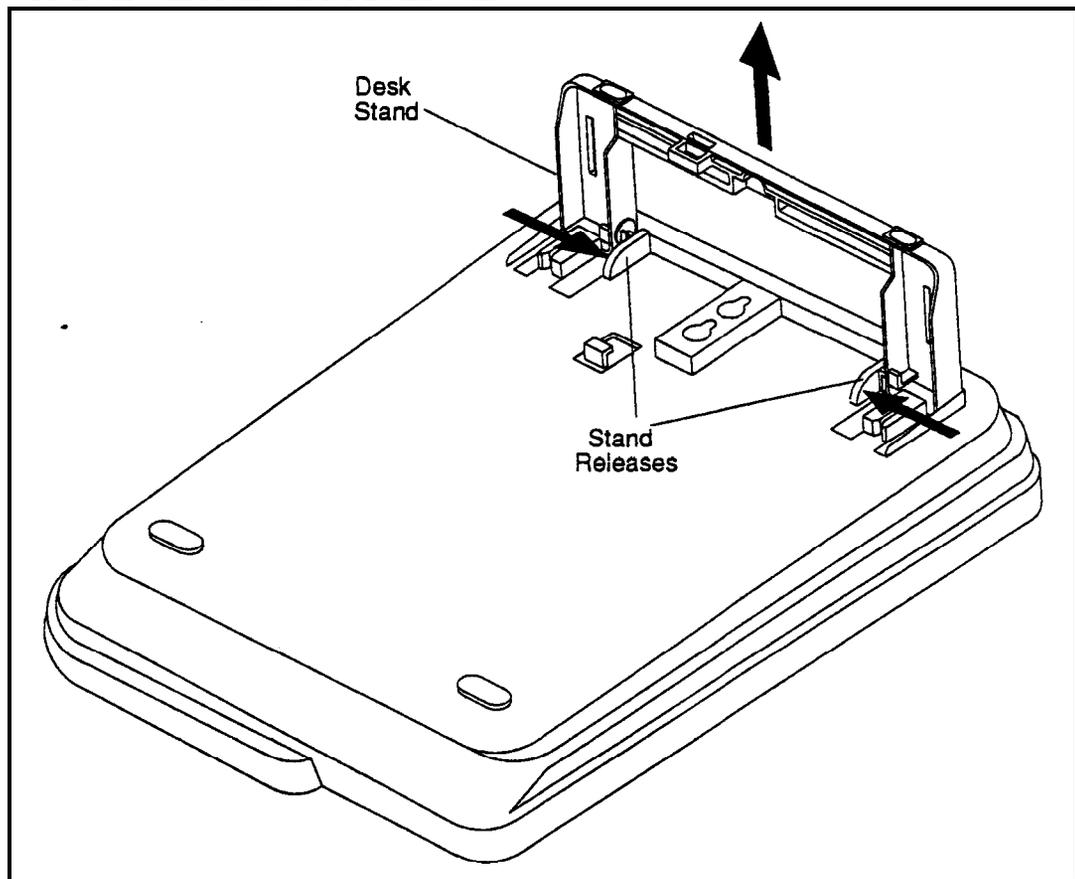


DSL Wall Mounting

Digital Single-Line Telephones (DSLTs) can be modified for wall mounting by removing the desk stand and mounting it on the bottom of the phone. The back of the DSLT and the desk stand include slots for attaching the phone to a screw inserted in the wall.

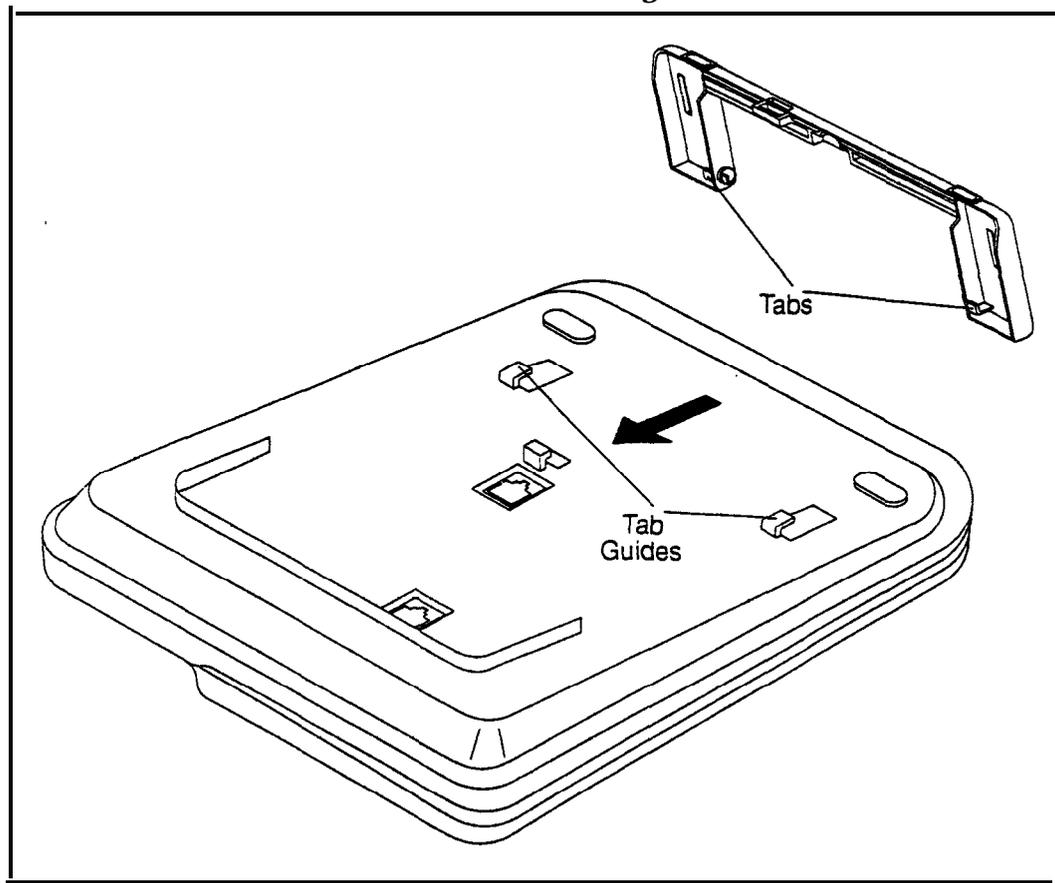
1. Press the stand releases in toward the middle of the phone to release the desk stand (Figure 3-14).

Figure 3-14. Desk stand removal for DSLT wall mounting



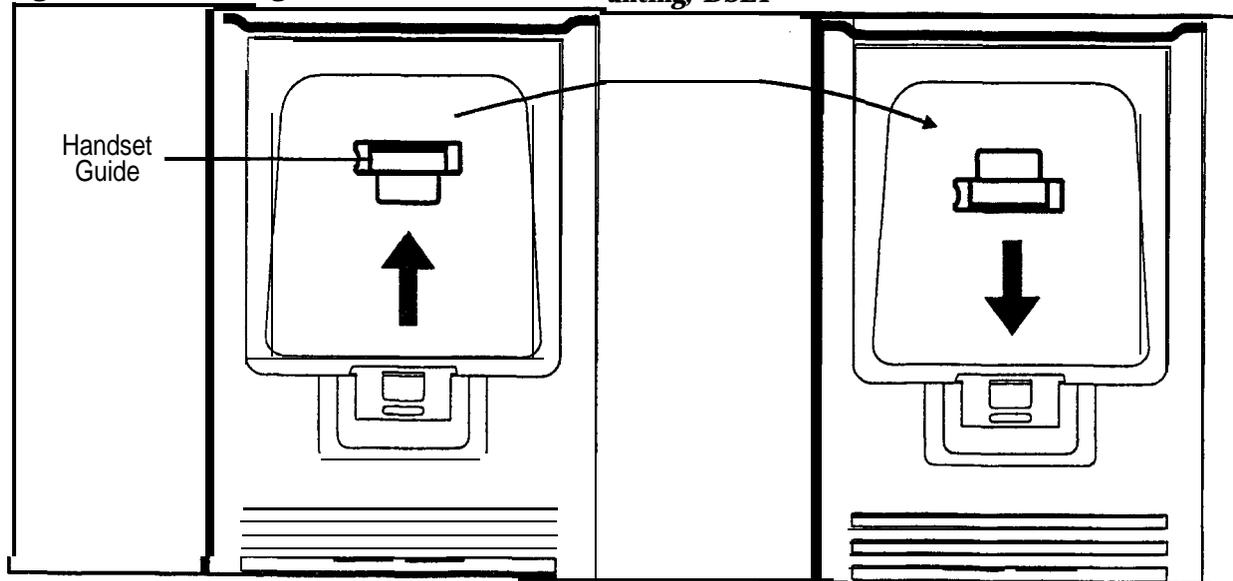
2. Attach the desk stand to the bottom of the phone by aligning the tabs and tab guides and sliding it into place (Figure 3-15).

Figure 3-15. Desk stand attachment for DSLT wail mounting



3. Remove the handset guide with a small screwdriver, turn it over, and reinsert it into the phone,

Figure 3-16. Handset guide insertion for wall-mounting, DSLT



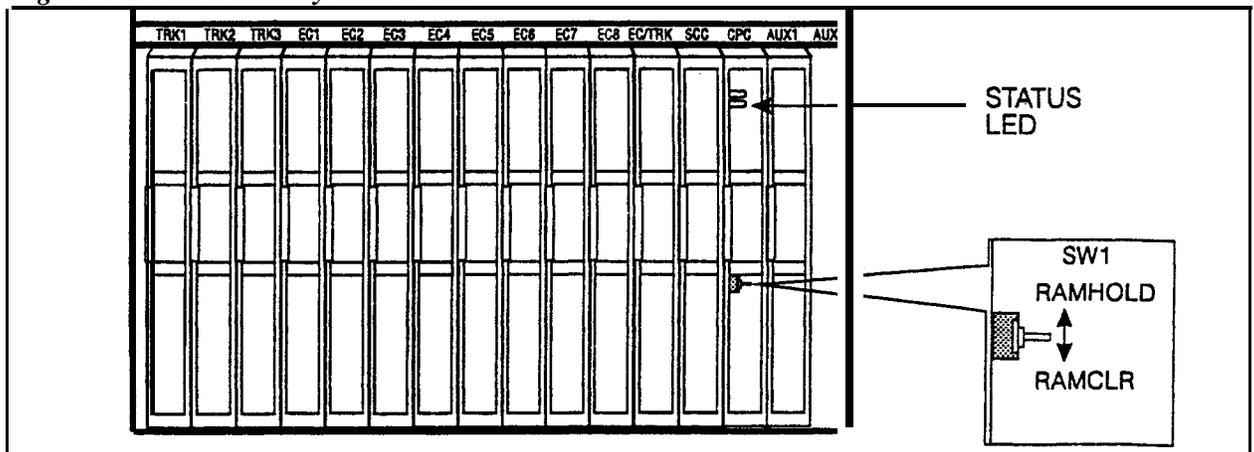
System Initialization

1. Confirm that the DBS power switch is OFF.
2. Plug the power cord into a dedicated 120V 15 amp AC wall outlet.

Note: A surge protector should be installed on the power cord.

3. Set SW1 on the CPC card to RAMCLR (RAM Clear).

Figure 3-17. CPC memory clear switch



4. Turn the power switch on.

As the system loads, the bottom LED lamp on the CPC card will flash.

5. Once the bottom LED lamp on the CPC card stops flashing, set SW1 on the CPC to RAMHOLD.

Test Phone

Guidelines

- The test terminal (CN3) on the DBS Connector Panel can be used to connect a display phone for programming.

The test terminal can be used for initial programming before extension cabling is completed.

- The test terminal is turned on by flipping SW1 on the Connector Panel to the “Test” position. When SW 1 is in the test position, extension ports 7 and 8 are connected through the test terminal. When SW1 is not in the test position, extension ports 7 and 8 are connected through the **MDF**.

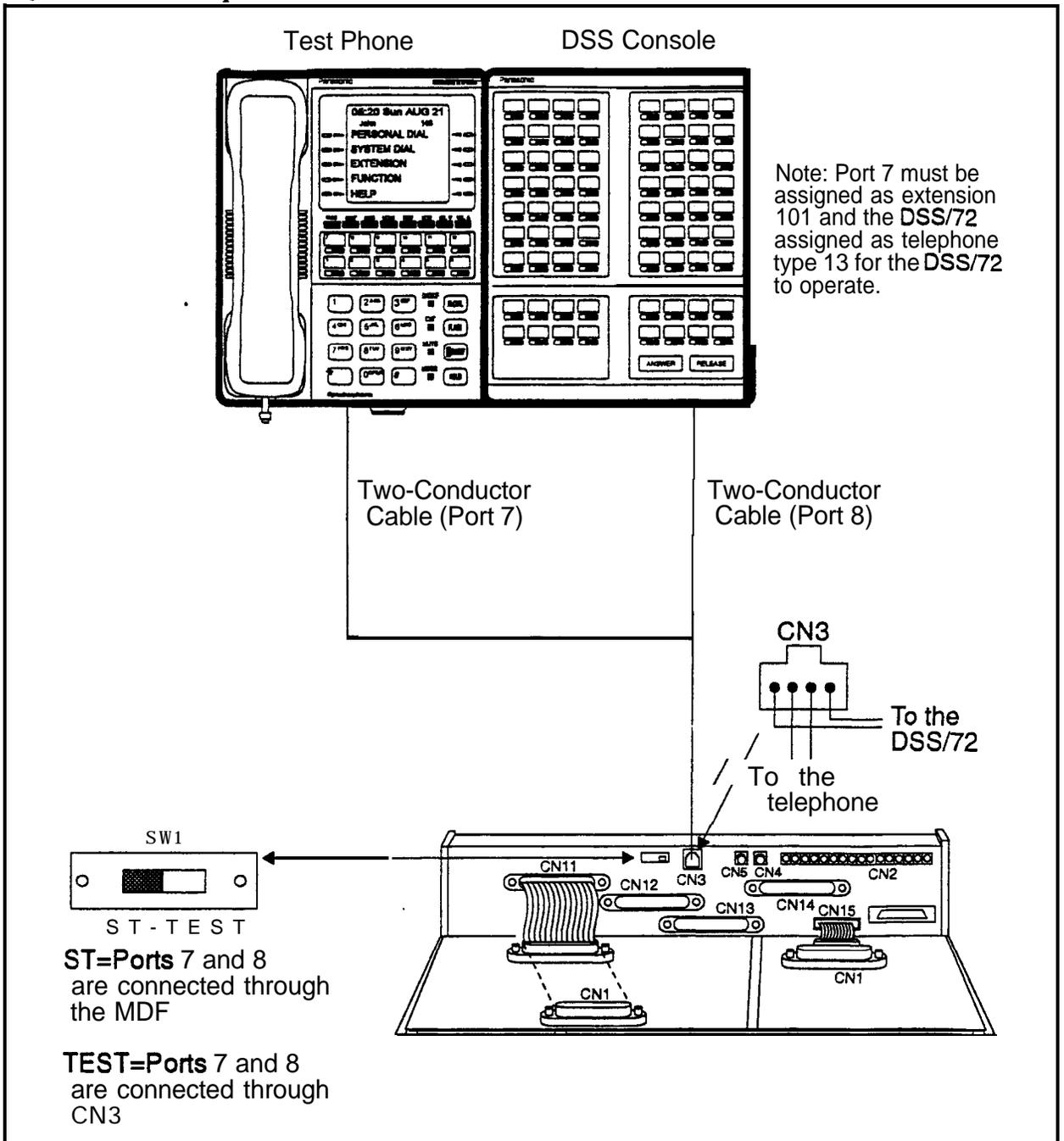
Note: Before using the test terminal on a DBS that is operational, be sure the phones connected to ports 7 and 8 can be taken out of service.

- A **DSS/72** can be connected to the display phone for text entry. Port 7 must be assigned as extension 101 and the **DSS/72** must be assigned as telephone type 13 for the **DSS/72** to operate.

Installation

1. Connect the telephone and DSS (optional) to CN3 on the Connector Panel. (See **Figure 3-18** on page 3-19.)
2. Set SW 1 to “Test.”
3. When programming is completed, set SW 1 back to “ST.”

Figure 3-18. Test telephone connection



Chapter 4. Trunks and Lines

This chapter describes trunk and line installation. Some peripheral equipment also requires trunk and/or line interfaces (for example, door phones or power failure units). See Chapter 5 for instructions on connecting peripheral equipment through trunks or lines.

This chapter covers the following topics::

Topic	Page
Trunks	4-3
Loop-Start Trunks	I 4-7
Ground Start and DID Trunks	4-9
T1 Interface	4-11
Lines	4-3 1
Analog Extensions	4-37
Digital Extensions	4-40
DSS/72	4-40
EM/24	4-42
Trunk and Line Expansion	4-43

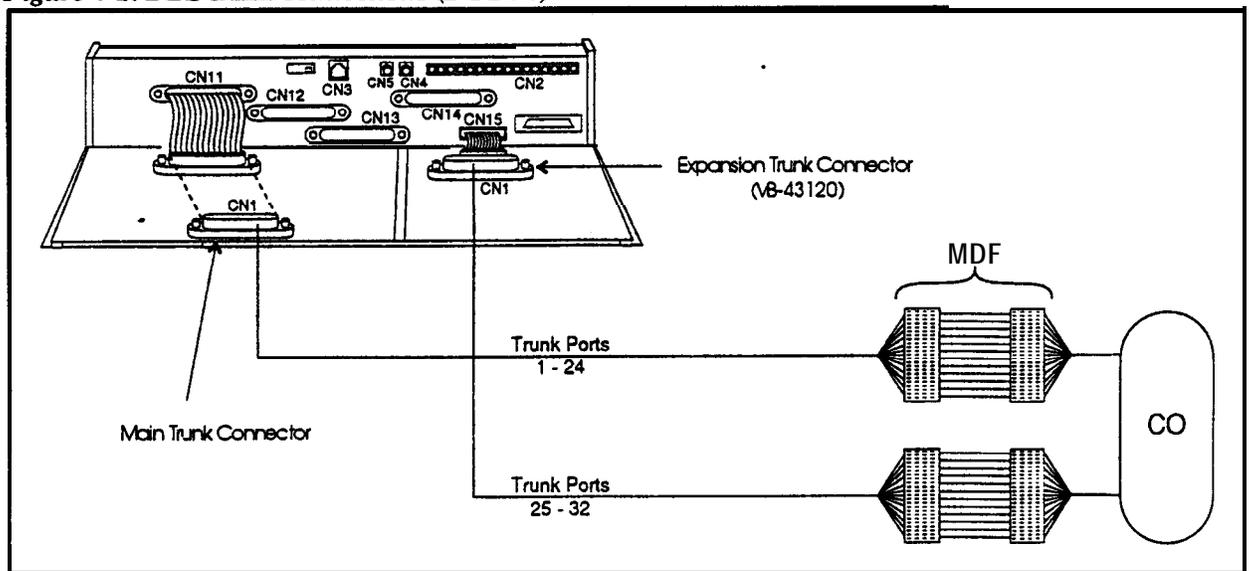
Trunks

Trunk Connectors

Each DBS cabinet is provided with one main trunk connector, labeled CN 1. In addition, a trunk expansion connector (VB-43120) can be added to the DBS to provide eight additional trunk connections. (The trunk expansion connector is also labeled CN1.)

Figure 4-1 shows the maximum number of trunks that can be connected when both trunk connectors are used with a DBS 96.

Figure 4-1. DBS trunk connections (DBS 96)



The number of trunks that can be connected through the main trunk connector depends on the type of system you have and the number of trunk cards installed. Table 4-1 shows the main trunks and expansion trunks available with each system type. Chapter 6 includes trunk maximums for two-cabinet systems.

Table 4-1. Main trunks and expansion trunks provided with each system type

System Type	Main Trunk Numbers	Expansion Trunk Numbers
DBS 40	1-8	9-16
DBS 72	1-16	17-24
DBS 96	1-24	25-32

Trunk Connector Pinouts

Table 4-2 includes pinouts and color codes for the main trunk connector. Table 4-3 shows pinouts and color codes for the trunk expansion connector.

- Instructions on installing the expansion connector begin on 4-43.

Table 4-2. Pinouts and trunk numbers for the main trunk connector.

Trunk Slot ¹	Color Code	Pin No.	Desig.	Function
TRK1 (DBS 40, DBS 72, DBS 96)	WH-BL	26	1T	Trunk 1
	BL-WH	1	1R	
	WH-OR	27	2T	Trunk 2
	OR-WH	2	2R	
	WH-GN	28	3T	Trunk 3
	GN-WH	3	3R	
	WH-BR	29	4T	Trunk 4
	BR-WH	4	4R	
WH-SL	30	5T	Trunk 5	
SL-WH	5	5R		
TRK2 (DBS 72, DBS 96)	RD-BL	31	6T	Trunk 6
	BL-RD	6	6R	
	RD-OR	32	7T	Trunk 7
	OR-RD	7	7R	
	RD-GN	33	8T	Trunk 8
	GN-RD	8	8R	
	RD-BR	34	9T	Trunk 9
	BR-RD	9	9R	
RD-SL	35	10T	Trunk 10	
SL-RD	10	10R		
BK-BL	36	11T	Trunk 11	
BL-BK	11	11R		
BK-OR	37	12T	Trunk 12	
OR-BK	12	12R		
BK-GN	38	13T	Trunk 13	
GN-BK	13	13R		
BK-BR	39	14T	Trunk 14	
BR-BK	14	14R		
BK-SL	40	15T	Trunk 15	
SLBK	15	15R		
YL-BL	41	16T	Trunk 16	
BLYL	16	16R		
TRK3 (DBS 96 only,	YL-OR	42	17T	Trunk 17
	OR-YL	17	17R	
	YL-GN	43	18T	Trunk 18
	GN-YL	18	18R	
	YL-BR	44	19T	Trunk 19
	BR-YL	19	19R	
	YL-SL	45	20T	Trunk 20
	SL-YL	20	20R	
	VI-BL	46	21T	Trunk 21
	BL-VI	21	21R	
	VI-OR	47	22T	Trunk 22
	OR-VI	22	22R	
VI-GN	48	23T	Trunk 23	
GN-VI	23	23R		
VI-BR	49	24T	Trunk 24	
BR-VI	24	24R		
VI-SL	50	Not used		
	SL-VI	25		

1. Trunks connections for a trunk card installed in the EC/TRK slot appear on the Trunk Port Expansion connector as described on the next page.

Table 4-3. Pinouts and trunk numbers for trunk expansion connector CNI

Trunk Slot	Color Code	Pin No.¹	Desig.	Trunk Assignments According to System Type		
				DBS 40	DBS 72	DBS 96
EC/TRK	W-H-BL BL-WH	26 1	1T 1R	Trunk 9	Trunk 17	Trunk 25
	WH-OR OR-WH	27 2	2T 2R	Trunk 10	Trunk 18	Trunk 26
	WH-GN GN-WH	28 3	3T 3R	Trunk 11	Trunk 19	Trunk 27
	WH-BR BR-WH	29 4	4T 4R	Trunk 12	Trunk 20	Trunk 28
	WH-SL SL-WH	30 5	5T 5R	Trunk 13	Trunk 21	Trunk 29
	RD-BL BL-RD	31 6	6T 6R	Trunk 14	Trunk 22	Trunk 30
	RD-OR OR-RD	32 7	7T 7R	Trunk 15	Trunk 23	Trunk 31
	RD-GN GN-RD	33 8	8T 8R	Trunk 16	Trunk 24	Trunk 32

1. Only the first 8 pairs on the **trunk** expansion connector are used.

Loop-Start Trunks

Guidelines

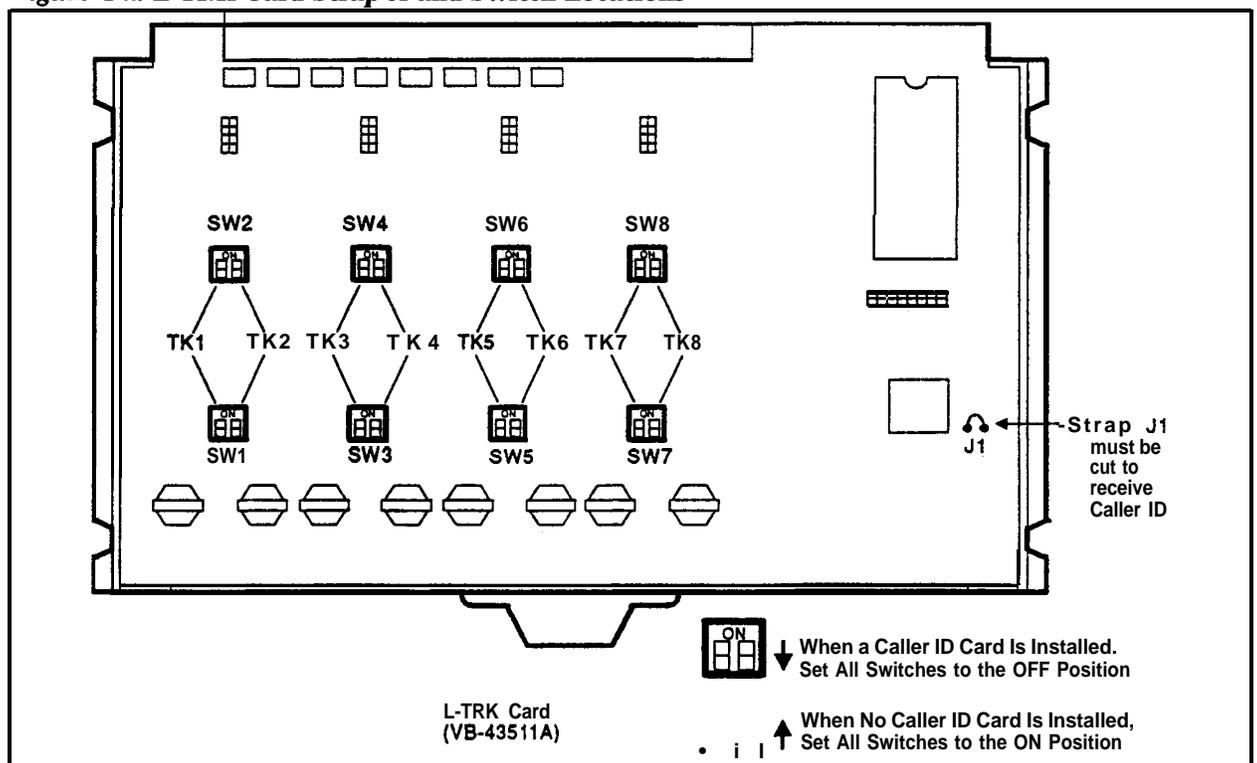
- Two versions of the loop-start trunk are available: the four-port version (VB-435 10) and the eight-port version (VB-43511).
- The following procedure covers loop-start trunk installation using the main trunk connector. For instructions on using the expansion trunk connector, see “Trunk and Line Expansion” on page 4-43
- For **pinouts** and color codes for the main trunk connector, see Table 4-2 on page 4-5.

Installation

Installation without Caller ID

1. If installing VB-435 11A Loop Start Card:
 - a. Remove the cover from the L-TRK card (VB-435 11A).
 - b. Set the all option switches to ON as shown in Figure 4-2.
 - c. Replace the cover on the L-TRK card (VB-43511A).

Figure 4-2. L-TRK Card Strap J1 and Switch Locations



2. Install the loop-start trunk in a trunk slot.
3. Use a standard **50-pin** cable to connect the trunks from the MDF to the main trunk connector CN1.

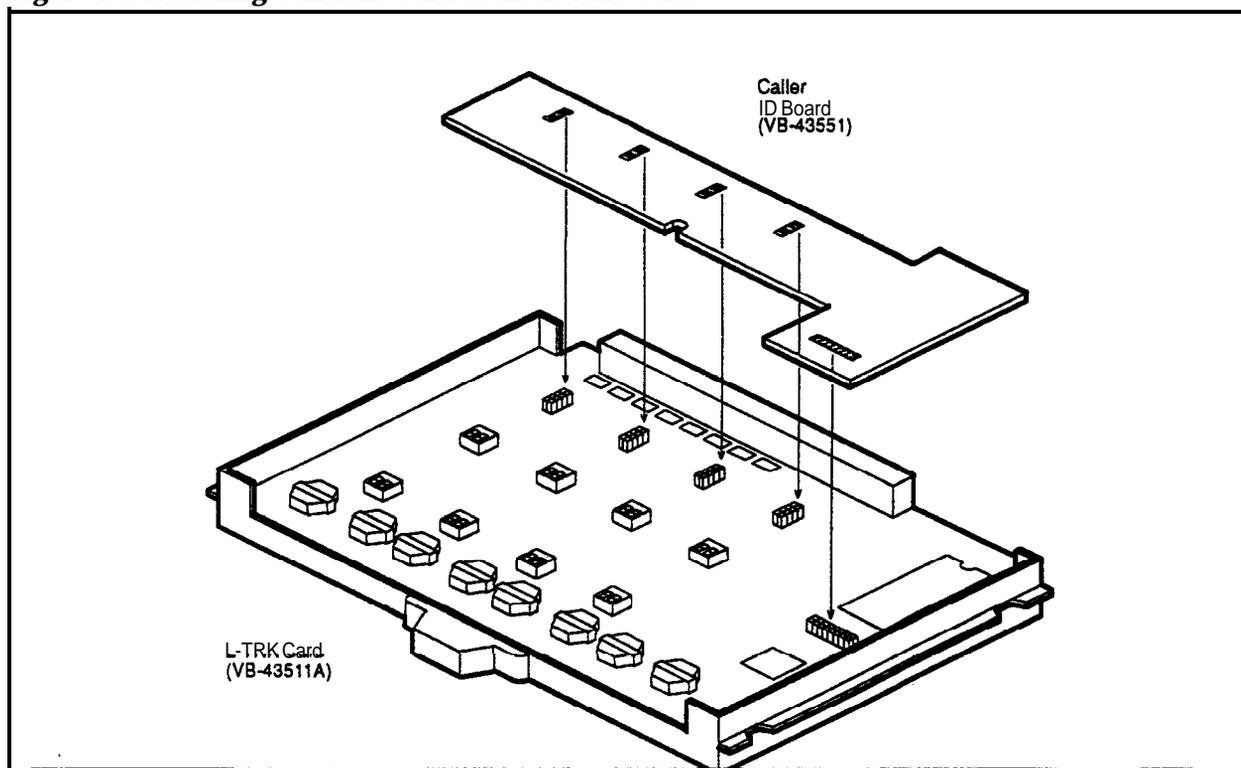
Installation with Caller ID

1. Remove the cover from the L-TRK card (VB-43511A). This cover should be set aside since it cannot be reinstalled with a Caller ID Board installed.
2. Cut strap J1 on the L-TRK card as shown in Figure 4-2.
3. Set switches SW1 through SW8 on the L-TRK card (VB-43511A) to OFF.

A▪ **IMPORTANT:** When caller ID is used, you must correctly set the switches to prevent possible damage to the L-TRK card.

4. Attach the Caller ID card to the L-TRK card.

Figure 4-3. Attaching Caller ID Card to the L-TRK Card



5. Install the L-TRK card in a trunk slot.
6. Use a standard **50-pin** cable to connect the trunks from the MDF to the main trunk connector CN 1.

Ground Start and DID Trunks

Guidelines

- The following procedure covers ground-start (VB-43531) and DID (VB-43541) installation using the main trunk connector. For instructions on using the expansion trunk connector, see “Trunk and Line Expansion” on page 4-43.
- For **pinouts** and color codes for the main trunk connector, see Table 4-2 on page 4-5.
- Each circuit on the ground-start trunk card can be used as either a loop-start or ground-start trunk. By default, all circuits on the ground-start trunk are assigned as loop start.
- The ground-start trunk card requires CPC-B Version 1.0 or higher.
- The DID card requires CPC-B (Version 2.0 or higher) and SCC-B (Version 1.2 or higher).
- Both ground start and DID trunks require an external -48V floating output power supply. The following table shows -48V power consumption for one- and two-cabinet systems.

Table 4-4. -48V current consumption for ground-start and DID trunks

System Size	Current Consumption (Output voltage = 48 ± 4 V Ripple voltage = ± 500 mVp-p)
One-cabinet system	1 Amp
Two-cabinet system	2Amps

- The following -48V floating output power supplies have been tested with DBS ground-start and DID trunks.

Table 4-5. -48V power supplies tested with the DBS

Manufacturer	Model Number	Rating
Valcom	VP-2048B	2 Amps
Tellabs	8 1-8002	2 Amps

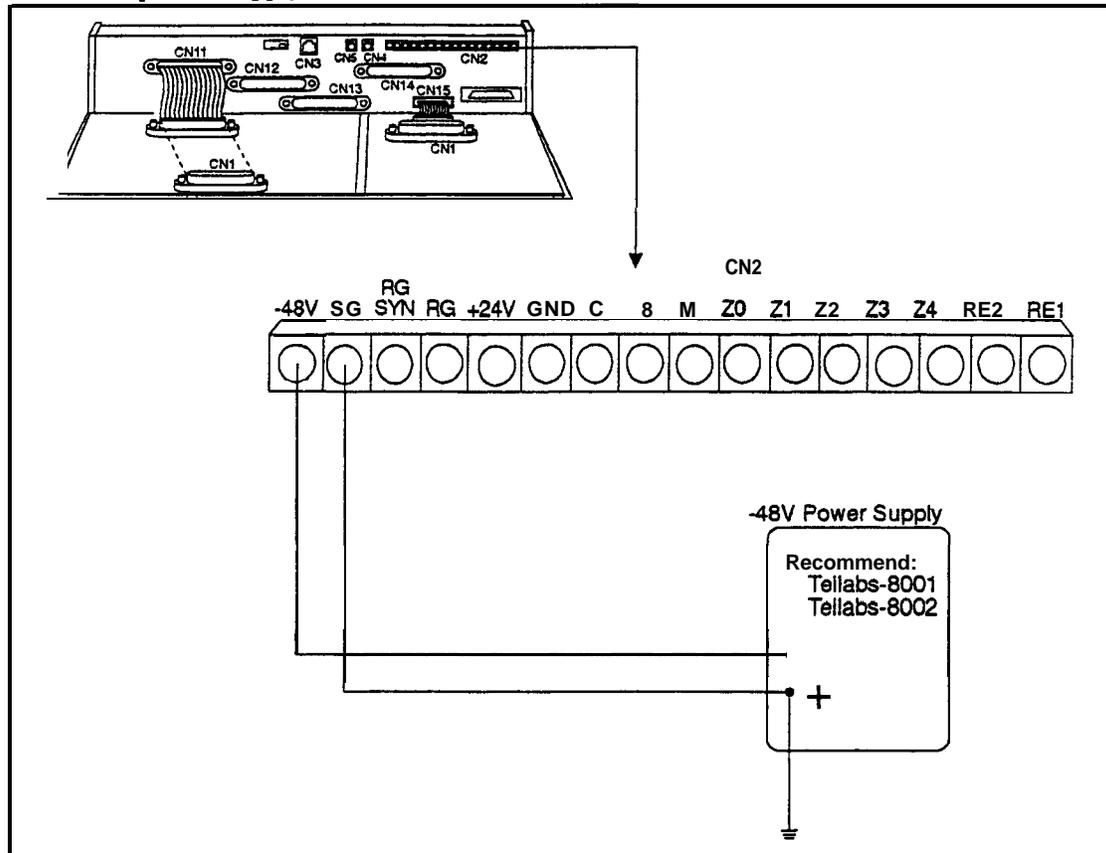
- The following “Installation” section includes details on installing the -48V power supply.

Installation

1. Install the G-TRK/8 or DID card in a trunk slot.
2. Connect the power supply by cabling the positive side to the SG connector on CN2 (Figure 4-4).

Note: Use cables that are 18 AWG or larger to connect the power supply to the DBS.

Figure 4-4. -48V power supply installation



3. Ground the positive side of the -48V power supply to the building ground.
Note: Resistance to ground must be 10 Ohms or less, and the ground cable must be 18 AWG or larger.
4. Install power-surge protectors between the wall outlet and the -48V power supply.
5. Use a standard **50-pin** cable to connect the trunks from the MDF to the main trunk connector CN1.
6. Use a test set to verify the polarity of the trunk.

Connect the test set across the tip and ring of the trunk to be tested. **With** the test set in the “monitor” position, apply ground to the ring side of the trunk.

If you hear dial tone, the polarity of the trunk is okay, and you can switch the test set to the “talk” mode to test the voice path.

If you do not hear dial tone, ground the tip side of the trunk. If you receive dial tone when grounding the tip side, polarity is reversed.

T1 Interface

Guidelines

Read the following guidelines before beginning **T1** installation. Installation instructions begin on page 4-2 1.

Hardware Requirements

- The **T1** requires the following DBS hardware.

Table 4-6. T1 Hardware requirements for single-cabinet systems

CPC-B 4.0 or Higher (VB-43411)	SCC-B (VB-43421)	T1 Trunk Card (VB-4356 1)	T1 MDF Card (VB-43562)	Sync Unit (VB-43563)
1 (See Note 1.)	1 (See Notes 2 and 3.)	1	1	1

Notes:

1. Version 1.3 or higher of the Bus Processor Unit (BPU) chip is required for **T1**.
2. An MFR card is required for **DID/DNIS** if DTMF signaling is used. If **DID/DNIS** is provided through DP signaling, an MFR card is not **required**.
3. SCC-B with ROM 1.3 or higher is required if the central **office** does not provide **T1 dial tone**.

Table 4-7. T1 Hardware requirements for double-cabinet systems

T1 Location	CPC-B V4 (V-B-43411) (See Note 1.)	SCC-B (VB-43421) (See Notes 2 and 3.)	T1 Trunk Card (VB-43561)	T1 MDF Card (VB-43562)	Sync Card (VB-43563)	T1 Cable (VB-43564)	Cable Kit (VB-43 110) (See Note 4.)
T1 in the Master	1	1	1	1	1	0	1
T1 in the Slave	1	1	1	1	1	1	1
T1 in both Master and Slave	1	1	2	2	1	1	1

Notes:

1. Version 1.3 of the Bus Processor Unit (BPU) chip is required for T1.
2. An MFR card is required for DID/DNIS if DTMF signaling is used. If DID/DNIS is provided through DP signaling, an MFR card is not required.
3. SCC-B with ROM 1.3 or later is required if the central office does not provide T1 dial tone.
4. Version 1.2 of the Cable Kit is required for T1.

- The T1 trunk card must be installed in the “EC/TRK” slot.
- 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.

The CSU must be compatible with the framing format (SF or ESF) that is provided by the public network.

Maximums

- One T1 card can be installed per cabinet.
- The number of T1 cards that can be installed in double-cabinet systems depends on the sizes of the connected systems. Table 4-12 on page 4-15 shows T1 maximums for double-cabinet systems.

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

Table 4-8. T1 slot usage for two-cabinet systems

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

- **Fractional T1** can be used when fewer than 24 T1 trunks are needed. Fractional T1 allows you to use only a portion of the 24 channels provided on the T1 card.
- Though each T1 Interface provides 24 trunk channels, T1 trunks do not increase the overall trunk capacity of the DBS. Each T1 channel subtracts from the total number of analog trunks that can be installed.
- With CPC-B earlier than 5.00, the number of analog trunks that can be used with Fractional T1 are always decremented in quantities of 8.

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

The number of analog trunks must be decremented in quantities of 8. the actual number of analog trunks that can be used is 16:

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

Tables.69 through 4- 11 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.

- With CPC-B 5.00 and higher and the VB-435 11A Loop Start Trunk Card, the number of analog trunks that can be used with Fractional T1 are decremented in quantities of 1.

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

Trunk Assignments for Single-Cabinet Systems

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

Table 4-9. T1 and analog trunk assignments, DBS 40

Trunk Number	Fractional T1 using 16 Channels	Fractional T 1 using 8 Channels
1	T1 channel 16	Analog trunk 1
↓	↓	↓
8	T1 channel 9	Analog trunk 8
9	T1 channel 8	T1 channel 8
↓	↓	↓
16	T1 channel 1	T1 channel 1

Note: Since the DBS 40 supports a maximum of 16 trunks, all 24 channels of the T1 cannot be used.

Table 4-10. T1 and analog trunk assignments, DBS 72

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

Table 4-11. T1 and analog trunk assignments, DBS 96

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

Trunk Assignments for Double-Cabinet Systems

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

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

Table 4-12. Maximum T1 assignments for two-cabinet systems

System Size	Master	Slave
DBS 40 + DBS 40	8 analog trunks	16 T1 trunks
DBS 72 + DBS 72	16 analog trunks	24 T1 trunks
DBS 96 + DBS 40	24 T1 trunks 8 analog trunks	16 T1 trunks
DBS 96 + DBS 72	24 T1 trunks 8 analog trunks	24 T1 trunks
DBS 96 + DBS 96	24 T1 trunks 8 analog trunks	24 T1 trunks 8 analog trunks

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

Tables 4-13 through 4-17 show trunk numbering for two-cabinet systems using the maximum number of T1 channels.

Table 4-13. T1 and analog trunk assignments, DBS 40 + 40 (16-channel fractional T1 in the slave)

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

Table 4-14. T1 and analog trunk assignments, DBS 72 + DBS 72 (24-channel T1 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 ↓ 24	N/A	T1 channel 24 ↓ T1 channel 17
33 ↓ 40	N/A	T1 channel 16 ↓ T1 channel 9
41 ↓ 48	N/A	T1 channel 8 ↓ T1 channel 1

Table 4-15. T1 and analog trunk assignments, DBS 96 + DBS 40 (24-channel T1 in the master; 16-channel T1 in the slave)

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

Table 4-16. T1 and analog trunk assignments, DBS 96 + DBS 72 (24-channel T1 in the master; 24-channel T1 in the slave)

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

Table 4-17. T1 and analog trunk assignments, DBS 96 + DBS 96(24-channel T1 in the master; 24-channel T1 in the slave)

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

Installation

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

If you are installing . . .	Use this procedure...
A T1 in a single cabinet	"Installing a T1 in a Single Cabinet" (page 4-21)
One T1 in a double cabinet, with the T1 located in the master	"Installing a T1 in a Single Cabinet" (page 4-21)
One T1 in a double cabinets, with the T1 located in the slave	"Installing a T1 in a Double Cabinet with the T1 in the Slave" (page 4-27)
T1s in both the master and slave	"Installing a T1 in a Double Cabinet with T1s in the Master and Slave" (page 4-27)

Installing a T1 in a Single Cabinet

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

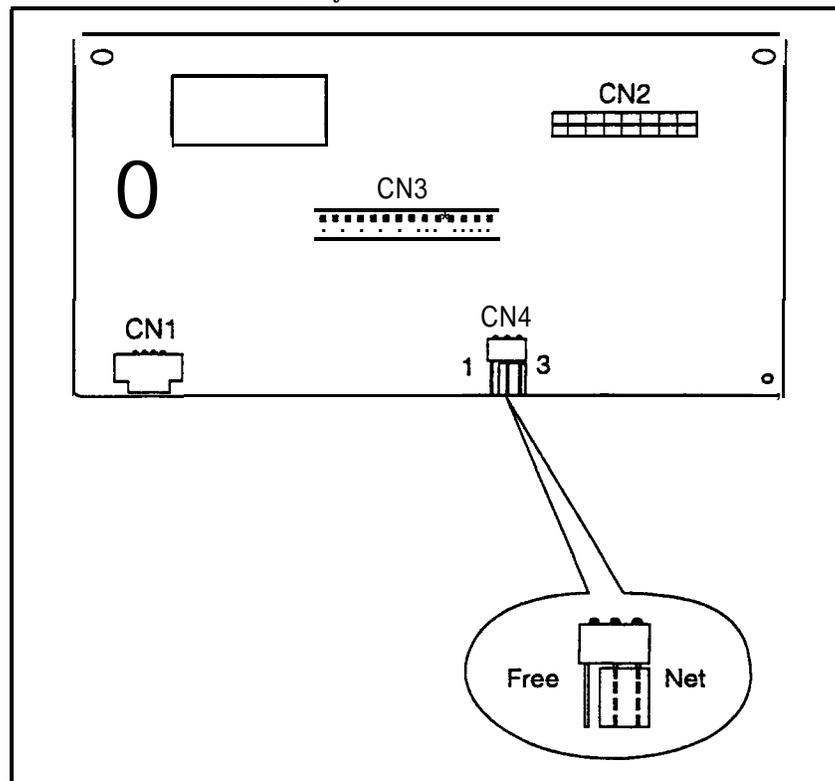
If only one T1 is installed in a two-cabinet system, it must be installed in the cabinet specified in Table 4-8 on page 4-13.

Note: The T1 Interface cannot be used for systems consisting of a DBS 72 connected to a DBS 40.

1. Check connector 4 (CN4) on the Sync Unit (VB-43563). Make sure that Pins 2 and 3 are strapped. (See Figure 4-5.)

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

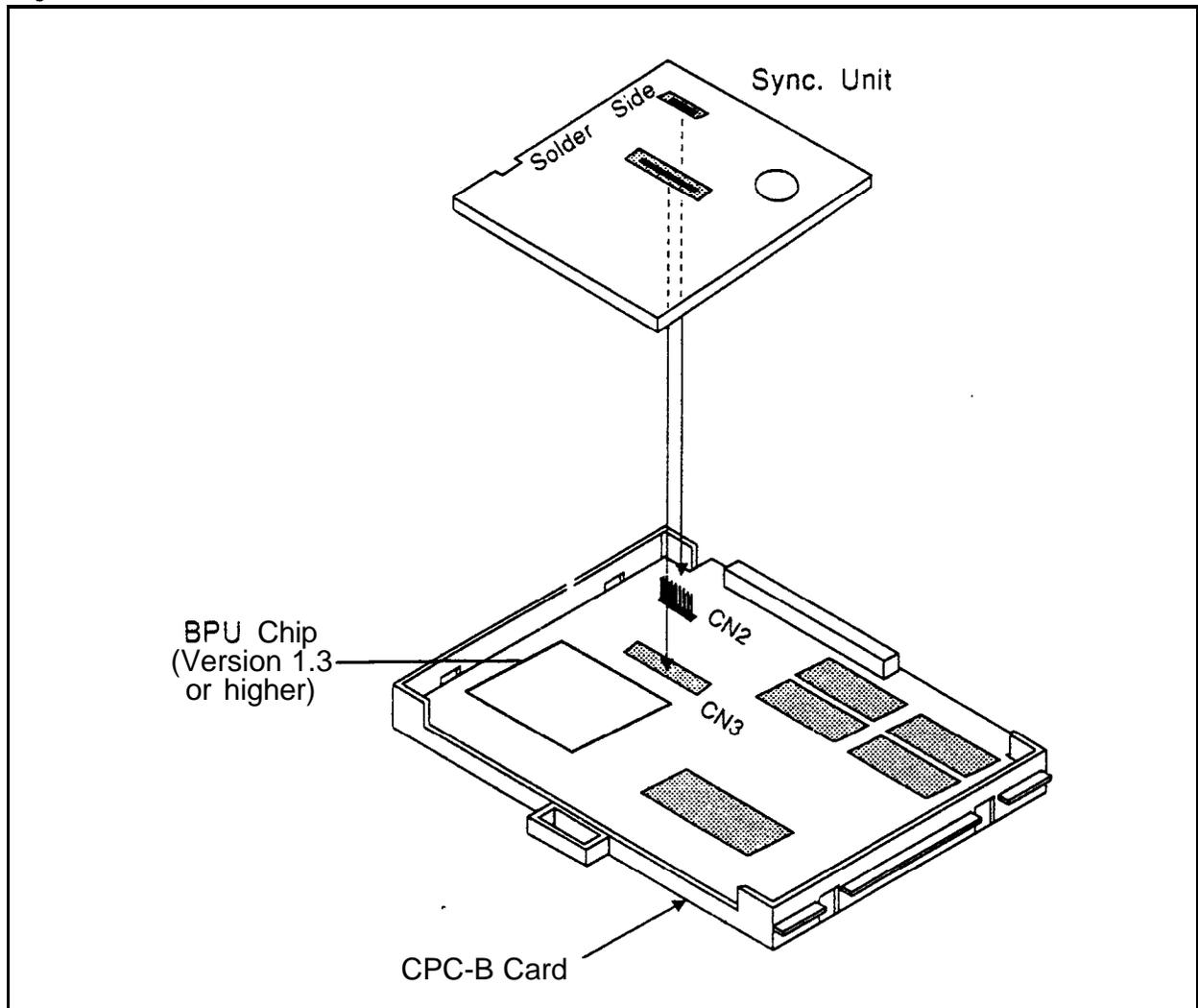
Figure 4-5. Connector 4 (CN4) strapping, Sync Unit



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

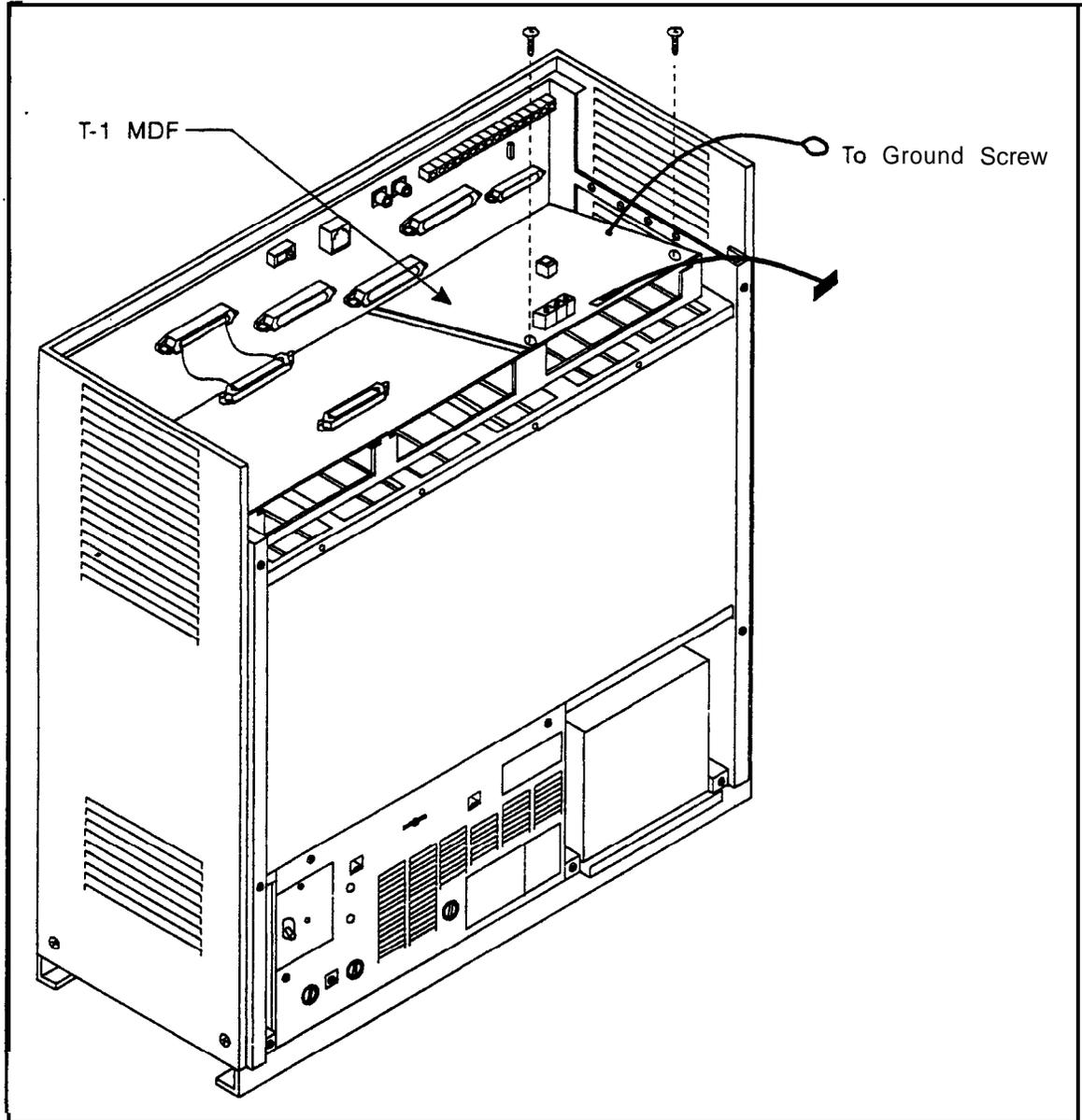
Note: Before attaching the Sync Unit, insert the three spacers provided with the unit and remove the jumpers from CN2 of the CPC-B card.

Figure 4-6. TI Sync Unit installation



3. Install the T1 MDF (main distribution frame) card in the top of the cabinet as shown in Figure 4-7.

Figure 4-7. T1 MDF card installation



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

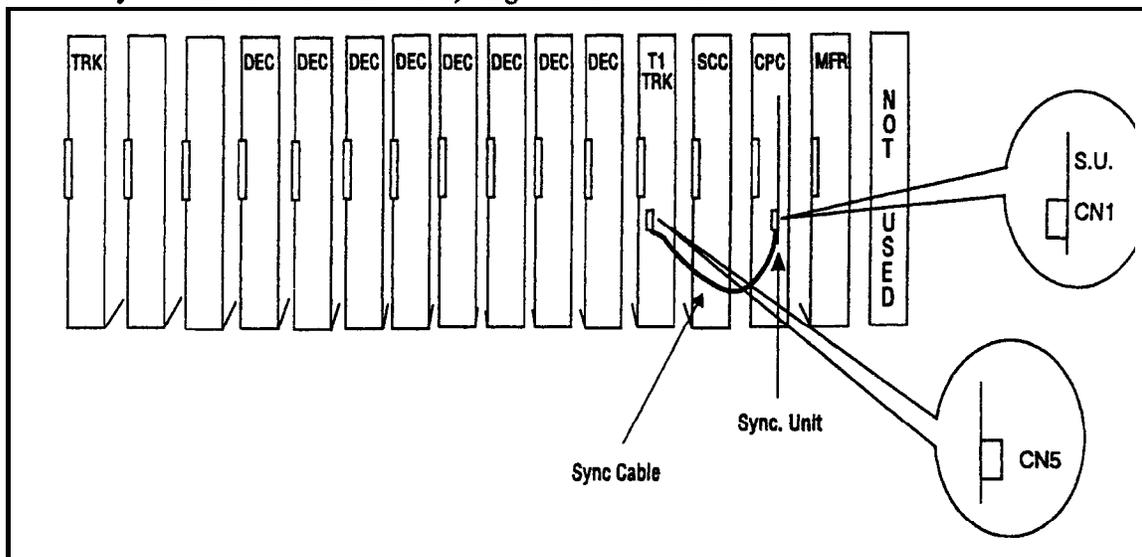
These switch settings correspond to the distance between the DBS and the CSU. To turn a switch on, flip it to the “up” position.

Table 4-18. Switch settings for SWZ on the T1 card

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

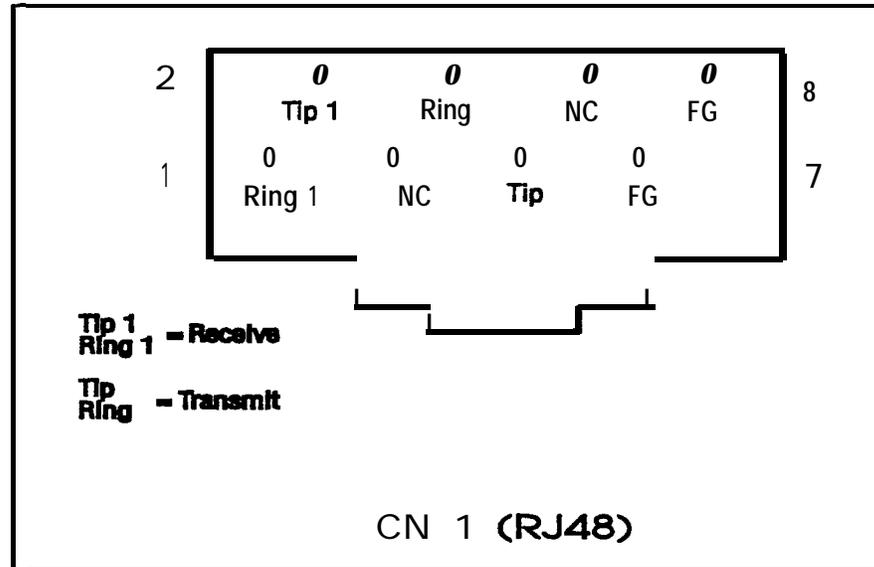
5. Install the T1 card in the “EC/TRK” slot
6. Connect the Sync Cable from CN1 on the Sync Unit to CN5 on the T1 card.

Figure 4-8. Sync Unit and T1 connection, sin&-cabinet installation



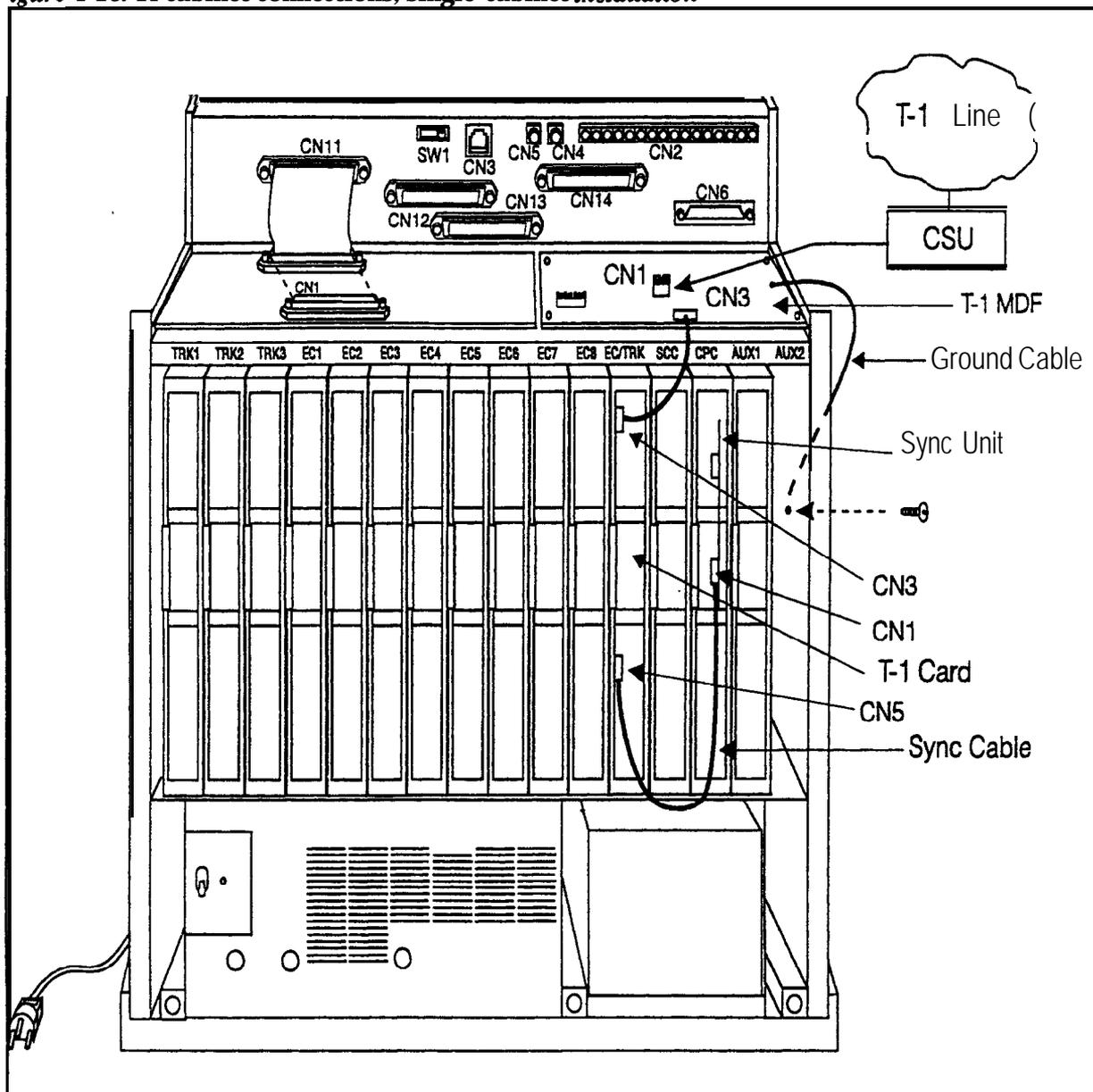
7. Connect the cable attached to CN3 on the T1 MDF card to CN3 on the T1 card (Figure 4-10).
8. Using an RJ48 cable, connect CN1 on the T1 MDF card to the CSU (Figure 4-10). The following illustration shows CN1 pinouts.

Figure 4-9. RJ48 pinouts, CN1 connector



9. Connect the ground cable from the T1 MDF card to the cabinet as shown in Figure 4-10.

Figure 4-10. T1 cabinet connections, single-cabinet installation



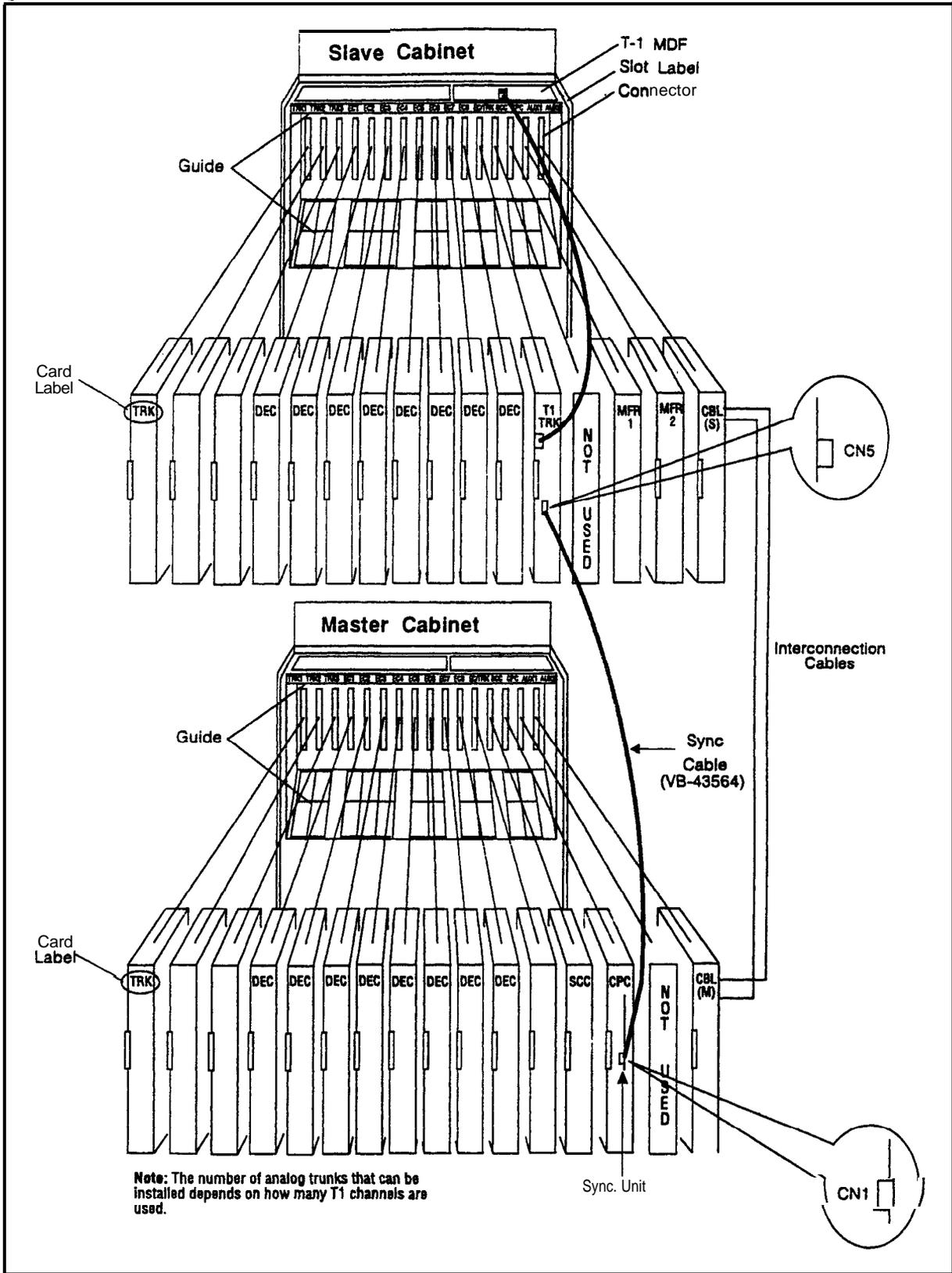
Installing T1 in a Double Cabinet with the T1 in the Slave

1. Install the Sync Unit in the master cabinet as described in Steps 1 and 2 under “Installation for a Single T1.”
2. Install a T1 MDF card in the slave cabinet. (See Step 3 on page 4-23.)
3. Set Switch 1 on the T1 card. (See Step 4 on page 4-24.)
4. Install a T1 card in the “EC/TRK” slot of the slave cabinet.
5. Connect the Sync Cable from CN1 on the Sync Unit to CN5 on the T1 card (Figure 4-1 1).

Note: Part Number VB-43564 is used for the Sync Cable when a T1 is installed only in the slave cabinet of a two-cabinet system.

6. At the slave cabinet, connect the cable attached to CN3 on the T1 MDF card to CN3 on the T1 card (Figure 4-10).
7. Using an RJ48 cable, connect CN1 of the T1 MDF card to the CSU. (See Figure 4-9 on page 4-25 for RJ48 pinouts.)
8. At the slave cabinet, connect the ground cable on the T1 MDF card as shown in Figure 4-10 on page 4-26.

Figure 4-11. Sync cable connections, double-cabinet with a T1 in the slave



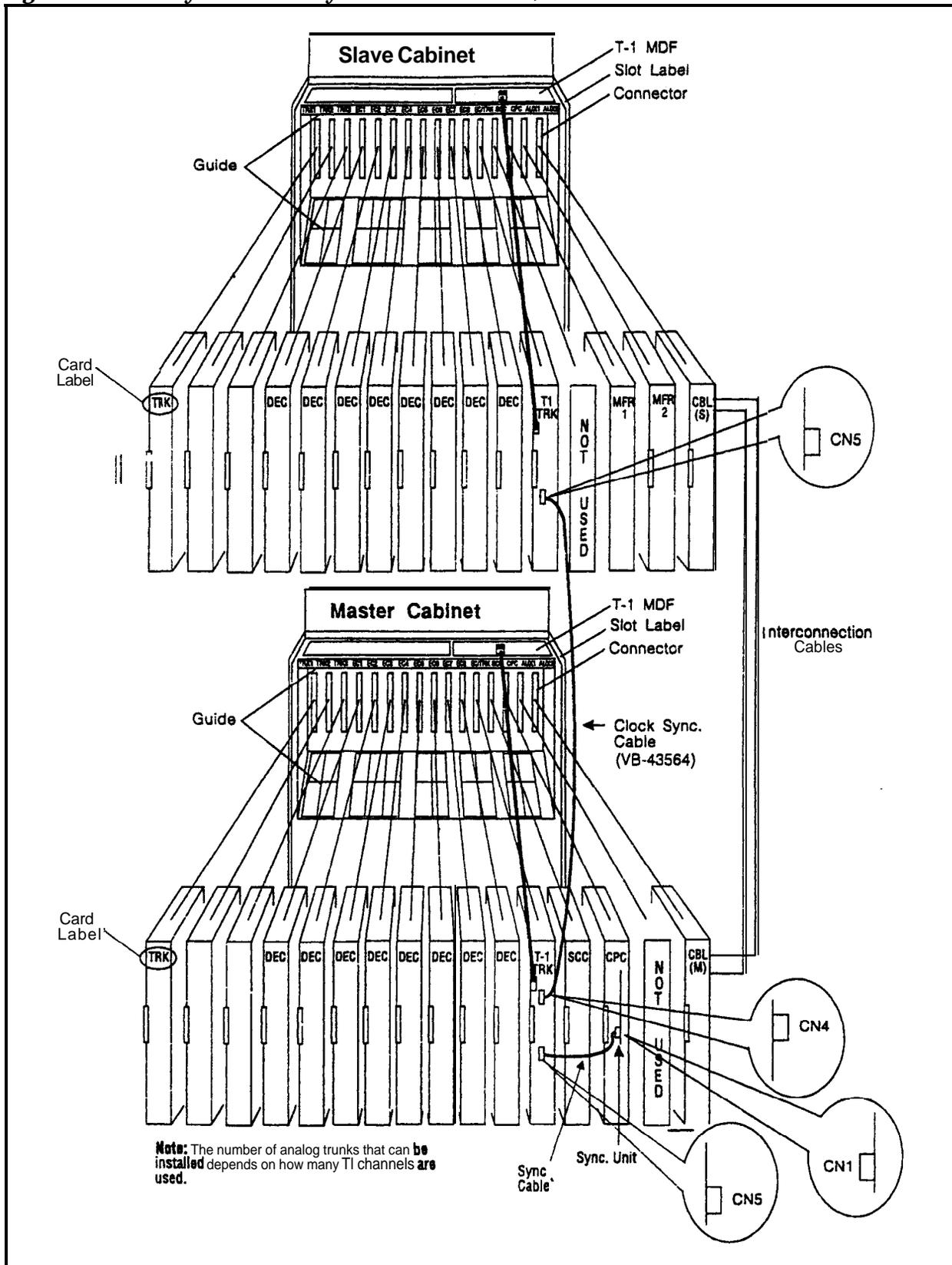
Installing T1 in a Double Cabinet with T1s in the Master and Slave

1. Install the Sync Unit in the master cabinet as described in Steps 1 and 2 under "Installation for a Single T1."
2. Install a T1 MDF card in each cabinet. (See Step 3 on page 4-23.)
3. Set Switch 1 on the T1 cards. (See Step 4 on page 4-24.)
4. Install a T1 card in each "EC/TRK" slot.
5. Connect the Clock Sync Cable from CN4 on the master-cabinet T1 to CN5 on the slave-cabinet T1, as shown in Figure 4-12.

Note: Part Number VB-43564 is used for the Clock Sync Cable when T1s are installed in the master and slave cabinets.

6. At the master cabinet, connect the Sync Cable from CN1 on the Sync Unit to CN5 on the T1 card (Figure 4-12).
7. At each cabinet, connect the cable attached to CN3 on the T1 MDF card to CN3 on the T1 card (Figure 4-10).
8. Using an RJ48 cable, connect CN1 of each T1 MDF card to a CSU. (See Figure 4-9 on page 4-25 for RJ48 pinouts.)
9. For both cabinets, connect the ground cable from the T1 MDF card as shown in Figure 4-10 on page 4-26.

Figure 4-12. Clock sync cable and sync cable connections, double-cabinet installation



Lines

Extension Connectors

The number of extension ports that can be connected to your system depends on the type of system you have. **Figure 4-13** shows the maximum number of extensions that can be connected to each system when the extension expansion connector is used.

Table 4-1 summarizes the number of ports that can be used without the extension expansion connector. Chapter.6 includes extension maximums for two-cabinet systems.

Figure 4-13. DBS extension connections

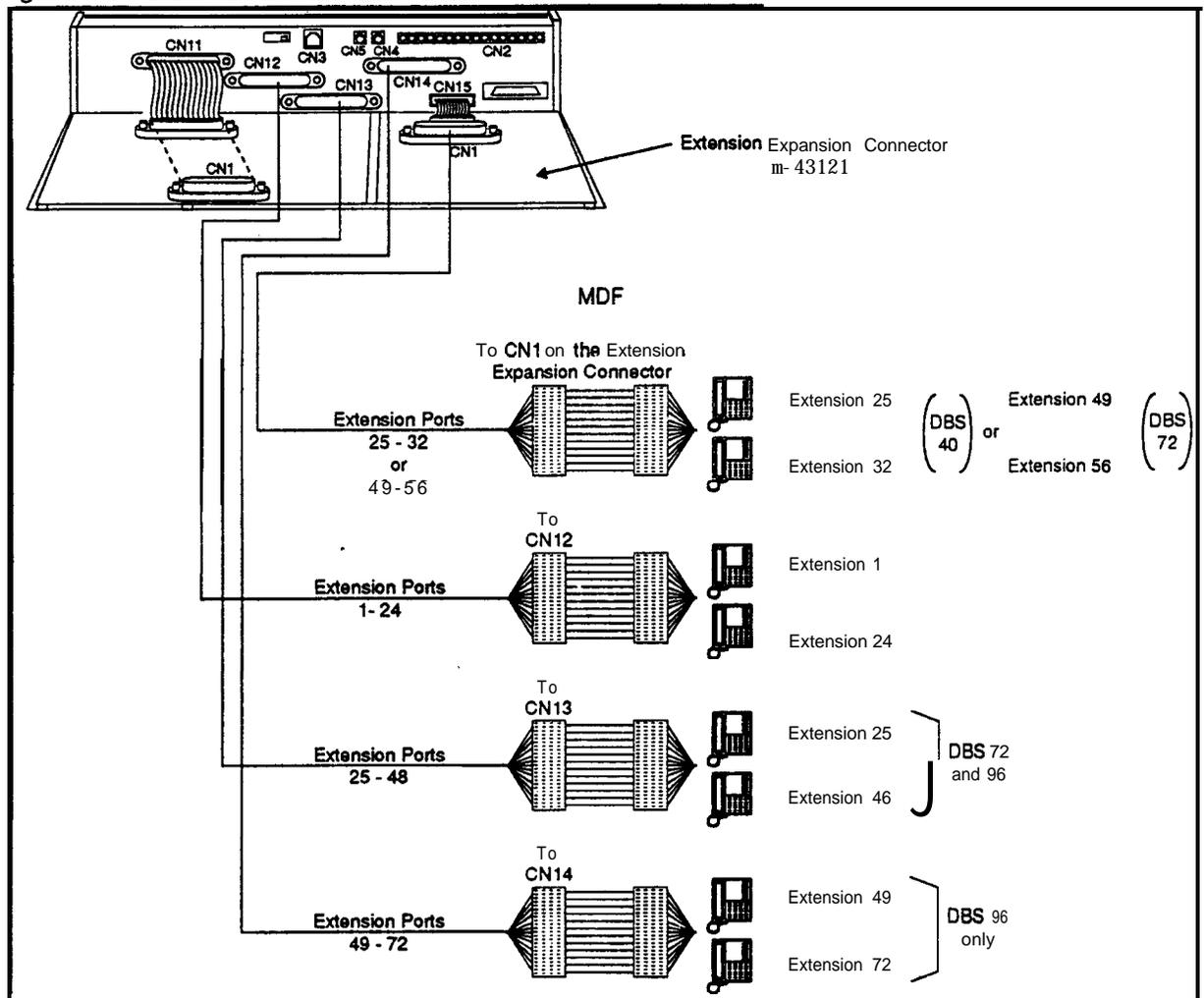


Table 4-19. Extension ports provided with each system

System Type	Extension Ports (Not including the Expansion Connector*)
DBS 40	1-24
DBS 72	1-48
DBS 96	1-72

***Note:** Extensions 65 to 72 on the DBS 96 use the EC/TRK slot, but they do not require the extension expansion connector. If extensions 65 to 72 are used, the trunk expansion connector cannot be used.

Extension Connector Pinouts

Tables 4-20 through 4-22 provide pinouts and color codes for extension slots. Table 4-22 on page 4-35 provides pinouts and color codes for the extension expansion connector.

Instructions on installing the expansion connector begin on 4-43.

Table 4-20. Pinouts and color codes for extension connector CN12

Extension Slot	Color Code	Pin No.	Desig.	Function
EC1 (DBSJO, DBS 72, DBS 96)	W-H-BL	26	1T	Extension Port 1
	BL-WH	1	1R	
	Extension Port 2	WH-OR	27	2T
		OR-WH	2	2R
	Extension Port 3	WH-GN	28	3T
		GN-WH	3	3R
	Extension Port 4	WH-ER	29	4T
		BR-WH	4	4R
	Extension Port 5	WH-SL	30	5T
		SL-WH	5	5R
	Extension Port 6	RD-BL	31	6T
		BL-RD	6	6R
	Extension Port 7	RD-OR	32	7T
		OR-RD	7	7R
	Extension Port 8	RD-GN	33	8T
		GN-RD	8	8R
EC2 (DBS 40, DBS 72, DBS 96)	RD-BR	34	9T	Extension Port 9
	BR-RD	9	9R	
	Extension Port 10	RD-SL	35	10T
		SL-RD	10	10R
	Extension Port 11	BK-BL	36	11T
		BL-BK	11	11R
	Extension Port 12	BK-OR	37	12T
		OR-BK	12	12R
	Extension Port 13	BK-GN	38	13T
		GN-BK	13	13R
	Extension Port 14	BK-BR	39	14T
		BR-BK	14	14R
	Extension Port 15	BK-SL	40	15T
		SL-BK	15	15R
	Extension Port 16	YL-BL	41	16T
		BL-YL	16	16R
EC3 (DBS 40, DBS 72, DBS 96)	YL-OR	42	17T	Extension Port 17
	OR-YL	17	17R	
	Extension Port 18	YL-GN	43	18T
		GN-YL	18	18R
	Extension Port 19	YL-BR	44	19T
		BR-YL	19	19R
	Extension Port 20	YL-SL	45	20T
		SL-YL	20	20R
	Extension Port 21	VI-BL	46	21T
		BL-VI	21	21R
	Extension Port 22	VI-OR	47	22T
		OR-VI	22	22R
	Extension Port 23	VI-GN	48	23T
		GN-VI	23	23R
	Extension Port 24	VI-BR	49	24T
		BR-VI	24	24R
Not used	VI-SL	50		
	SL-VI	25		

Note: Only digital extensions can be used in slot EC1. Port 1 is reserved for Attendant 1 and requires a Display Key Phone.

Table 4-21. Pinouts and color codes for extension connector CN13

Extension Slot	Color Code	Pin No.	Desig.	Function	
EC4 (DBS 72, DBS 96)	WH-BL	26	1T	Extension Port 25	
	BL-WH	1	1R		
	WH-OR	OR-WH	27	2T	Extension Port 26
			2	2R	
	WH-GN	GN-WH	28	3T	Extension Port 27
			3	3R	
	WH-BR	BR-WH	29	4T	Extension Port 28
			4	4R	
	WH-SL	SL-WH	30	5T	Extension Port 29
			5	5R	
	RD-BL	BL-RD	31	6T	Extension Port 30
			6	6R	
RD-OR	OR-RD	32	7T	Extension Port 31	
		7	7R		
RD-GN	GN-RD	33	8T	Extension Port 32	
		8	8R		
EC5 (DBS 72, DBS 96)	RD-BR	34	9T	Extension Port 33	
	BR-RD	9	9R		
	RD-SL	SL-RD	35	10T	Extension Port 34
			10	10R	
	BK-BL	BL-BK	36	11T	Extension Port 35
			11	11R	
	BK-OR	OR-BK	37	12T	Extension Port 36
			12	12R	
	BK-GN	GN-BK	38	13T	Extension Port 37
			13	13R	
	BK-BR	BR-BK	39	14T	Extension Port 38
			14	14R	
BK-SL	SL-BK	40	15T	Extension Port 39	
		15	15R		
YL-BL	BL-YL	41	16T	Extension Port 40	
		16	16R		
EC6 (DBS 72, DBS 96)	YL-OR	42	17T	Extension Port 41	
	OR-YL	17	17R		
	YL-GN	GN-YL	43	18T	Extension Port 42
			18	18R	
	YL-BR	BR-YL	44	19T	Extension Port 43
			19	19R	
	YL-SL	SL-YL	45	20T	Extension Port 44
			20	20R	
	VI-BL	BL-VI	46	21T	Extension Port 45
			21	21R	
	VI-OR	OR-VI	47	22T	Extension Port 46
			22	22R	
	VI-GN	GN-VI	48	23T	Extension Port 47
			23	23R	
	VI-BR	BR-VI	49	24T	Extension Port 48
			24	24R	
VI-SL	50	Not used			
SL-VI	25				

Table 4-22. Pinouts and color codes for extension connector CN14

Extension Slot	Color Code	Pin No.	Desig.	Function
EC7 (DBS 96 Only)	WH-BL	26	1T	Extension Port 49
	BL-WH	1	1R	
	WH-OR	27	2T	Extension Port 50
	OR-WH	2	2R	
	WH-GN	28	3T	Extension Port 51
	GN-WH	3	3R	
	WH-BR	29	4T	Extension Port 52
	BR-WH	4	4R	
WH-SL	30	5T	Extension Port 53	
SL-WH	5	5R		
EC8 (DBS 96 Only)	RD-BL	31	6T	Extension Port 54
	BL-RD	6	6R	
	RD-OR	32	7T	Extension Port 55
	OR-RD	7	7R	
	RD-GN	33	8T	Extension Port 56
	GN-RD	8	8R	
	RD-BR	34	9T	Extension Port 57
	BR-RD	9	9R	
RD-SL	3s	10T	Extension Port 58	
SL-RD	10	10R		
BK-BL	36	11T	Extension Port 59	
BLBK	11	11R		
BK-OR	37	12T	Extension Port 60	
OR-BK	12	12R		
BKGN	38	13T	Extension Port 61	
GN-BK	13	13R		
BK-BR	39	14T	Extension Port 62	
BR-BK	14	14R		
BK-SL	40	15T	Extension Port 63	
SL-BK	15	15R		
YLBL	41	16T	Extension Port 64	
BL-YL	16	16R		
EC/TRK (DBS 96only)	YL-OR	42	17T	Extension Pon 65
	OR-YL	17	17R	
	YL-GN	43	18T	Extension Port 66
	GN-YL	18	18R	
	YLBR	44	19T	Extension Port 67
	BR-YL	19	19R	
	YL-SL	45	20T	Extension Port 68
	SL-YL	20	20R	
	VI-BL	46	21T	Extension Port 69
	BL VI	21	21R	
	VI-OR	47	22T	Extension Port 70
	OR-VI	22	22R	
VIGN	48	23T	Extension Port 71	
GN-VI	23	23R		
VI-BR	49	24T	Extension Port 72	
BR-VI	24	24R		
VI-SL	50	Not used		
	SL-VI	25		

Note: The **EC/TRK** slot is wired to CN14 only in the DBS 96. In the DBS 40 and 72, a card placed in the **EC/TRK** slot must be wired to the expansion connector.

Table 4-23. Pinouts and color codes for extension expansion connector CN1

Extension Slot	Color Code	Pin No.	Desig.	Extension Port Assignments According to System Type		
				DBS 40	DBS 72	DBS%
EC/TRK	WH-BL BL-WH	26 1	1T 1R	Extension Port 25	Extension Port 49	No Extension Expansion Card Required (uses CN14 instead)
	WH-OR OR-WH	27 2	2T 2R	Extension Port 26	Extension Port 50	
	WH-GN GN-WH	28 3	3T 3R	Extension Port 27	Extension Port 51	
	WH-BR BR-WH	29 4	4T 4R	Extension Port 28	Extension Port 52	
	WH-SL SLWH	30 5	5T 5R	Extension Port 29	Extension Port 53	
	RD-BL BL-RD	31 6	6T 6R	Extension Port 30	Extension Port 54	
	RD-OR OR-RD	32 7	7T 7R	Extension Port 31	Extension Port 55	
	RD-GN GN-RD	33 8	8T 8R	Extension Port 32	Extension Port 56	

Analog Extensions

Note: Normally analog extensions are supported using the AEC (VB-4362 1). Alternatively, a Single Line Telephone Adaptor (SLTA, VB-43709) may be used to support analog DTMF (2500 set) extensions. The SLTA converts up to 4 digital ports to analog ports. See “Single Line Telephone Adaptor” on page 5-34 for more information.

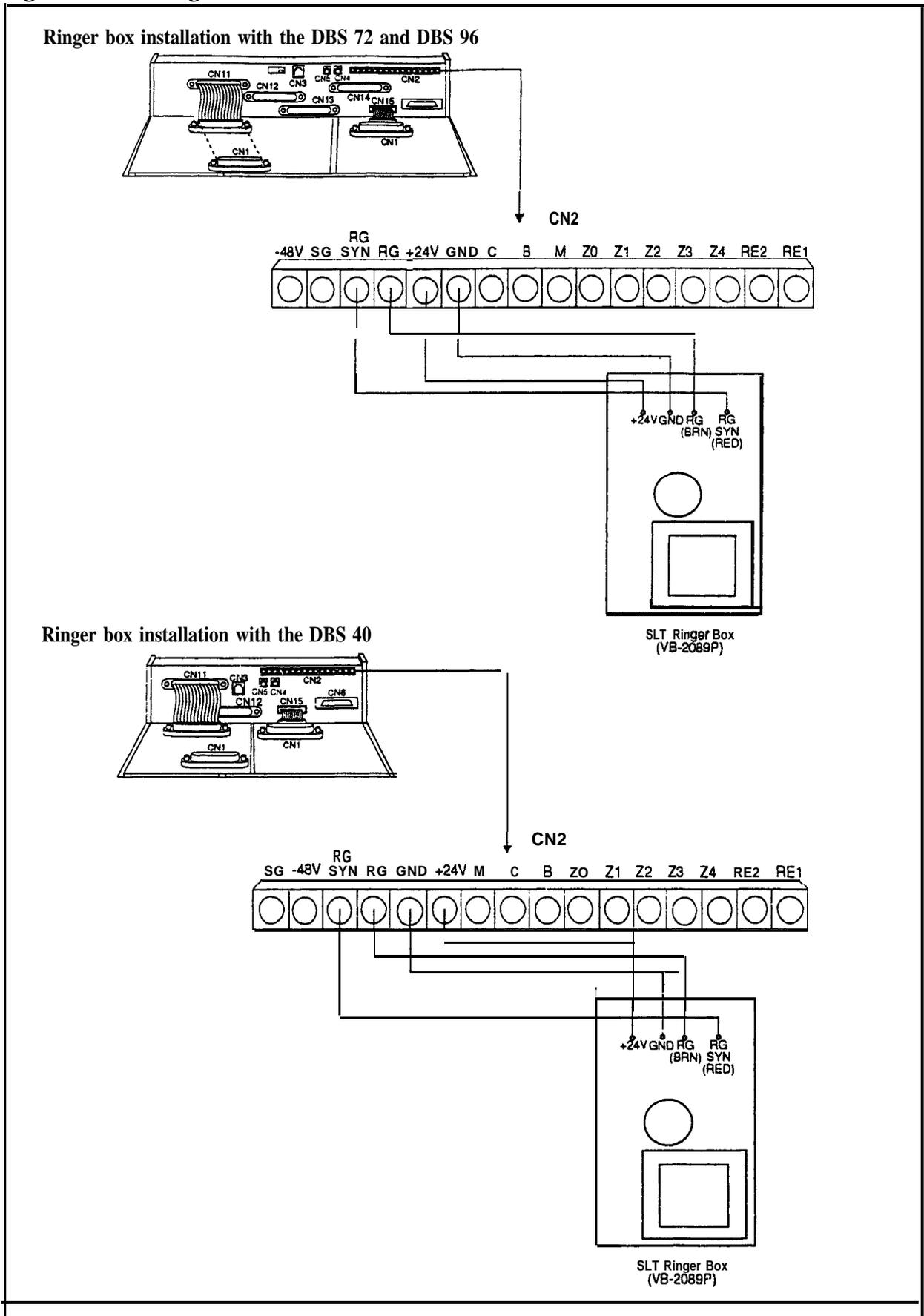
Guidelines

- An **MFR** card (VB-43431) is required when the AEC is used. The MFR card, which provides DTMF signals, includes eight circuits that are shared among the analog extensions.
- The AEC also requires the SLT ringer.box (VB-2089P).

Installation

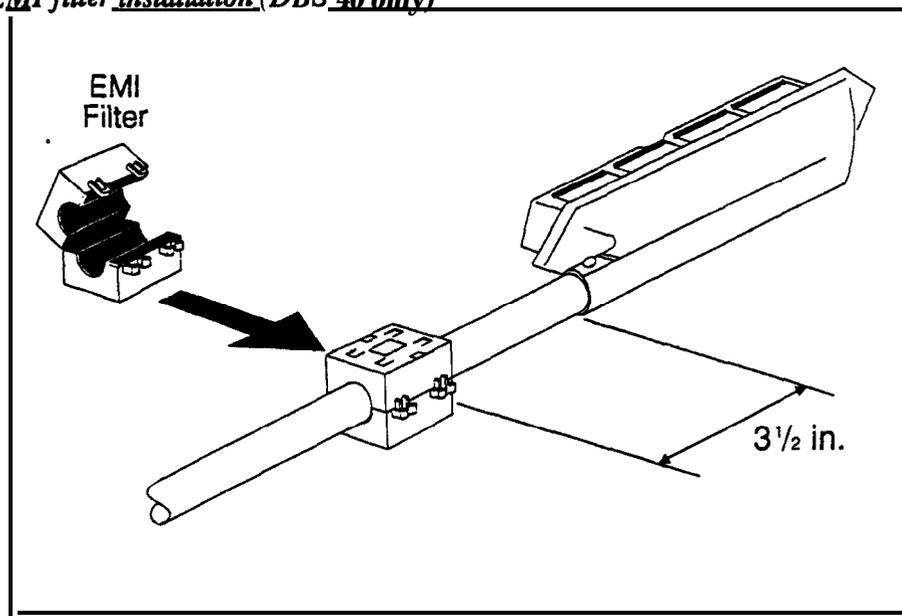
1. Install the AEC cards in extension slots.
2. Install the MFR card in **AUX1** or **AUX2**. If installing in a two-cabinet system, see Chapter 6 for specific information for installing MFR card(s).
3. Install the SLT Ringer Box as shown in Figure 4-14. Be sure to note the differences between the DBS 40 Connector Panel and the Connector Panel on the DBS 72 and 96.

Figure 4-14. SLT ringer box installation



4. Use a standard **50-pin** cable to connect the extensions from the MDF to the appropriate extension connector. (Refer to Tables 4-20 through 4-22 for extension pinouts.)
5. If you are installing a DBS 40 system, attach the **EMI filter** to the **amphenol** cable as shown in Figure 4-15.

Figure 4-15. EMI filter installation (DBS 40 only)



Digital Extensions

The following instructions explain how to connect digital extensions. These instructions apply for key phones and Digital Single-Line Telephones (DSLTs). Special instructions are provided for installing the DSS/72 and EM24 terminals, which connect to digital phones.

1. Install the DEC cards in extension slots.
2. Use a standard 50-pin cable to connect the extensions from the MDF to the appropriate extension connector, as shown in Figure 4-13 on page 4-31. (Refer to Tables 4-20 through 4-22 for extension pinouts.)
3. If you are installing a DBS 40, attach the EM1 filter to the amphenol cable, as shown in Figure 4-15.

DSS/72

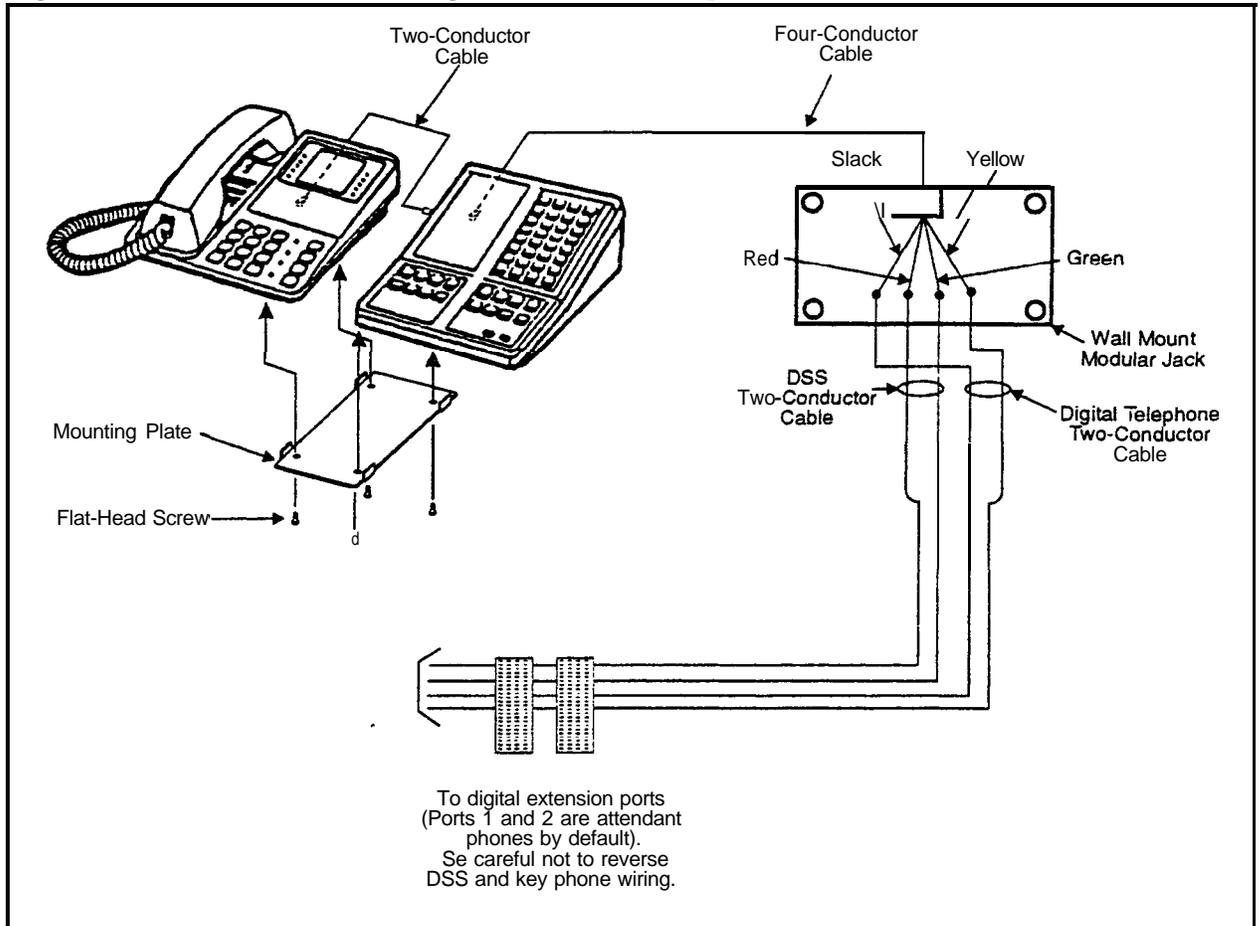
Guidelines

- The DSS/72 (VB-43320) is a 72-key console that can be attached to the attendant phone. It provides direct station selection and busy lamp fields for internal lines. The DSS/72 can also be used for text assignment.
- When the attendant feature package (VB-43330) is installed (CPC-B Version 2.0 to 4.0 only), the DSS/72 can be used as an Attendant Console. The Attendant Console provides station monitoring and call transfer by name for large systems, even if a large display phone is not used. For a detailed description of the differences between the standard DSS/72 and a DSS/72 configured as an Attendant Console, see **Feature Operation, Section 700**. For instructions on using the Attendant Console, see **the Attendant Console User Guide, Section 760**.
- Up to two DSS/72s or one Attendant Console can be assigned to attendant phones 1 and 2. Attendant phones 3 and 4 can each have one Attendant Console assigned, but neither can have a DSS/72.
- If more than one DSS/72 is assigned to an attendant phone, only one of the DSS/72s can be cabled from the same wall jack as the attendant phone. Additional DSS/72s must be cabled from separate wall jacks.
- The DSS/72 comes with a mounting bracket, screws, and a two-conductor cable for attaching the DSS to the key phone.

Installation

1. Attach the DSS/72 to the key phone using the mounting plate and the four screws.
2. Connect the DSS to the key phone using the two-conductor cable.
3. Connect the DSS to the wall jack using a four-conductor cable.
4. Connect the four wires from the key phone and DSS to the MDF.

Figure 4-16. DSS/72 connection using one cable with two pairs.



EM/24

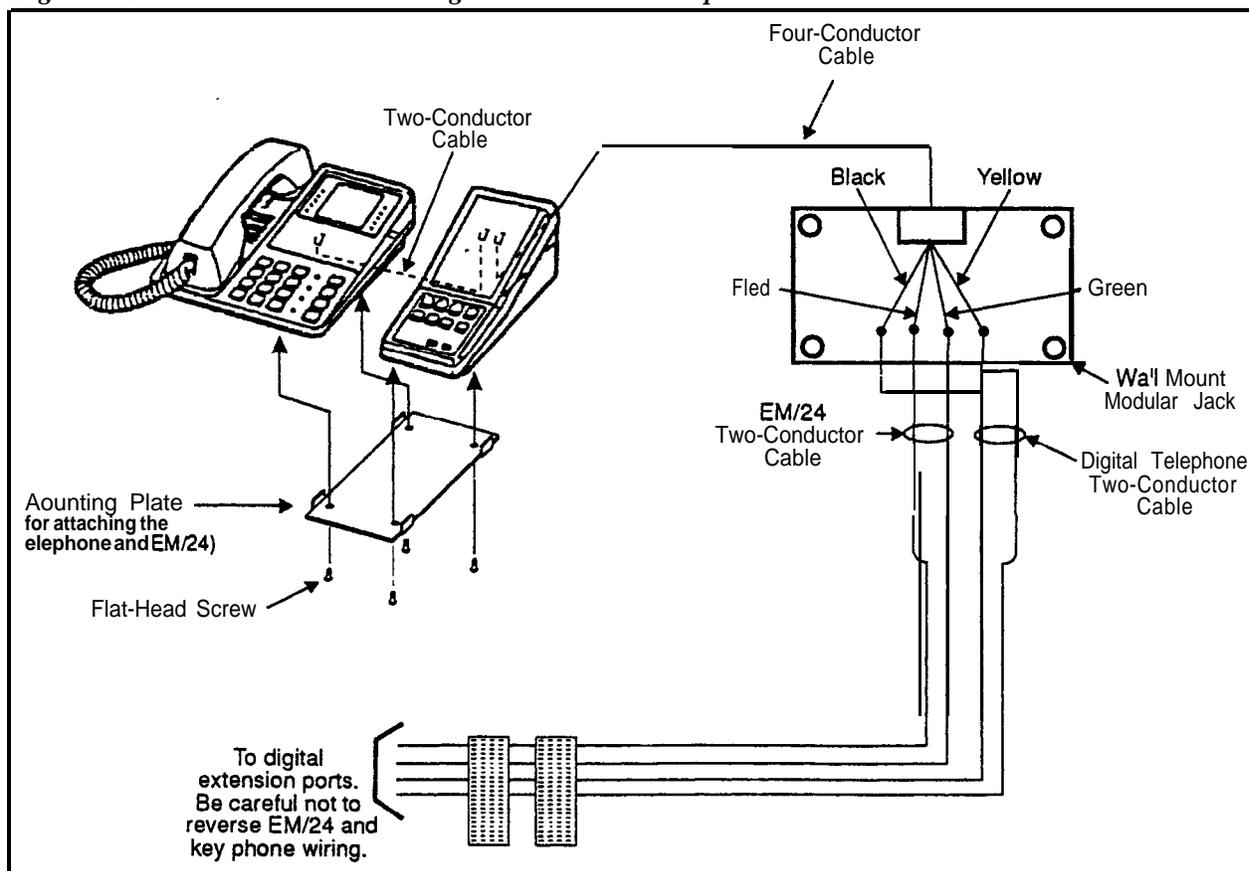
Guidelines

- The EM/24 (VB-43310) provides 24 flexible function (FF) keys. It can be attached to any key phone.
- The EM/24 comes with a mounting bracket, screws, and a two-conductor cable for attaching it to a key phone.

Installation

1. Attach the EM/24 to the key phone using the mounting plate and the four screws, as shown in Figure 4-17.
2. Connect the EM/24 to the key phone using the two-conductor cable.
3. Connect the EM/24 to the wall jack using a four-conductor cable.
4. Connect the four wires from the key phone and EM/24 to the MDF connector.

Figure 4-17. EM/24 connection using one cable with two pairs



Trunk and Line Expansion

Guidelines

- The **EC/TRK** slot can be used for a trunk or extension card.
- Different expansion connectors are used for trunks and extensions:

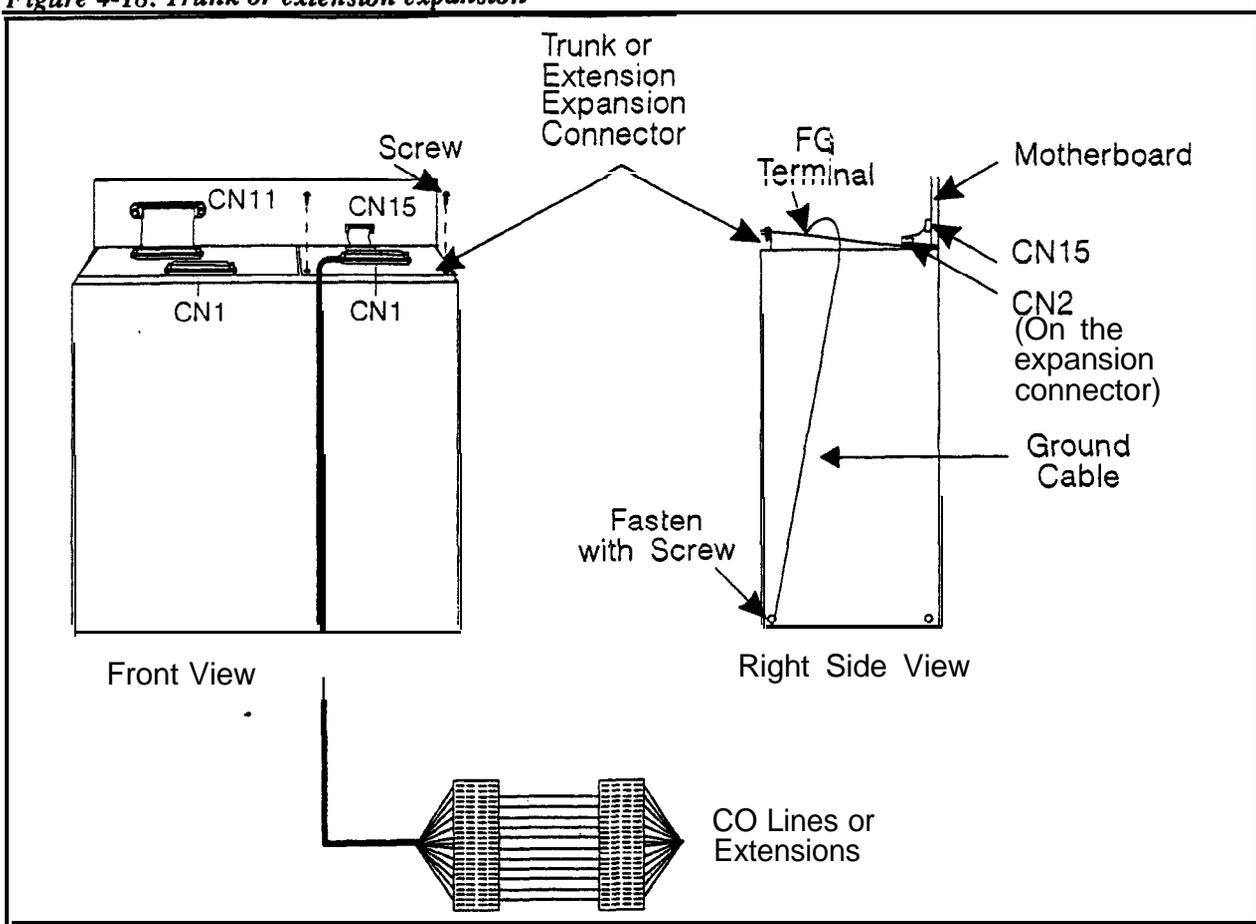
Expansion connector	Part No.
Trunk expansion connector	VB-43 120
Extension expansion connector	VB-43121

Note: With the DBS 96, the expansion connector is not required to use the **EC/TRK** slot for an extension card. The DBS 96 uses connector CN14 to accommodate an extension card in the **EC/TRK** slot. Table 4-22 on page 4-35 shows the **pinouts** from the **EC/TRK** slot to CN14.

Installation

1. Install a trunk or extension card in the slot marked **EC/TRK**.
2. Connect the appropriate expansion connector to the main cabinet with two screws, as shown in Figure 4-18.
3. Connect the ground cable from the FG terminal of the expansion connector to a screw already in use on the right side of the main cabinet.
4. Connect CN2 of the expansion connector to **CN15** on the mother board.
5. Prepare a cable with a **50-pin** connector on one end and wiring for the MDF on the other end.
6. Cross-connect the cable to the trunks or extensions through the MDF. See Table 4-3 "**Pinouts** and trunk numbers for trunk expansion connector **CN1**" on page 4-6 or Table 4-23 "**Pinouts** and color codes for extension expansion connector **CN1**" on page 4-36.
7. Connect the **50-pin** connector to **CN1** on the expansion connector.

Figure 4-18. Trunk or extension expansion



See Table 4-3 on page 4-6 for **pinout** and trunk number information for the **trunk** expansion connector.

Chapter 5. Peripheral Equipment

This chapter describes peripheral equipment installation. Some peripheral equipment requires trunk and/or line interfaces (for example, door phones or power failure units). For information on trunk and line connections, see Chapter 4.

This chapter covers the following topics:

Topic	Page
Local Terminal or SMDR Device	5-3
Remote Administration Interface (RAI)	5-6
Background Music/Music-On-Hold	5-8
Off-Premises Adaptor (OPX)	5-10
Paging	5-14
External Ringer (UNA Device)	5-17
Power Failure Unit	5-19
Voice Announce Unit (VAU)	5-22
Door Box Adaptor (Trunk Port)	5-27
Door Box Adaptor (Extension Port)	5-31
Single Line Telephone Adaptor	5-33

Local Terminal or SMDR Device

Guidelines

- Connector 6 (CN6) on **the** Connector Panel provides an RS-232C interface for connection of a local programming terminal or an SMDR device such as a printer or **call** accounting machine.
- The following table contains RS-232C designations.

Table 5-1. RS-232C pin designations used for CN6

Pin	Signal Name	Description
1	N/A	Not used.
2	TD	Transmit Data
3	RD	Receive Data
4	CTS	Clear to Send
5	RTS	Request to Send
6	DSR	Data Set Ready
7	SG	Signal Ground
8	CD	Carrier Detect
20	DTR	Data Terminal Ready

- For instructions on connecting a remote PCAS PC, see the *PCAS User's Guide*.
- For instructions on connecting **the** remote DBS Manager, see the *DBS Manager User Guide*.

Installation

1. Connect one end of the RS-232C cable to CN6 on the Connector Panel.

Figure 5-1 shows cable pinouts for 25-pin and 9-pin RS-232C devices. These connections have been used successfully with many PCs and SMDR devices; however, consult the documentation of the PC or SMDR device before fabricating a cable.

2. Connect the other end of the RS-232C cable to the local programming terminal or SMDR device.

Figure 5-1. RS-232C connection

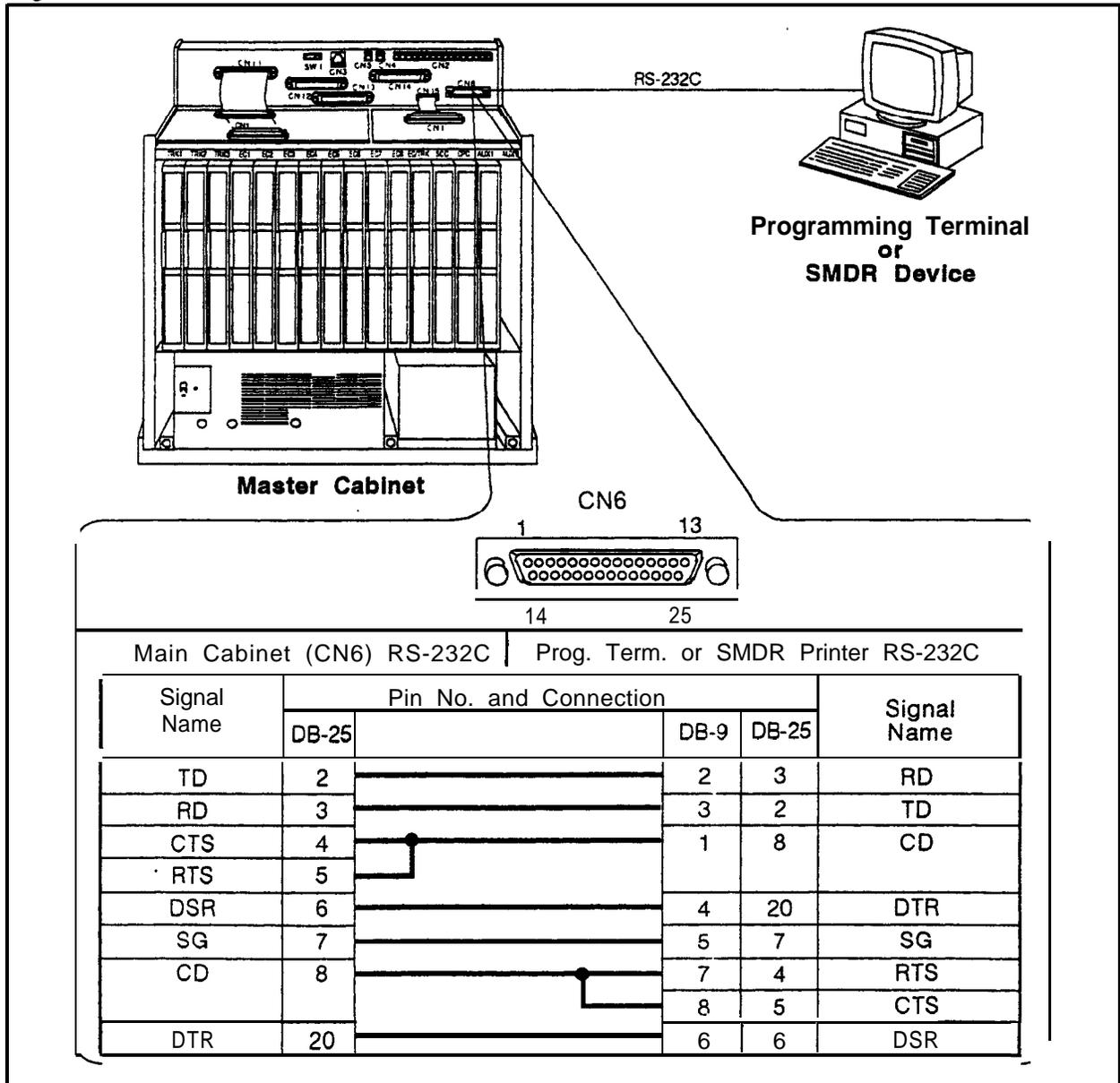


Figure 5-2. SMDR Format for CPC-AII and CPC-B Version 3.1 or higher

0	1	2	3	4	5	6	7	8	9
0	1	2	3	4	5	6	7	8	9
1	2	3	4	5	6	7	8	9	
T	MM/DD	HH:MM:SS	HH:MM:SS	NNN	DDDDDDDDDDDDDDDDDDDDDDDDDDDDDD	AAAAA	VVVVV	NN	
1=Call type S=Inbound DISA s=Outbound DISA I=Incoming O-Outgoing T=Transfer (See Note 1.) N=DNIS D=DID					5=Extension number 10-69, 100-699=extensions CO number=DISA				
2=Date MM=month DD=day					6=Dialed digits or Caller ID DD=digits 0-9 or symbols * or # (See Note 2.)				
3=Call start time HH=hours MM=minutes SS=seconds					7=Account code A=0-9999999999				
4=Call duration HH=hours MM=minutes SS=seconds					8=Verified account code or walking COS code V0000-V9999=verified account codes W0000-W9999=walking COS codes				
					9=Trunk Number NN=number (01-64)				
Notes : 1. Transferred calls include direct and group call pickups and conference calls. If a station call is transferred to an outside number, an SMDR record is also created for the station that is transferred. 2. The . symbol appears as a greater-than sign (>) on the SMDR printout; the # symbol appears as a less-than sign (<). Centrex and PBX codes, as well as LCR access codes, do not appear as dialed digits. If the Caller ID Feature is installed and enabled, *Private" appears with calls that have restricted Caller ID display and "Out of Area" with long distance calls that do not provide Caller ID information.									

Remote Administration Interface (RAI)

Guidelines

- The RAI is a modem card that installs on the SCC card. The card is used to remotely administer the system through a trunk line.
- Two versions of the RAI card are available. Both versions use 1 Stop bit, 8 data bits, and no parity. The RAI-A card has a fixed baud rate of 300. The RAI-B card supports both 300 and 1200 baud operation. The following table shows the transmission rate of each card along with the SCC version compatibility.

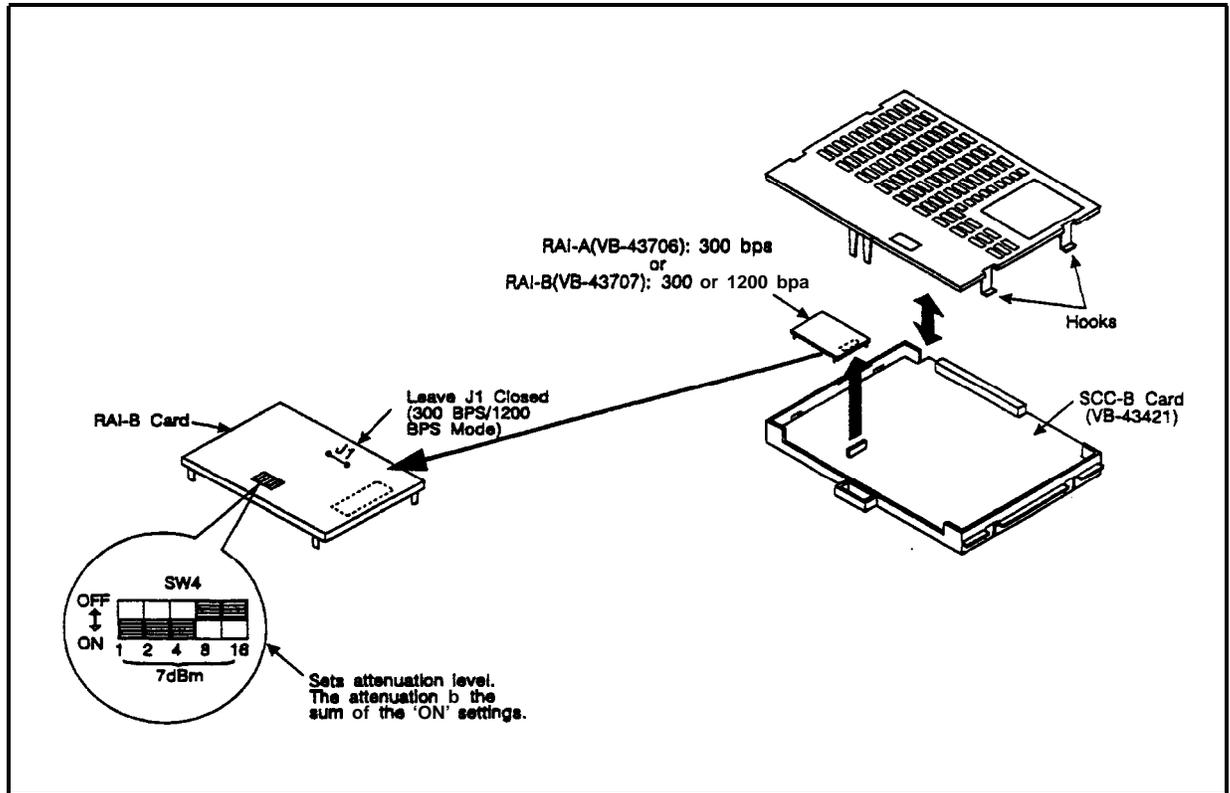
Table 5-2. RAI compatibility

RAI Version/Part No.	Transmission Parameters	SCC Compatibility
RAI-A (VB-43706)	300 bps, 1 stop bit, 8 data bits, no parity	SCC-A or SCC-B
RAI-B (VB-43707)	300 bps/1200 bps, 1 stop bit, 8 data bits, no parity	SCC-B only

Installation

- Remove the upper cover of the SCC card.
 - Jumper 1 (J1) on the RAI-B controls the transmission rate. When closed, the transmission rate is switchable from 300 bps to 1200 bps through system programming. When open, the rate is fixed at 300 bps.
- Connect the RAI card to the connector on the SCC card.
 - The RAI-A connects to CN3. RAI-B connects to CN2 and CN3.
- Replace the upper cover of the SCC.
 - **Note:** To adjust the output level of the RAI, set switch 4 as shown in Figure 5-3.

Figure 5-3. RAI connection



Background Music/Music-On-Hold

Guidelines

- A single music source can be used for both background music (BGM) and music-on-hold (MOH), or separate music sources can be used for each feature.
- If a single music source is used for both MOH and BGM, the music source connects to CN5 on the Connector Panel. If separate sources are used, the MOH source connects to CN5, and the BGM source connects to the BGM connector on the SCC card.
- If an FM radio is connected to the BGM connector on the SCC, install it at least 16.5 ft. (5m) away from the main cabinet. If it is too close, the receiver may not function properly.
- The maximum input impedance of both terminals is **10k** ohms. The maximum signal level is **-10 dB**.
- Beginning with **CPC-AII** and **CPC-B** Version 7.0, an internal hold tone may be selected in programming. If selected, the internal hold tone will always be used even if a sound source is connected to MOH connector CN5.

Installation

1. If you are using a single source for both BGM and MOH, connect the source to CN5 on the Connector Panel. If using separate sources, connect the MOH source to **CN5** and the **BGM** source to the BGM connector on the SCC card.
2. Strap the CN5 block (SCC-A) or the CN4 block (SCC-B) according to the number of music sources used.

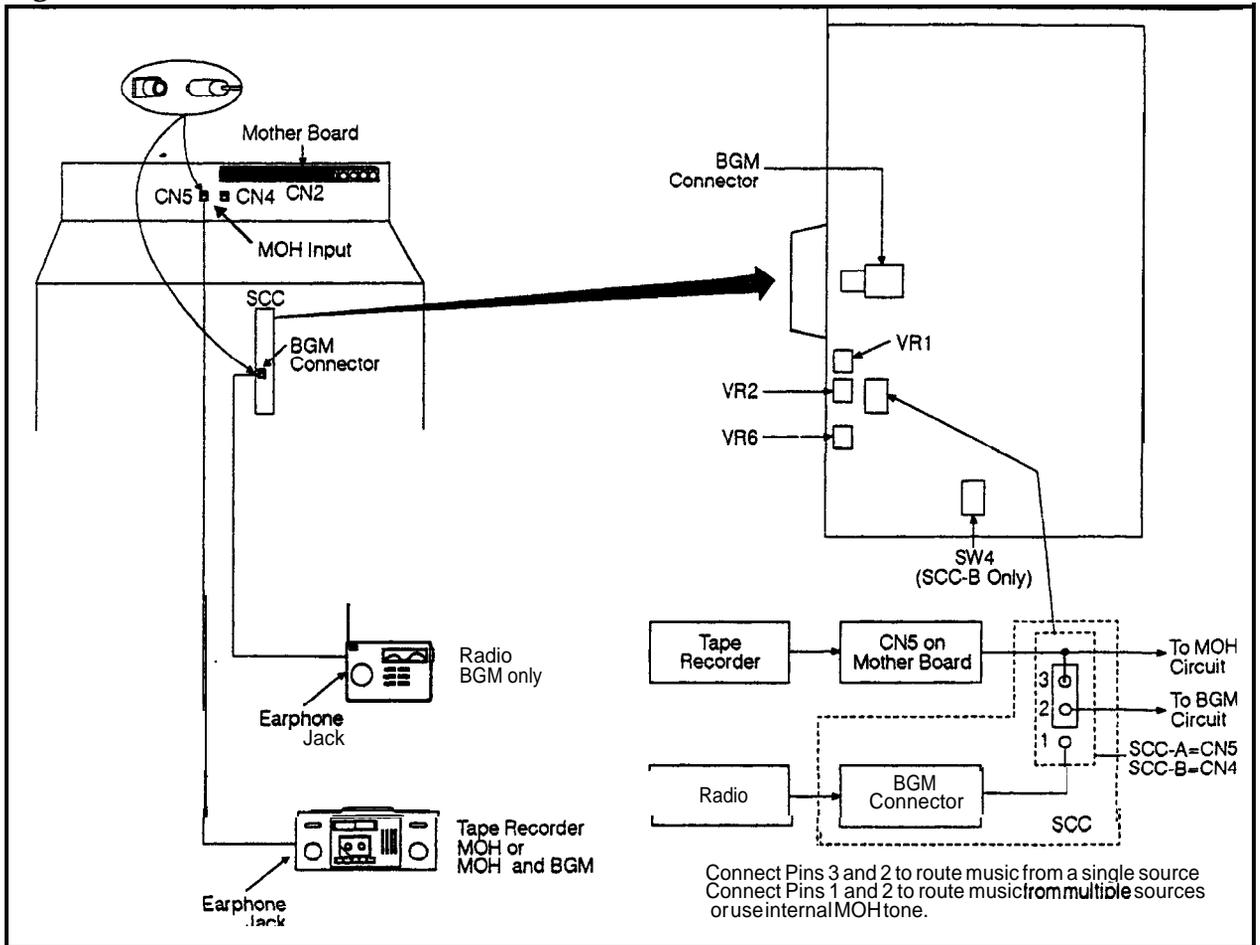
To route the music from . . .	Do this . . .
A single source	Short pin 3 to 2.
Separate sources	Short pin 1 to 2.

Note: To change the volume levels of the music sources, adjust the variable resistors on the SCC card.

Table 5-3. SCC variable resistors

Variable Resistor	Purpose
SCC-A	
VR1	Adjusts CO ringing tone volume.
VR5	Adjust MOH and BGM volume.
SCC-B	
VR1	Adjusts MOH volume.
vR2	Adjust BGM volume.
VR6	Adjusts CO ringing tone volume.

Figure 5-4. Installation of music-on-hold and background music



Off-Premises Adaptor (OPX)

Guidelines

- Analog phones can be connected as off-premise stations through a direct line to the DBS or through the central office, depending on how far the stations are from the OPX Adaptor.

Table 5-4 shows how far the OPX stations can be from the adaptor without going through a CO.

Table 5-4. Maximum distances for direct connection to OPX stations

Wiring gauge	Max. distance (in feet) between the OPX Adaptor and the OPX station
AWG 22	27877
AWG 24	17532
AWG 26	11025

- One OPX Adaptor (VB-43702) is required for each OPX station.
- The ringing output of the OPX Adaptor is 225 Vp-p (peak-to-peak) at 20 Hz.
- When OPX stations are connected through the central office, an external ringer supply may be required. If required, the ringing supply is connected to the OPX Adaptor.
- Order an OL13C circuits for OPX stations connected through a CO.
- The following tools are required to install the OPX Adaptor:
 - Phillips screwdriver
 - Needle-nose pliers
 - Diagonal shears.

Installation

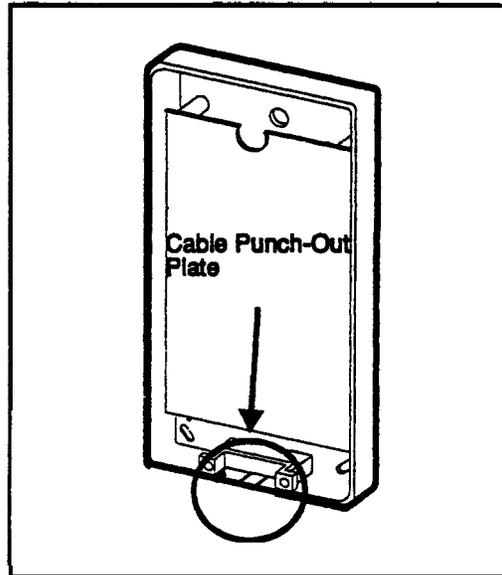
The following procedures describe direct OPX connection and OPX connection through a CO. Order an OL13C circuit for an OPX through a CO. Refer to Figure 5-6 on page 5-13 when installing the OPX.

Installing an OPX Station Without Going Through a Central Office

1. Remove the cover from the OPX Adaptor.
2. Remove the cable punch-out plate (Figure 5-12) to make an opening for the cables coming into the OPX Adaptor.

To remove the plate, cut the grooves on either side with diagonal shears. Then bend the plate back and forth with needle-nose pliers to remove it.

Figure 5-5. Cable punch-out plate, OPX Adaptor



3. Mount the OPX Adaptor to the wall.

Note: Table 5-5 shows how far the Adaptor can be located from the DBS.

Table 5-5. Maximum distances for OPX Adaptor installation

Wiring gauge	Max. distance (in feet) between the DBS and OPX Adaptor
AWG 22	309
AWG 24	194
AWG 26	122

4. Connect the “R” and “T” leads to a digital extension port on the DBS.
5. Connect the “GND” lead on the OPX Adaptor to the DBS Frame Ground screw.
6. Connect the “TR” and “IT” leads to the OPX station.
7. Install the cover on the OPX Adaptor.
8. Turn the system off and back on, or unplug the cable connected to the digital extension and then plug it back in.

Installing an OPX Station Through a Central Office

1. Perform Steps 1 through 5 of “Installing an OPX Station Without Going Through a Central Office” on page 5- 11.

2. Connect the “TR” and “TT” leads to the central office.

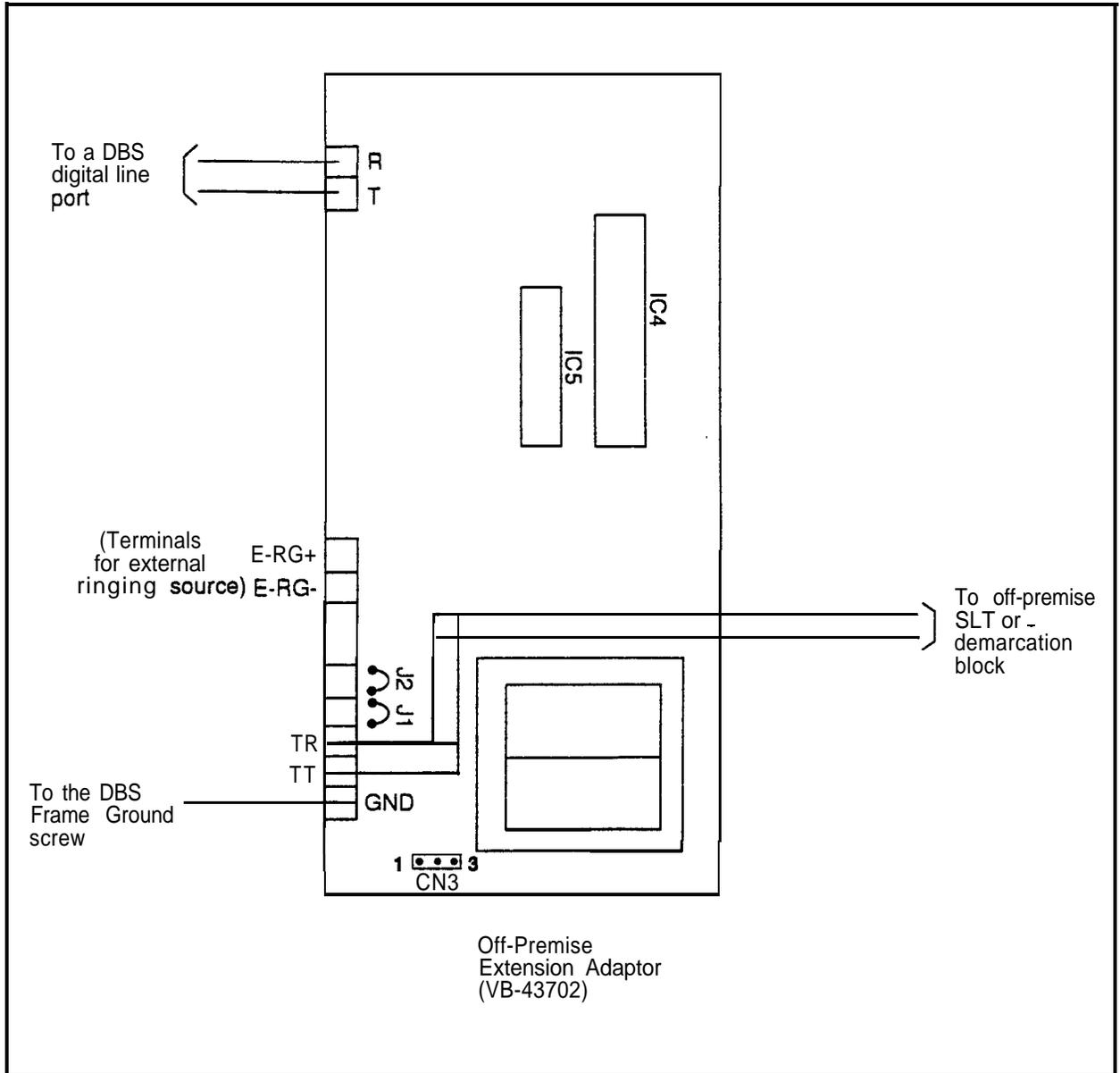
Note: If the central office requests a ground on the tip side of the OPX, strap Pins 1 to 2 on CN3.

3. If the ringing level at the OPX station is not sufficient, connect a ringing supply to the “E-RG+” and “E-RG-” terminals on the OPX Adaptor.

Note: Signals to the external ringer should not exceed 300 Vp-p.

4. If a ringing supply is used, cut Straps J1 and J2 on the OPX Adaptor.
5. Install the cover on the OPX Adaptor.
6. Power the system down then back up, or unplug the cable connected to the digital extension, then plug it back in.

Figure 5-6. OPX installation



Paging

The DBS allows extensions to be grouped into paging groups numbered 00-07. When you issue a page (by dialing #00-#07), you specify a paging group, so that your announcement is heard over the key telephones and Digital Single Line Telephones that are members of that group. Paging groups often include people whose work is related.

External zone paging allows you to connect up to five speaker groups to the DBS. Each speaker group is assigned to one of five paging zones (00-04). Zone 00 corresponds to group 00. When you page group 00, your page is heard over the All-Page Speaker(s) as well as all other external zones. Zones 01-04 correspond to groups 01-04. For example, when you page group 02, the page is heard on the external speaker(s) assigned to zone 02. Paging groups 05-07 have no external paging zones.

If zone paging is not required, general paging relay terminals C (common), B (break) and M (make) are also provided. The relay terminals activate any time there is a page to an **external** page group. These are used when paging and UNA use the same paging amplifier system. (See notes for more information.)

Guidelines

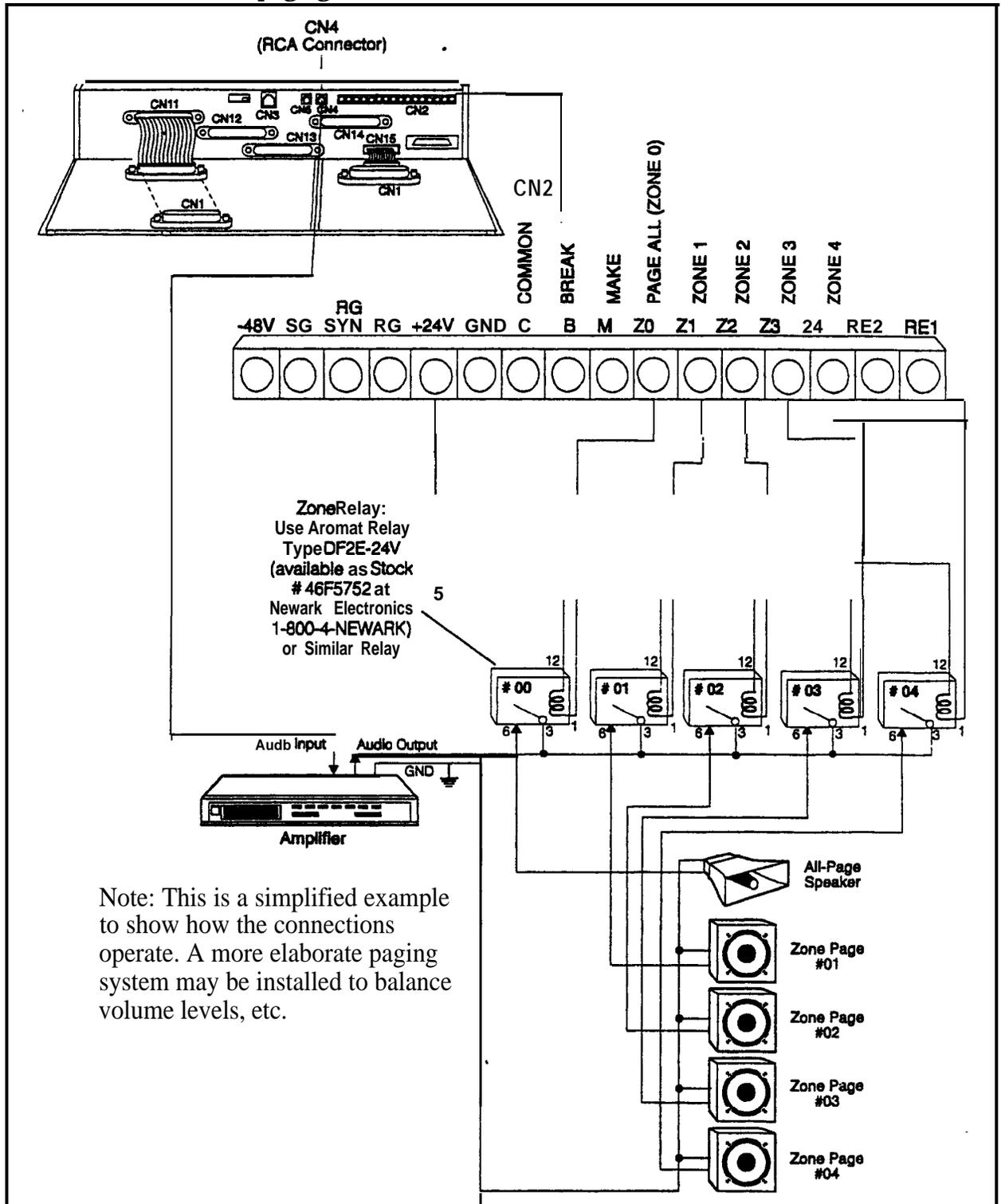
- The paging amplifier, zone relays, and speakers are not provided with the DBS. They must be purchased separately.
- The maximum current for each zone paging terminal on the Connector Panel (Z0-Z4) is 50 mA; the resistance of the relay used for each zone paging terminal must be 2600 to 2800 Ohms.
- The contact rating for the UNA/General Paging “C” and “M” terminals is 30V DC, 1 amp (maximum).
- Connector 4 (CN4) on the Connector Panel is used to connect the paging amplifier. The output impedance of CN4 is 600 Ohms; the loss/gain setting is 0 dB.

External Page Zone Installation

1. Connect the paging amplifier to CN4 on the DBS Connector Panel. (See Figure 5-7 on page 5-15.)
2. Connect the paging speakers to the amplifier and relays.

3. Connect the zone relays to the amplifier.
4. Connect the zone relays to the +24V and zone paging terminals (20-24) on the Connector Panel.

Figure 5-7. External zone paging installation

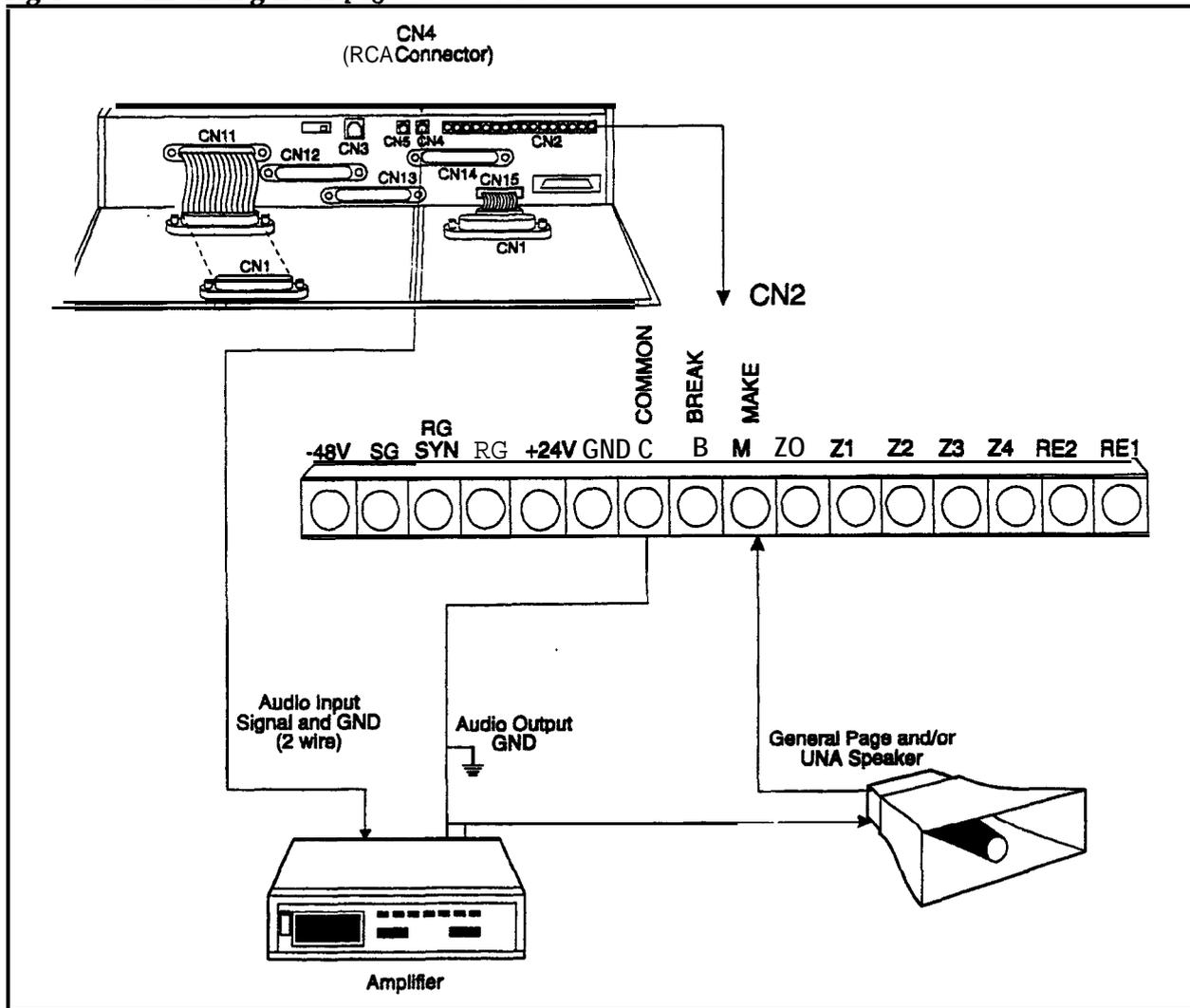


External General Page/UNA Installation

Use this procedure to connect a general page system, connect UNA over a page system or connect a combined **page/UNA** system.

1. Connect CN4 on the DBS Connector Panel to the audio input of the paging amplifier. (See Figure 5-8.)
2. Connect the audio output of the amplifier through the C and M relay terminals to the speaker(s) as shown in Figure 5-8.

Figure 5-8. External general page/UNA installation



Notes:

- Instead of the described combined **Paging/UNA** configuration, most often Universal Night Answer notification is provided by an external ringer device. (See "External Ringer (UNA Device)" on page 5-17 for more information on UNA external ringer device installation.)

- If UNA operates over the paging system, the Audio Output of CN4 provides the Audio **Ringback** sound to be heard over the paging system when a trunk rings UNA.
- If UNA operates over the paging system, the UNA ringing will always takes precedence over paging. When a page is **interrupted** in progress, the pager must hang up and wait until after UNA ringing ends to reinstate the page.
- If UNA rings over the paging system, set the Ring Patterns for UNA Terminals (M, C, & B) to continuous ring burst (FF1 2# 4# 1# 1#). This sets the contacts to remain continuously activated during the UN.4 ring broadcast.

External Ringer (UNA Device)

Guidelines

- An external ringer device can be used to alert users when Universal Night Answer (IJNA) calls come in.
- The external ringer device is not provided with the DBS. It must be **purchased** separately.
- UNA calls can also be set to ring over an external paging system. See “Paging” on page 5-14 for more information. This alternate connection is preferred when both paging and UNA are required.
- The contact rating for the “C” and “M” terminals is 30V DC, 1 amp (maximum).

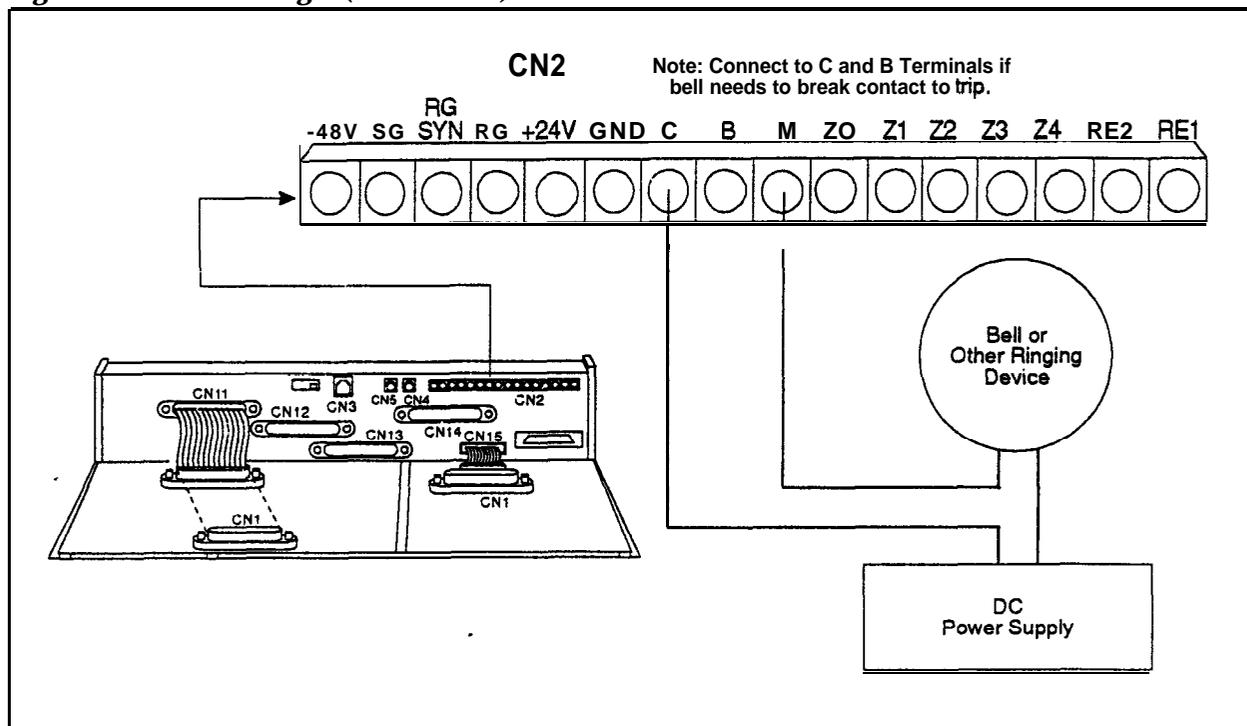
Installation

1. Connect the external ringer to the “C” and “M” terminals on the Connector Panel. (See Figure 5-9 on page 5-18.)

Note: When the Ring Patterns for UNA Terminals (M, C, & B) programming command (FF1 2# 4# 1# (0 or 1)# is set to 0, connecting the ringer to the “C” and “M” terminals provides a “1 second on/3 seconds off” ringing pattern and connecting to “C” and “B” terminals provides a “1 second off/3 seconds on” ringing pattern.

2. Connect the external ringer to its DC power source.

Figure 5-9. External ringer (UNA device) installation



Notes:

- Most often, Universal Night Answer notification is provided by an external ringer device. Universal Night Answer (UNA) can alternatively be set to ring over the paging system. See “Paging” on page 5- 14 for more information.
- If UNA operates over a external ringer device, it is not recommend that external paging also be used. Since contacts C, B and M activate for both UNA calls and external pages, the external ringer device would turn ON for all pages.

Power Failure Unit

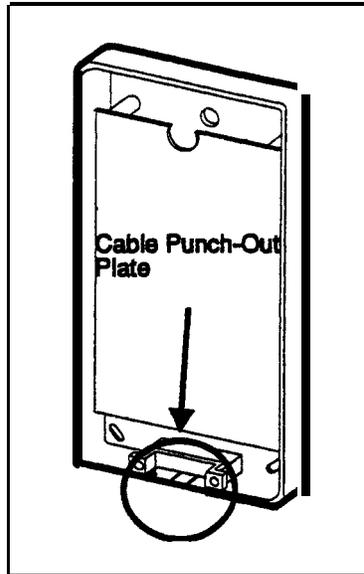
Guidelines

- Up to four **SLTs** can be connected to the Power Failure Unit (VA-43703). If a power failure occurs, the **SLTs** will automatically receive dial tone directly from the central office. DBS features and restrictions do not apply when the **SLTs** are receiving dial tone from the CO.
- If a call is in progress through the Power Failure Unit (PFU) when the power is restored, the call will be disconnected.
- The following tools are required to install the PFU:
 - Phillips screwdriver
 - Needle-nose pliers
 - Diagonal shears.

Installation

1. Remove the cover from the Power Failure Unit (**PFU**).
2. Remove the cable punch-out plate (Figure 5-12) to make an opening for the cables coming into the PFU.

To remove the plate, cut the grooves on either side with diagonal shears. Then bend the plate back and forth with needle-nose pliers to remove it.

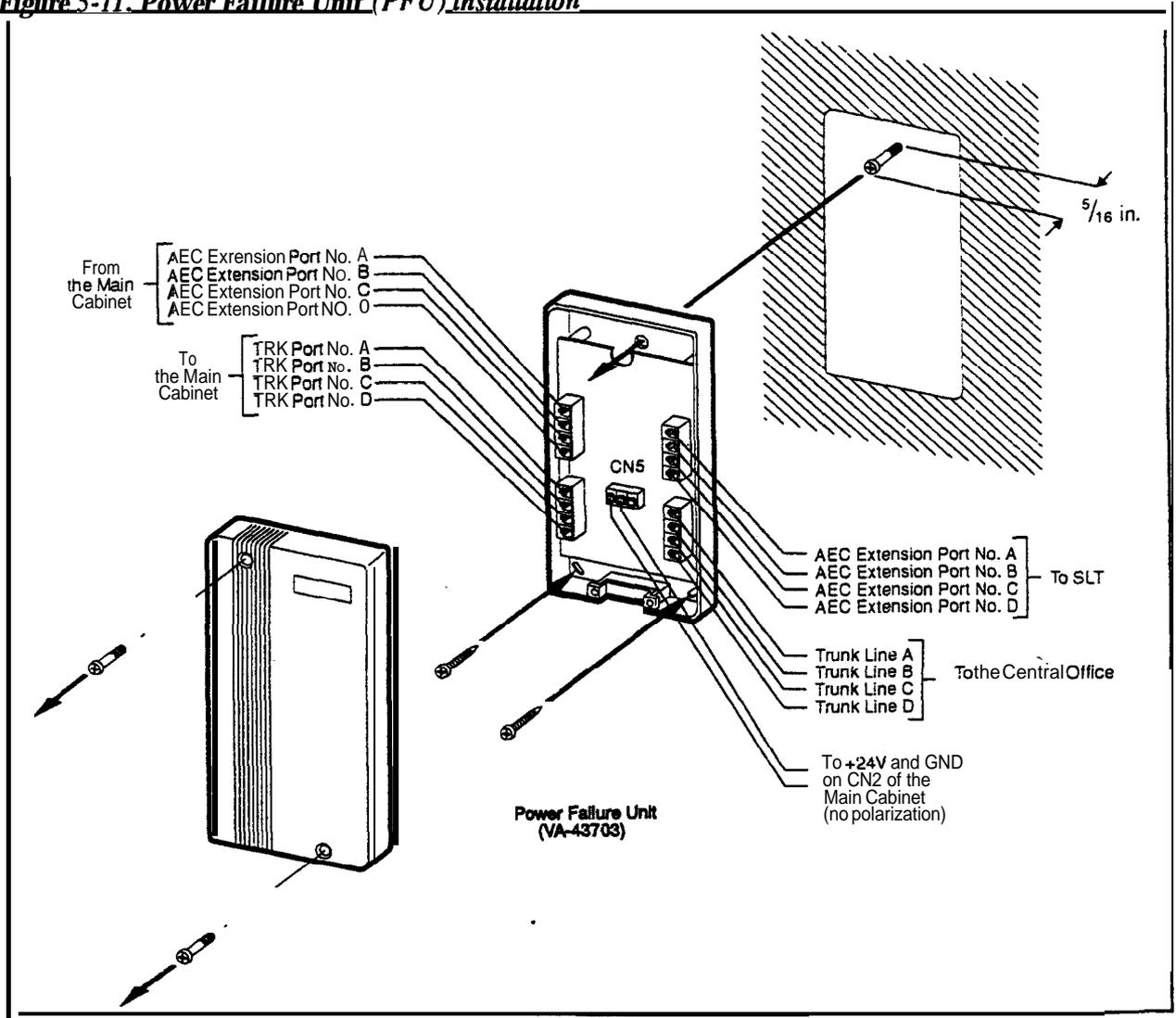
Figure S-10. Cable punch-out plate Power Failure Unit

3. Mount the PFU on the wall using the three screws provided with the unit. (See Figure 5- 11. j
4. Connect the trunks from the central office to the PFU.
5. Connect the SLTs to the AEC extension ports on the PFU.
6. Connect the trunks from the DBS to the PFU.
7. Connect the AEC ports from the DBS to the PFU.

When a power failure occurs, AEC "A" is switched to Trunk "A," AEC "B" is switched to Trunk "B," and so on.

8. Connect the +24V and GND terminals from CN2 on the DBS Connector Panel to the PFU.
9. Install the cover on the PFU.

Figure 5-11. Power Failure Unit (PFU) installation



Voice Announce Unit (VAU)

Guidelines

- Operating temperatures for the Voice Announce Unit (VB-43708) should be between 35 and 105° F.
- Maximum loop resistance for the VAU is 10 Ohms.
- The VAU contains a rechargeable lead-acid battery. Recharging circuitry for the battery is included on the VAU.
- The ports used for the VAU must have **all FF** key assignments cleared before voice messages and abbreviated dial numbers are programmed.
- The following tools are required to install the VAU:
 - Phillips screwdriver
 - Needle-nose pliers
 - Diagonal shears.

installation

1. Remove the cover from the Voice Announce Unit.
2. Set SW 1 and SW2 according to the following tables. (Default settings are italicized.)

See Figure 5-14 for the location of the switch blocks.

Table 5-6. Switch settings for SW1, VAU

Switch Block 1 (SW1)	
Switch	Function
1	ON=Enable blind transfer OFF=Disable blind transfer (VAU chip 1.1 or later is required for blind transfer.)
2	ON=Small DBS OFF=DBS and DBS 824
3	ON=Two messages up to 16 seconds each OFF=One message up to 32 seconds

Table 5-7. Switch settings for delay answer timing, VAU

Switch Block 2 (SW2) Delay Answer Timer (Switches 1-3)								
Switch	Timer (in seconds)							
	4	8	12	16	20	24	28	No Answer (VAU 1.1 or below) or Immediate Answer (VAU 1.2 or above)
1	OFF	OFF	OFF	OFF	ON	ON	ON	ON
2	OFF	OFF	ON	ON	OFF	OFF	ON	ON
3	OFF	ON	OFF	ON	OFF	ON	OFF	ON

Table5-8. Switch settings for DTMF detection timing, VAU

DTMF Detection Timer		
VAU Version	Switch block and switch	Function
1.1 or above	SW2, pin 4	ON=80 ms OFF=40 ms
1.0 or below	SW1, pin 1 and SW2, pin 4	Where X/X=SW 1 setting/SW2 setting: ON/ON=40 OFF/ON=60 ON/OFF=80 OFF/OFF= 100

Table5-9. Switch settings for wait timing between dialed digits, VAU

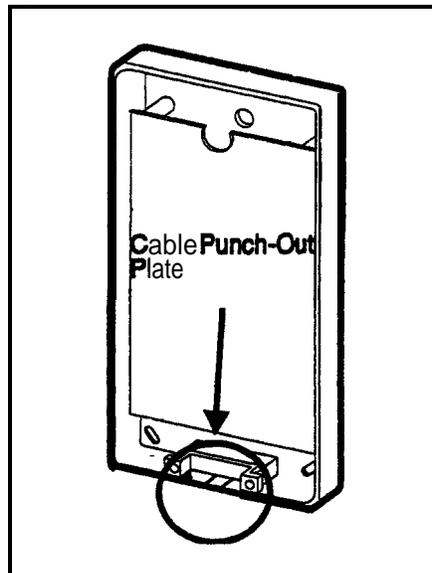
Switch Block 2 (SW2) Wait Time Between Dialed Digits (Switches 5-6)				
Switch	Time (in seconds)			
	2	6	10	14
5	OFF	OFF	ON	ON
6	OFF	ON	OFF	ON

Table S-10. Switch settings for abbreviated dialing digit length, VAU

Switch Block 2 (SW2) Abbreviated Dialing Digit Length (Switches 7-8)			
Switch	Number of Digits		
	1 Digit	2 Digits	3 Digits
7	OFF	OFF	ON
8	OFF	ON	OFF

- Remove the cable punch-out plate (Figure 5-12) to make an opening for the cable coming into the VAU.

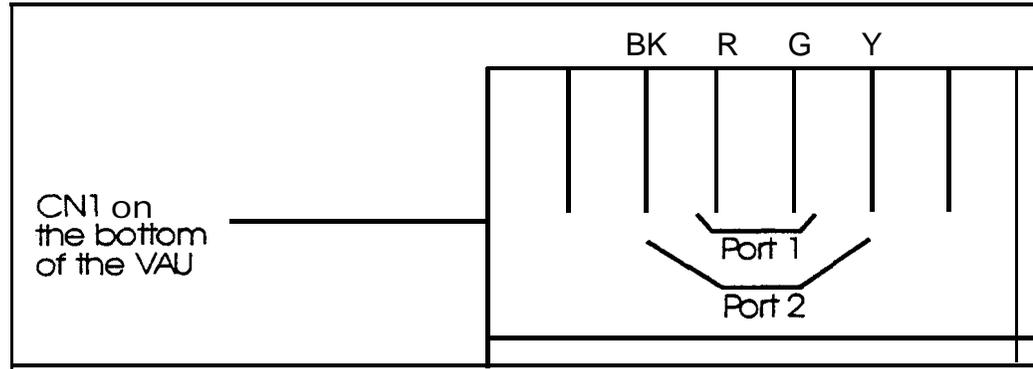
To remove the plate, cut the grooves on either side with diagonal shears. Then bend the plate back and forth with needle-nose pliers to remove it.

Figure 5-12. Cable punch-out plate, Voice Announce Unit

- Mount the VAU on the wall using the three screws provided with the unit. (See Figure 5-14.)
- Connect the extension cable from the DBS to CN1 on the VAU.

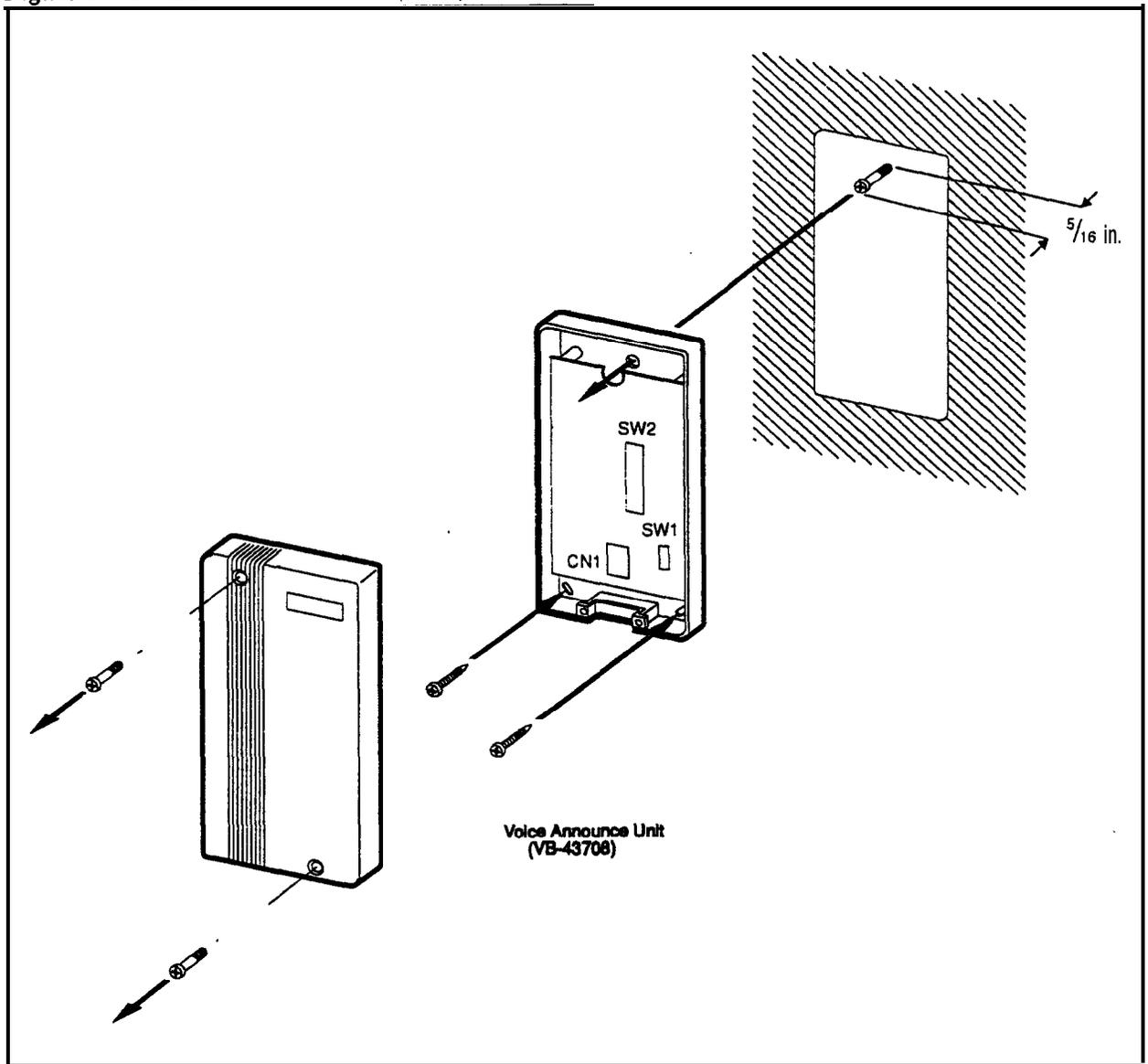
Note: The two inside pins on CN1 are port 1. The two pins on either side are port 2, as shown in Figure 5-13.

Figure S-13. Extension cord connection to the VAV



6. Install the cover on the VAU.

Figure 5-14. Voice Announce Unit (VAU) installation



Recording and Playing Messages

You can record the VAU messages from either an extension or a trunk.

Notes: You must use a DTMF telephone to record and play VAU messages. To change existing messages, record over them.

To record and play messages, complete the following steps.

1. Do one of the following:

<i>If . . .</i>	<i>Then . . .</i>
You are recording or playing from an extension	Take your phone off hook. Dial the VAU extension number. (If the intercom is set for Voice, dial 1 to change from Voice to Tone.)
You are recording or playing from a trunk	Dial the phone number of the VAU, or call in and have the operator transfer you to the VAU extension.

2. After the VAU answers, do one of the following:

<i>If . . .</i>	<i>Then . . .</i>
You want to record the first message	Dial * 98 1 Wait for a beep. After the beep, record the message.
You want to record the second message	Dial * 98 2 Wait for a beep. After the beep, record the message.
You want to play the first message	Dial*971 The VAU plays the message.
You want to play the second message	Dial*972 The VAU plays the message.

Notes: You can enter the *97 codes again to replay messages without ending your call. You can only record one message at a time. To record another message, you must end your call and redial the VAU.

3. When the operation is complete, put the phone on hook.

Note: For more information on the VAU and its operation, see Section 770, "Voice Announce Unit User Guide."

Door Box Adaptor (Trunk Port)

Guidelines

There are two types of door phone adaptors available for the DBS. The first type (VB-43701) utilizes a trunk connection to connect to the door box and is described below. The second type (VB-437 11) utilizes a digital port extension to connect to the door box and door opener. See “Door Box Adaptor (Extension Port)” on page 5-31 for more information.

Each Door Box Adaptor (VB-43701) can be used to connect one door sensor and up to two Door Boxes (VA-43705) equipped with door openers. Door openers and door sensors are not sold by Panasonic; they can be purchased separately from an electronics dealer.

Door Sensors

- A door sensor is similar to an alarm; different types of sensors detect different things, such as a door opening, moisture, heat, etc. When the sensor is tripped, a trunk rings on a dedicated key. You can reset the “alarm” by answering the key.
- To set up a sensor, assign a trunk to ring at a phone, and then assign that trunk to an FF key.
- Each sensor uses one trunk port.

Door Boxes with Door Openers

- Door-Boxes and door openers work together. The Door Box allows visitors to announce their presence from outside the office. The door opener enables a user to unlock the door using a telephone.
- To set up the Door Box and opener, assign a trunk to ring at a phone and then assign that trunk to an FF key.
- When a visitor is announced from the Door Box, the user presses the ringing FF key to answer the call. Then, to open the door, the user dials 3.
- The door opener can be set to open the door for 15 seconds, 30 seconds, or one minute.
- Up to two Door Boxes with openers can be connected to a Door Box Adaptor.
- Each Door Box and opener use one trunk port.

Requirements

- Trunks used for Door Boxes and openers must be set up as dial pulse trunks.
- Equipment combinations used with the Door Box Adaptor require the number of trunks in the following table:

If you use...	The adaptor uses
1 sensor and 1 Door Box/opener	2 trunks
1 sensor and 2 Door Boxes/openers	2 trunks
1 sensor	1 trunk
1 Door Box/opener	1 trunk

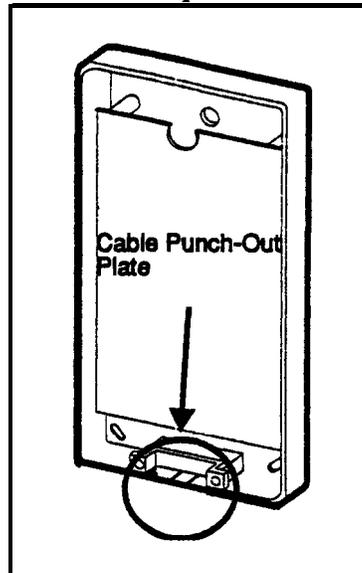
- The following tools are required to install the Door Box Adaptor:
 - Phillips screwdriver
 - Needle-nose pliers
 - Diagonal shears.

Installation

1. Remove the cover from the Door Box Adaptor.
2. Set the switches in the Door Box Adaptor as shown in Figure 5-16.
3. Remove the cable punch-out plate Figure 5-12 in order to make an opening for the cables coming into the Door Box Adaptor.

To remove the plate, cut the grooves on either side with diagonal shears. Then bend the plate back and forth with needle-nose pliers to remove it.

Figure S-15. Cable punch-out plate Door Box Adaptor



4. Mount the Door Box Adaptor on the wall using the three screws provided with the unit.
5. Connect the trunk line(s) to the Door Box Adaptor, as shown in Figure 5-16.

The "COD" connector is used for the Door Box and opener. The "COS" connector is used for the sensor.

6. Connect the Door Box, door opener, and sensor to the Door Box Adaptor.

Door Box Adaptor (Extension Port)

Note: There are two types of door phone adaptors available for the DBS. The first type (VB-43701) utilizes a trunk connection to connect to the door box. See “Door Box Adaptor (Trunk Port)” on page 5-27 for more information. The second type (VB-43711) utilizes a digital port extension to connect to the door box and door opener and is described below.

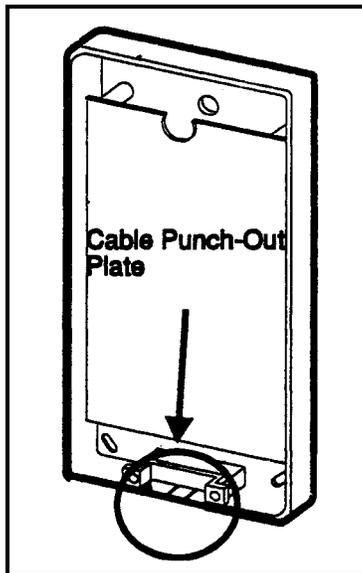
Guidelines

- The Door Box Adaptor (VB-43711) requires a door opener. In addition, a Door Box (door phone) (VA-43705) is normally used with the Door Box Adaptor. The door opener is not sold by Panasonic; it can be purchased separately from an electronics dealer.
- Each Door Box and opener use one extension port.

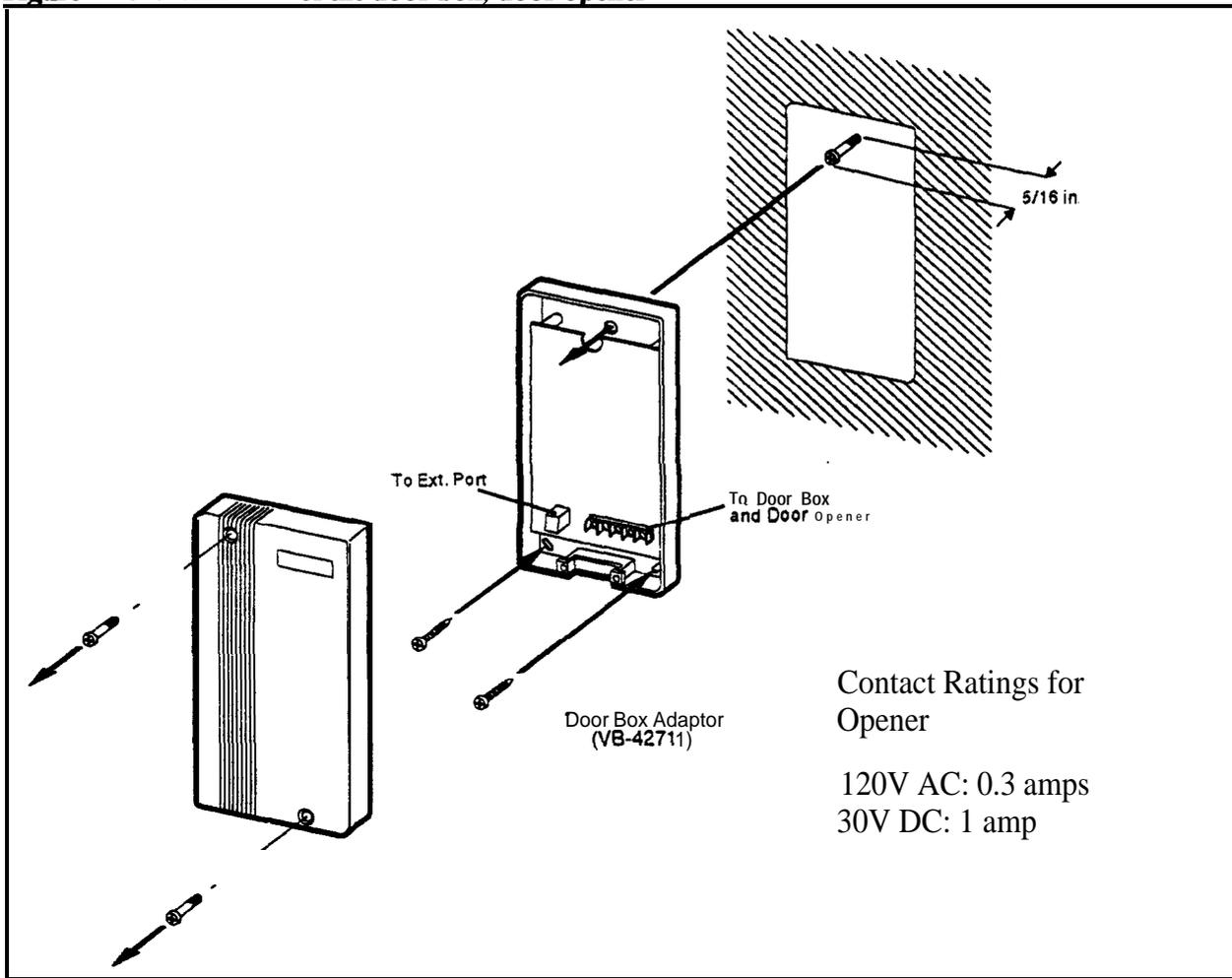
Installation

1. Remove the cover from the Door Box Adaptor.
2. Remove the cable punch-out plate (Figure 5-17) in order to make an opening for the cables coming into the Door Box Adaptor. To remove the plate, cut the grooves on either side with diagonal cutters. Then bend the plate back and forth with needle-nose pliers to remove it.

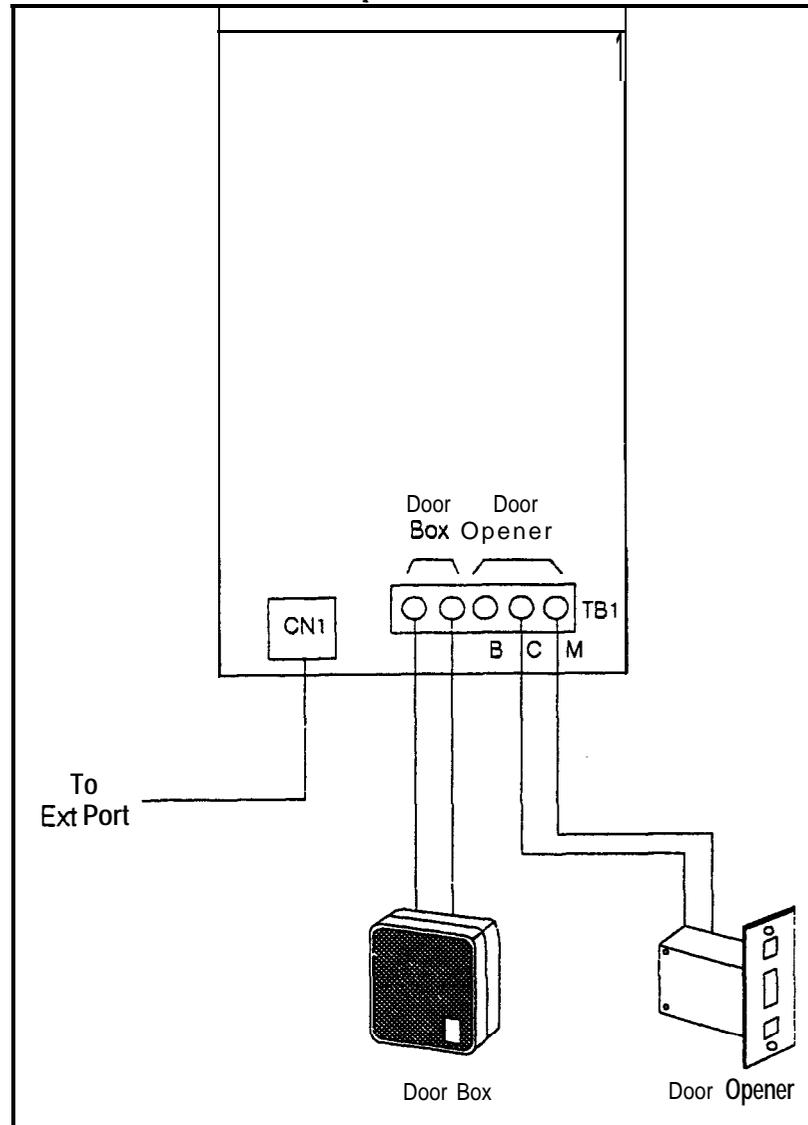
Figure 5-17. Cable punch-out plate Door Box Adaptor



3. Mount the Door Box Adaptor on the wall using the three screws provided with the unit.

Figure 5-18. Installation of the door box, door opener

4. Connect the extension line to the Door Box Adaptor, as shown in Figure 5-19.

Figure j-19. Connections to the Door Box Adaptor

5. Connect the Door Box and door opener to the Door Box Adaptor.

Single Line Telephone Adaptor

Guidelines

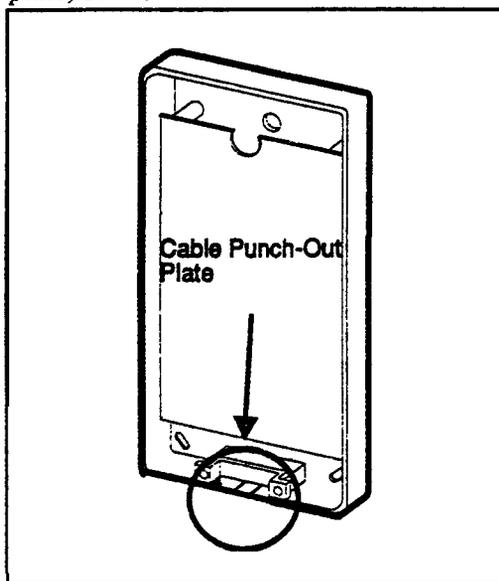
- The Single Line Telephone Adaptor (SLTA, VB-43709) provides an alternative way of connecting analog DTMF telephones (2500 sets). One SLTA supports up to 4 Single Line Telephones.
- Each SLT extension requires a digital extension port connection to the SLTA.

Installation

1. Remove the cover from the SLTA.
2. Remove the cable punch-out plate (Figure 5-20) to make an opening for the cables coming into the SLTA.

To remove the plate, cut the grooves on either side with diagonal cutters. Then bend the plate back and forth with needle-nose pliers to remove it.

Figure S-20. Cable punch-out plate, SLTA



3. Mount the SLTA to the wall (see Figure 5-21).

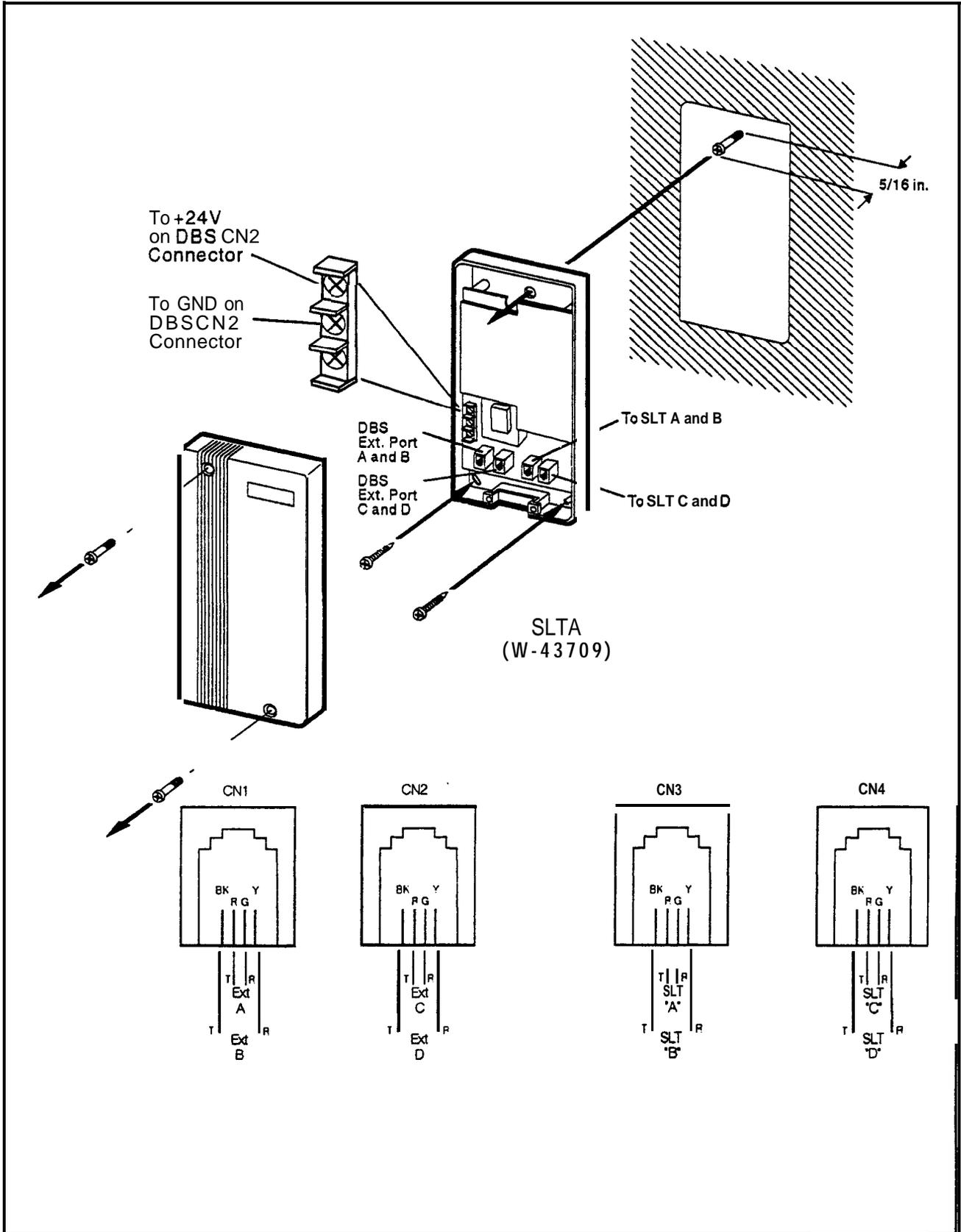
Note: Table 5-11 shows the maximum distance the SLTA can be located from the DBS.

Table S-11. Maximum distances for SLTA installation

Wiring gauge	Max. distance (in feet) between the DBS and SLTA	Max. distance (in feet) between the SLTA and the SLT
AWG 22	300' or 10 Ω	3000' or 100 Ω
AWG 24	190' or 10 Ω	1900' or 100 Ω
AWG 26	120' or 10 Ω	1200' or 100 Ω

4. **If** the DBS is powered up, turn off the power.
5. Connect the GND and +24V leads on the SLTA to the DBS connector panel. **Be sure the wires do not touch each other or touch the metal frame housing.**
6. Turn on the DBS power.
7. Connect the "T" and "R" leads to the digital extension ports on the DBS as per Figure 5-21. One digital extension port is required for each SLT.
8. Connect the SLT "T" and "R" leads to the SLTs.
9. Install the cover on the SLTA.

Figure S-21. SLTA installation



Chapter 6. Double-Cabinet Systems

Two DBS cabinets can be connected in order to increase capacity. This chapter includes connection procedures, as well as capacities for two-cabinet systems.

See Chapter 4 for instructions on installing TIs in two-cabinet systems.

This chapter covers the following topics:

Topic	Page
Guidelines	6-3
Installation	6-10

Guidelines

- Two DBS cabinets can be connected to increase line size. The maximum line size consists of two DBS 96 cabinets, which provide 192 ports.
- CPC-B and SCC-B are required for two-cabinet systems.
- If ground start or DID trunks are used in both cabinets, separate -48V supplies must be supplied for each cabinet. **If AECs** are used in both cabinets, separate SLT ringer boxes must be supplied for each cabinet.
- The following table shows the acceptable combinations of system types

Table 6-I. Trunk and extension port maximums for double-cabinet systems

System Combinations		Trunk Ports	Extension Ports	Expansion Ports (Trunk lines or extensions)
Master	Slave			
DBS 40	DBS 40	16	48	8 (See Note 1.)
DBS 72	DBS 40	24	72	0 (See Note 2.)
DBS 72	DBS 72	32	96	8 (See Note 1.)
DBS 96	DBS 40	32	88	16
DBS 96	DBS 72	40	112	16
DBS 96	DBS 96	48	128	16
Notes:				
1. The slave cabinet must be used for expansion ports.				
2. When a DBS72 and DBS40 are connected, expansion ports cannot be used.				

- Figures 6-1 through 6-6 shows slot usage for two-cabinet combinations.

Figure 6-1. Slot usage for two-cabinet systems. DRS 40 + DRS 40

DBS 40 (Slave)								
TRK1	EC1	EC2	EC3	EC/TRK	SCC	CPC	AUX1	AUX2
TRK 9-16	EXT 25-32	EXT 33-40	EXT 41-48	TRK 17-24* or EXT 49-56	N/A	MFR#	MFR#	CBL-S
DBS 40 (Master)								
TRK1	EC1	EC2	EC3	EC/TRK	SCC	CPC	AUX1	AUX2
TRK 1-8	EXT 1-8	EXT 9-16	EXT 17-24	N/A	SCC-B	CPC-B	MFR# or API	CBL-M

Notes:

*See "T1 Interface" on page 4-11 for EC/TRK port numbers for T1.

#A maximum of two MFR cards can be installed in a two-cabinet system. With Cable Kit Version 1.1, one MFR is installed in the Master AUX1, and one MFR is installed in the Slave AUX1. With Cable Kit Version 1.2, both MFR cards are installed in the slave cabinet--one in the CPC slot and one in AUX1. (When two MFR cards are used, Strap S3 on the second card must be cut..)

Figure 6-2. Slot usage for two-cabinet systems, DBS 72 + DBS 40

DBS 40 (Slave)												
TRK1	EC1	EC2	EC3	EC/TRK	SCC	CPC	AUX1	AUX2				
TRK 17-24	EXT 49-56	EXT 57-64	EXT 65-72	N/A	N/A	MF*	MF*	CBL-S				

DBS 72 (Master)												
TRK1	TRK2	EC1	EC2	EC3	EC4	EC5	EC6	EC/TRK	SCC	CPC	AUX1	AUX2
TRK 1-8	TRK 9-16	EXT 1-8	EXT 9-16	EXT 17-24	EXT 25-32	EXT 33-40	EXT 41-48	N/A	SCC-B	CPC-B	MFR* or API	CBL-M

Notes:

*A maximum of two MFR cards can be installed in a two-cabinet system. With Cable Kit Version 1.1, one MFR is installed in the Master AUX1, and one MFR is installed in the Slave AUX1. With Cable Kit Version 1.2, both MFR cards are installed in the slave cabinet--one in the CPC slot and one in AUX1. (When two MFR cards are used, Strap S3 on the second card must be cut)

Figure 6-3. Slotusage for two-cabinet systems. DBS 72 + DBS 72

DBS 72 (Slave)												
TRK 1	TRK 2	EC1	EC2	EC3	EC4	EC5	EC6	EC/TRK	SCC	CPC	AUX 1	AUX 2
TRK 1-24	TRK 33-40	EXT 49-56	EXT 57-64	EXT 65-72	EXT 73-80	EXT 81-88	EXT 89-96	TRK 41-48* or EXT 97-104	N/A	MFR#	MFR#	CBL-S

DBS 72 (Master)												
TRK 1	TRK 2	EC1	EC2	EC3	EC4	EC5	EC6	EC/TRK	SCC	CPC	AUX 1	AUX 2
TRK 1-8	TRK 9-16	EXT 1-8	EXT 9-16	EXT 17-24	EXT 25-32	EXT 33-40	EXT 41-48	N/A	SCC-B	CPC-B	MFR# or API	CBL-M

Notes:

*See "T1 Interface" on page 4-11 for EC/TRK port numbers for T1.

Beginning with CPC-B Version 4, the EC/TRK slot in the slave DBS 72 can be used for trunks or lines. Prior to CPC-B Version 4, this slot could only be used for lines.

#A maximum of two MFR cards can be installed in a two-cabinet system. With Cable Kit Version 1.1, one MFR is installed in the Master AUX1, and one MFR is installed in the Slave AUX1. With Cable Kit Version 1.2, both MFR cards are installed in the slave cabinet--one in the CPC slot and one in AUX1. (When two MFR cards are used, Strap S3 on the second card must be cut.)

Figure 6-4. Slot usage for two-cabinet systems, DBS 96 + DBS 40

DBS 40 (Slave)															
TRK 1	EC1	EC2	EC3	EC/ TRK	SCC	CPC	AUX 1	AUX 2							
TRK 33-40	EXT 73-80	EXT 81-88	EXT 89-96	TRK 41-48* or EXT 97-104	N/A	MFR#	MFR#	CBL-S							
DBS 96 (Master)															
TRK 1	TRK 2	TRK 3	EC1	EC2	EC3	EC4	EC5	EC6	EC7	EC8	EC/ TRK	SCC	CPC	AUX 1	AUX 2
TRK 1-8	TRK 9-16	TRK 17-24	EXT 1-8	EXT 9-16	EXT 17-24	EXT 25-32	EXT 33-40	EXT 41-48	EXT 49-56	EXT 57-64	TRK 25-32* or EXT 65-72	SCC-B	CPC-B	MFR# or API	CBL-M

Notes:

*See "T1 Interface" on page 4-1 1 for EC/TRK port numbers for T1.

#A maximum of two MFR cards can be installed in a two-cabinet system. With Cable Kit Version 1.1, one MFR is installed in the Master AUX1, and one MFR is installed in the Slave AUX1. With Cable Kit Version 1.2, both MFR cards are installed in the slave cabinet--one in the CPC slot and one in AUX1. (When two MFR cards are used, Strap S3 on the second card must be cut.)

Figure 6-5. Slot usage for two-cabinet systems, DBS 96 + DBS 72

DBS 72 (Slave)															
TRK 1	TRK 2	EC1	EC2	EC3	EC4	EC5	EC6	EC/ TRK	SCC	CPC	AUX 1	AUX 2			
TRK 33-40	TRK 41-48	EXT 73-80	EXT 81-88	EXT 89-96	EXT 97-104	EXT 105-112	EXT 113-120	TRK 49-56* or EXT 121-128	N/A	MFR#	MFR#	CBL-S			
DBS 96 (Master)															
TRK 1	TRK 2	TRK 3	EC1	EC2	EC3	EC4	EC5	EC6	EC7	EC8	EC/ TRK	SCC	CPC	AUX 1	AUX 2
TRK 1-8	TRK 9-16	TRK 17-24	EXT 1-8	EXT 9-16	EXT 17-24	EXT 25-32	EXT 33-40	EXT 41-48	EXT 49-56	EXT 57-64	TRK 25-32* or EXT 65-72	SCC-B	CPC-B	MFR# or API	CBL-M

Notes:

*See "T1 Interface" on page 4-1 1 for EC/TRK port numbers for T1.

#A maximum of two MFR cards can be installed in a two-cabinet system. With Cable Kit Version 1.1, one MFR is installed in the Master AUX1, and one MFR is installed in the Slave AUX1. With Cable Kit Version 1.2, both MFR cards are installed in the slave cabinet--one in the CPC slot and one in AUX1. (When two MFR cards are used, Strap S3 on the second card must be cut.)

Figure 6-6. Slot usage for two-cabinet systems, DBS 96 to DBS 96

DBS 96 (Slave)															
TRK 1	TRK 2	TRK 3	EC1	EC2	EC3	EC4	EC5	EC6	EC7	EC8	EC/TRK	SCC	CPC	AUX 1	AUX 2
TRK 33-40	TRK 41-48	TRK 49-56	EXT 73-80	EXT 81-88	EXT 89-96	EXT 97-104	EXT 105-112	EXT 113-120	EXT 121-128	EXT 129-136	TRK 57-64* or EXT 137-144	N/A	MFR#	MFR# or API	CBL-S
DBS 96 (Master)															
TRK 1	TRK 2	TRK 3	EC1	EC2	EC3	EC4	EC5	EC6	EC7	EC8	EC/TRK	SCC	CPC	AUX 1	AUX 2
TRK 1-8	TRK 9-16	TRK 17-24	EXT 1-8	EXT 9-16	EXT 17-24	EXT 25-32	EXT 33-40	EXT 41-48	EXT 49-56	EXT 57-64	TRK 25-32* or EXT 65-72	SCC-B	CPC-B	MFR# or API	CBL-M

Notes:

*See "T1 Interface" on page 4-1 1 for EC/TRK port numbers for T1.

#A maximum of two MFR cards can be installed in a two-cabinet system. With Cable Kit Version 1.1, one MFR is installed in the Master AUX 1, and one MFR is installed in the Slave AUX1. With Cable Kit Version 1.2, both MFR cards are installed in the slave cabinet--one in the CPC slot and one in AUX1. (When two MFR cards are used, Strap S3 on the second card must be cut.)

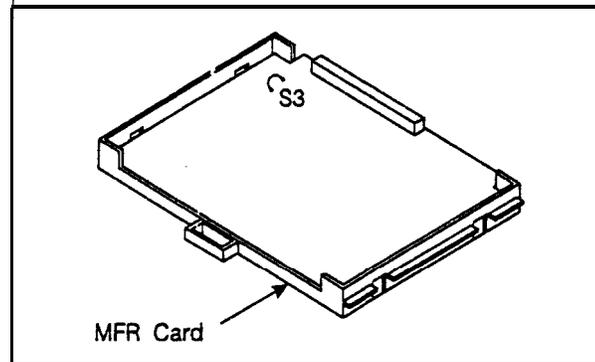
Installation

1. Install the trunk and extension cards according to the layouts shown in the Figures 6-1 through 6-6.

Note: The port numbers for each slot are fixed.

2. If you are using two MFR cards, cut Strap S3 on the second card.

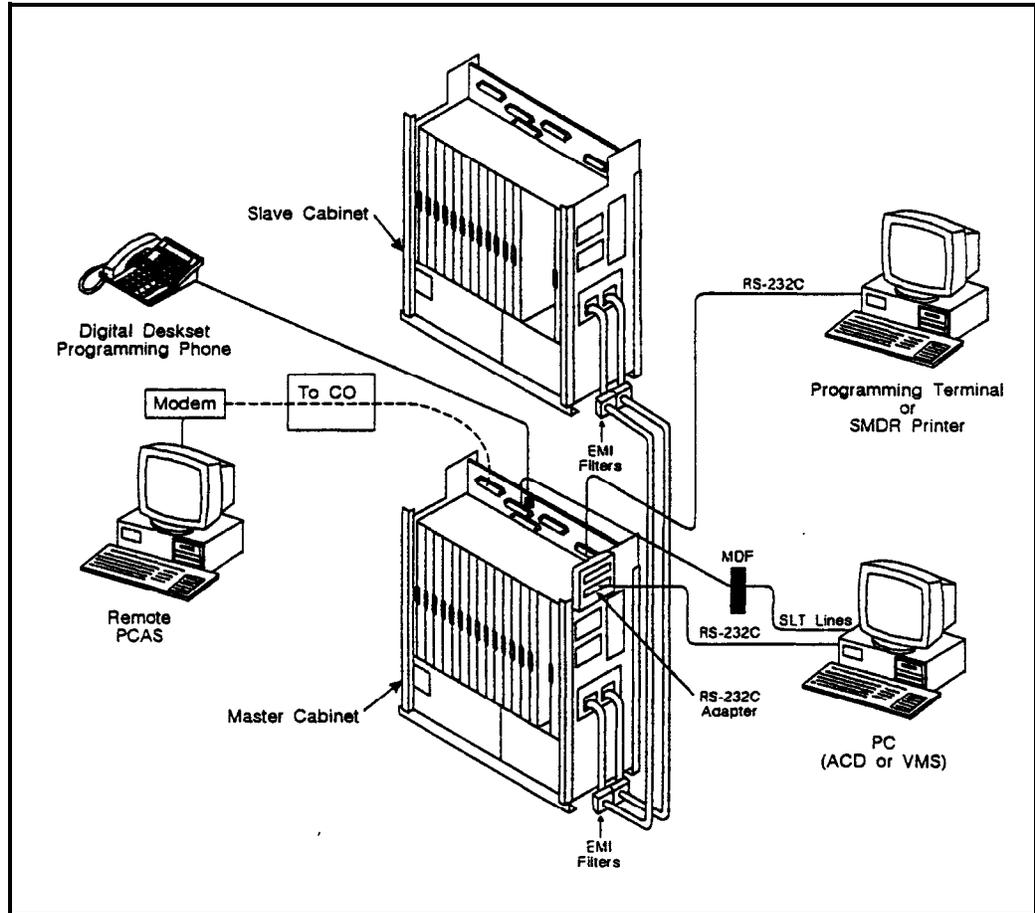
Figure 6-7. Strap 3, MFR card



3. Using the cables provided, connect the CBL-M card in the master cabinet to the CBL-S card installed in the slave cabinet.

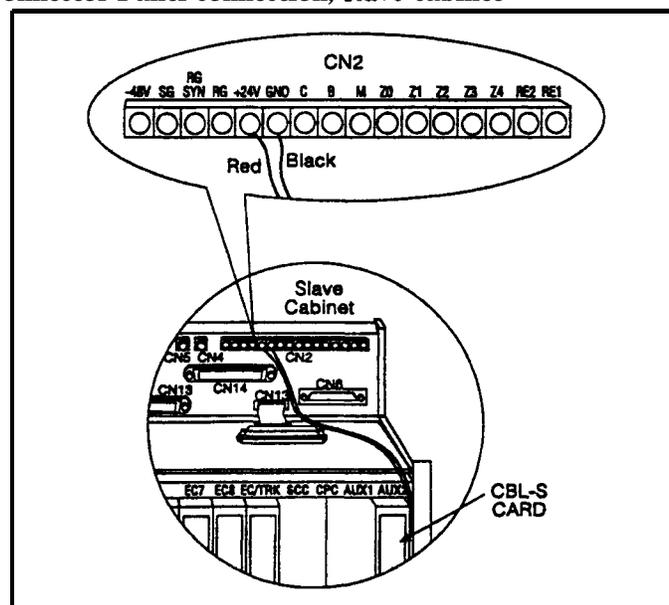
Note: The EMI filter must be installed as close to the cabinet as possible, as shown in Figure 6-8 on page 6-11.

Figure 6-8. Double-cabinet installation



4. Connect two 24V power supply cords from the CBL-S card to the 24V and GND terminals on CN2 of the Connector Panel of the slave cabinet.

Figure 6-9. CBL-S to Connector Panel connection, slave cabinet



5. Set SW1 on the CBL-M card according to the following table.

Table 6-2. CBL-M switch settings

System Combinations		Switch Settings							
Master	Slave	1	2	3	4	5	6	7	8
DBS40	DBS40	ON	ON	ON	ON	ON	ON	OFF	ON
DBS72	DBS40	ON	OFF	ON	ON	ON	ON	OFF	OFF
DBS72	DBS72	ON	OFF	ON	OFF	ON	OFF	ON	OFF
DBS96	DBS40	OFF	ON	OFF	ON	ON	OFF	OFF	OFF
DBS96	DBS72	OFF	ON	OFF	ON	ON	OFF	OFF	OFF
DBS96	DBS96	OFF	ON	OFF	ON	ON	OFF	OFF	OFF

Chapter 7. Specifications

This chapter contains frequently referenced DBS specifications.

Note: All maximums may not be attainable simultaneously. Also, attainment of some maximums depends on levels of feature usage and optional hardware requirements.

Though every effort has been made to ensure the accuracy of these specifications, Panasonic does **not** warrant them in regard to merchantability or fitness for a particular purpose. Specifications are subject to change without notice.

This chapter covers the following topics::

Topic	Page
Electrical Characteristics	7-3
Environmental Requirements	7-4
Resource Maximums	7-5
Cabling Specifications	7-13
Communication Parameters	7-14
Signaling Characteristics	7-15
Tone Characteristics	7-16

Electrical Characteristics

Table 7-1. Input power

Equipment	Power Requirements
All DBS cabinets	120V AC \pm 10 % 60 Hz
DBS key phones	3 watts maximum (powered from the DBS)

Table 7-2. Power consumption and heat generation

System status	DBS 40	DBS 72	DBS 96	DBS 40 + DBS 40	DBS 72 + DBS 40	DBS 72 + DBS 72	DBS 96 + DBS 40	DBS 96 + DBS 72	DBS 96 + DBS 96
Power Consumption (in Watts)									
With no traffic	170	250	320	340	420	500	490	570	640
with max. traffic	216	324	444	432	540	648	660	768	888
Heat Generation (Btu per hour)									
With no traffic	580	853	1092	1160	1433	1706	1672	1945	2184
With max. traffic	737	1106	1515	1474	1843	2212	2253	2621	3031

Table 7-3. Battery backup capacity

System	Battery Pack	Capacity (with maximum traffic)
DBS 40	VB-43130	40 minutes
DBS 7 2	VB-43130	40 minutes
DBS 9 6	VB-43130	30 minutes

Environmental Requirements

Table 7-4. Temperature and humidity requirements

Environmental Conditions	Requirements
Temperature	32 to 104° F (0 to 40° C)
Relative Humidity	30 to 90%

Table 7-5. Dimensions and weight, single-cabinet systems and phones

Physical Characteristics	DBS 40	DBS 72	DBS 96
Dimensions (H x W x D in inches)			
Cabinet	21 x 15 x 9.35	21 x 19.5 x 9.4	21 x 19.5 x 9.4
VB-43225	4 1/8 x 7 3/8 x 9		
Other key phones	3 3/4 x 7 3/8 x 9		
DSL/T	3 1/8 x 7 3/8 x 9 1/8		
DSS/72	3 1/2 x 7 1/2 x 9		
EM/24	3 3/13 x 3 1/8 x 8 3/8		
Weight (lbs)			
Cabinet	53	65	68
VB-43225	2.3		
Other key phones	2.2		
DSL/T	1.6		
DSS/72	1.6		
EM/24	.9		

Table 7-6. Dimensions for two-cabinet systems

Cabinet Installation	DBS 40 + DBS 40	All Other Combinations
Cabinets installed one above the other (10 in. between)	52 x 15 x 9.35	52 x 19.5 x 9.4

Resource Maximums

Table 7-7. Trunk and line capacities

System Resources	DBS 40	DBS 72	DBS 96	DBS 40 + DBS 40	DBS 72 + DBS 40	DBS 72 + DBS 72	DBS 96 + DBS 40	DBS 96 + DBS 72	DBS 96 + DBS 96
Trunk ports	8	16	24	16	24	32	32	40	48
Extension ports	24	48	64	48	72	96	88	112	128
Expansion ports	8	8	8	8	0	8*	16	16	16
Trunk/Extension speech path switching	nonblocking								
Notes:									
*Beginning with CPC-B Version 4, the EC/TRK slot in the slave DBS 72 can be used for trunks or lines. Prior to CPC-B Version 4, this slot could only be used for lines. CPC-AII also allows this.									

Table 7-8. Feature-related capacities

Resource	Maximums
Attendants	
No. of attendants with CPC-A	2
No. of attendants with CPC-B and CPC-AII (Version 2.0 or later)	4
No. of attendants that can be assigned DSS/72s	2 (ATTs 1 and 2 only)
No. of attendants that can be assigned Attendant Consoles CPC-A and CPC-AII	0
CPC-B (Version 2.0 to 4.0 only)	4 (1 per attendant)
Cal I back requests	
No. of requests that can be received by a single station	4
Call coverage	
No. of groups	16
No. of stations in a group	8
Call forwarding	
No. of simultaneous call forwarding registrations	No. of stations in the system

Resource	Maximums
Conference circuits	
SCC-A	3 four-party circuits
SCC-B with CPC-B	8 four-party circuits
SCC-B with CPC-A and CPC-AII	3 four-party circuits
DISA	
No. of incoming authorization codes	1
No. of outgoing authorization codes	2
No. of digits in each authorization code	4
Hunting	
No. of groups	8
No. of stations in a group	8
Least cost routing	
No. of routing tables	1 Area Code table 1 Office Code table 4 Special Area Code tables 4 Special Office Code tables
No. of entries in each routing table	1000
No. of digit addition tables	8
No. of digits that can be added	16
No. of digit deletion tables	8
No. of digits that can be deleted	16
No. of time priority tables	15
No. of LCR trunk groups	8
Toll Restrictions	
No. of Toll Restriction types	8
No. of 7-digit restrictions	50
No. of area. code restriction tables	4
No. of entries in each area code restriction table	1000 (4000 total)
No. of office code restriction tables	4
No. of entries in each office code restriction table	1000 (4000 total)
Paging	
No. of groups	8
No. of stations in a group	No. of stations in the system

Resource	Maximums
Paging (continued)	
No. of external paging zones	5
No. of stations in external paging zone 00	No. of stations in the system
No. of stations in external paging zones 01-04	No. of stations in corresponding paging group 01-04
Speed dial	
No. of personal speed dial numbers	10 per extension
No. of system speed dial numbers	90 (00 ~ 89) or 200 (000-199) with CPC-AII and CPC-B Version 7.0
No. of digits per speed dial number (personal and system)	16
Trunk Queuing	
No. of trunk queuing registrations	1 per station

Table 7-9. Hardware maximums for single-cabinet systems

Part No.	Description	Quantity		
		DBS 40	DBS 72	DBS 96
Phones				
VB-43210	16-key standard telephone with handsfree answerback	32	56	72
VB-43220	22-key standard telephone with handsfree answerback			
VB-4322 1	22-key speakerphone			
V-B -43223	22-key speakerphone with LCD display			
VB-43225	22-key speakerphone with large LCD display			
MS-43230	34-key telephone with handsfree answerback			
VB-43231	34-key speakerphone			
VB-43233	34-key speakerphone with LCD display			

Part No.	Description	Quantity		
		DBS 40	DBS 72	DBS 96
Phone Options				
VB-43310	24-key expansion module (EM24)	16	28	36
VB-43320	72-key DSS/BLF module (DSS/72)	CPC-A and CPC-AII: 4 CPC-B: 8 (up to 4 can be assigned as DSS/72s; up to 4 can be assigned as Attendant Consoles)		
VB-43884	7 ft. handset cord	32	56	72
VB-43885	15 ft. handset cord			
VB-43886	25 ft. handset cord			
VB-43890	K-type handset			
Printed Circuit Cards				
VB-43110	Cable kit for 2-system connection	N/A	N/A	N/A
VB-43410	Call processor card (CPC-A)	1	1	1
VB-43411	Call processor card (CPC-B)			
VB-43412	Call processor card (CPC-AII)			
VB-43420	Service circuit card (SCC-A)	1	1	1
VB-4342 1	Service circuit card (SCC-B)			
VB-4343 1	DTMF signal receiver for 8 SLT lines (MFR/8)	1	1	1
VB-43510	4-port loop-start trunk card (L-TRK/4)	2	3	4
VB-43511	8-port loop-start trunk card (L-TRK/8)			
VB-43541	Direct-inward-dialing trunk card (DID)			
VB-4353 1	8-port ground-start trunk card (G-TRK/8)			
VB-4356 1	T1 Interface	1	1	1
VB-43562	T1 MDF card	1	1	1
VB-43563	T1 Sync Unit	1	1	1
VB-436 11	8-port digital extension card (DEC)	4	7	9
VB-4362 1	8-port analog extension card (AEC)	3	4	4

Part No.	Description	Quantitp		
		j D B S 4 0	DBS 72	DBS 96
Expansion Connectors				
VB-43120	Trunk expansion connector	1	1	1
VB-43121	Extension expansion connector			
Doorbox Equipment (Trunk)				
VB-4370 1	Door box adaptor	8*	12"	16*
VB -43705	Door box	16*	24*	32*
Doorbox Equipment (Extension)				
VB -437 11	Extension-Based Door box adaptor	4	4	4
VB-43705	Door box	4	4	4
Optional Equipment				
VB-43706	Remote Administration Interface (RAI-A)	1	1	1
V-B -43707	Remote Administration Interface (RAI-B)			
VB-43551	8-circuit Caller ID daughter board	1 per VB- 43511A XEC	1 per VB- 43511A AEC	i per VB- .43511x AEC
VB -43 130	Built-in system backup batteries	1	1	1
VB-43709	Single Line Telephone Adaptor	8 I	14 I	18 I
VB-2089P	SLT ringer box	1	1	1
VA-43703	4-line power failure unit	6	8	8
VB -43702	Off-premise extension adaptor	8	8	8
VB-43940	Application processor interface (API)	1	1	1
VB-4399 1	PCAS software	1		
VB-43993	DBS Manager software			
* Note: These maximums are based on overall trunk capacities and do not allow for trunks used for outside lines.				

Table 7-10. Hardware maximums for do&e-cabinet systems

Part No.	Description	Quantity					
		DBS 40 + DBS 40	DBS 72 + DBS 40	DBS 72 + DBS 72	DBS 96 + DBS 40	DBS 96 + DBS 72	DBS 96 + DBS 96
Phones							
VB-43210	16-key keyphone w/ handsfree answerback	56	72	104	104	128	144
VB-43220	22-key keyphone w/ handsfree answerback						
VB-4322 1	22-key speakerphone						
VB-43223	22-key speakerphone w/LCD display						
VB-43225	22-key speakerphone w/ large LCD display						
VB-43230	34-key keyphone w/handsfree answerback						
VB-4323 1	34-key keyphone						
VB-43233	34-key keyphone w/ LCD display						
Phone Options							
VB -433 10	24-key expansion module (EM24)	32	44	56	52	64	72
VB-43320	72-key DSS/BLF module (DSS/72)	CPC-A and CPC-AII: 4 CPC-B (Version 2.0 to 4.0 only): 8 (up to 4 can be assigned as DSS/72s; up to 4 can be assigned as Attendant Consoles)					
VB-43884	7 ft. handset cord	56	72	104	104	128	144
VB-43885	15 ft. handset cord						
VB-43886	25 ft. handset cord						
VB-43890	K-type handset						

Part No.	Description	Quantity					
		DBS 40 + DBS 40	DBS 72 + DBS 40	DBS 72 + DBS 72	DBS 96 + DBS 40	DBS 96 + DBS 72	DBS 96 DBS 96
Printed Circuit Cards							
VB-43110	Cable kit for 2-cab. systems	1	1	1	1	1	1
VB-43410	Call processor card (CPC-A)						
VB-43411	Call processor card (CPC-B)	1	1	1	1	1	1
VB-43412	Call processor card (CPC-AII)						
VB-43420	Service circuit card (SCC-A)	1	1	1	1	1	1
VB-43421	Service circuit card (SCC-B)						
VB-43431	DTMF signal receiver for 8 SLT lines (MFR/8)	2	2	2	2	2	2
VB-43510	4-port loop-start trunk card (L-TRK/4)						
VB-43511	8-port loop-start trunk card (L-TRK/8)	3	3	5	6	7	8
VB-43541	8-port Direct-inward-dialing trunk card (DID)						
VB-43531	8-port ground-start trunk card (G-TRK/8)						
VB-43561	T1 Interface	1	0	1	2	2	2
VB-43562	T1 MDF Card	1	0	1	2	2	2
VB-43563	T1 Sync Card	1	0	1	1	1	1
VB-43611	8-port digital extension card (DEC)	7	9	13	13	16	18
VB-43621	8-port analog extension card (AEC)	6	7	8	7	8	8
VB-43551	8-port Caller ID Daughter Board (used with Loop Start Trunk Card VB-43511A)	1 per VB-43511A	1 per VB-43511A				

Part No.	Description	Quantity										
		DBS 40 +	DBS 40	DBS 72 +	DBS 40	DBS 72 +	DBS 72	DBS 96 +	DBS 40	DBS 96 +	DBS 72	DBS 96 +
Expansion Connectors												
VB-43120	Trunk exp. connector									2		2
VB-43121	Ext. exp. connector									1*		0"
Doorbox Equipment (Trunk Port)												
VB-43701	Door box adaptor		12#	12#	20#	24#	28#	32#				
VB-43705	Door box		24#	24#	40#	48#	56#	64#				
Doorbox Equipment (Extension Port)												
VB-43711	Doorbox adaptor		4	4	4	4	4	4				
VB-43705	Doorbox		4	4	4	4	4	4				
Optional Equipment												
VB-43706	Remote Administration Interface (R-41-A)		1'	1	1	1	1	1	1			
VB-43707	Remote Administration Interface (RAI-B)											
VB-43130	Built-in system backup batteries		2	2	2	2	2	2	2			
ml-43709	SLT Adaptor		16	22	28	26	32	36				
VB-2089P	SLT ringer box		2	2	2	2	2	2	2			
VA-43703	4-line power fail unit		12	14	16	14	16	16	16			
VB-43702	Off-premise ext adaptor		16	16	16	16	16	16	16			
VB-43940	Application processor interface (API)		1	1	1	1	1	1	1			
VB-43991	PCAS software		1									
VB-43993	DBS Manager software											
Notes:												
*An expansion connector is not required to use an extension card in the EC/TRK slot of a DBS 96. The DBS 96 uses connector CN14 to accommodate an extension card in the EC/TRK slot.												
# These maximums are based on overall trunk capacities and do not allow for trunks used for outside lines.												

Cabling Specifications

Table 7-11. Maximum cabling distances

Loop Type and Resistance	Resistance	Cable Gauge (AWG)	Maximum Cabling Length in Feet (Distance from the DBS)
Key phone, EM/24	40 Ohms	22	1239
		24	779
		26	490
DSSI72	20 Ohms	22	619
		24	388
		26	244
SLT	100 Ohms	22	3097
		24	1948
		26	1225
OPX (Loop between the DBS and the OPX Adaptor)	10 Ohms	22	309
		24	194
		26	122
OPX (Loop between the OPX Adaptor and a pushbutton SLT)	900 Ohms (excluding end impedance)	22	27877
		24	17532
		26	11025
Doorphone (Loop between the DBS and the Doorphone Adaptor)	10 Ohms	22	309
		24	194
		26	122
Doorphone (Loop between the Doorphone Adaptor and the Doorphone)	40 Ohms	22	1239
		24	779
		26	490
Voice Announce Unit	10 Ohms	22	309
		24	194
		26	122

Communication Parameters

Table 7-12. Voice path from KTEs to DBS

Channel	Speed
Overall communications path	256 kbps
D-channel data	16 kbps
B-channel data	64 kbps

Table 7-13. Data communications ports

Port	Parameters	
SMDR	Interface	RS232-C
	Baud rate	300, 1200, 4800 or 9600 kbps
	Parity	Even, odd, or none
	Stop bit length	1, 1.5, or 2
	Data bit length	5, 6, 7, or 8
Maintenance (RAI card)	Baud rate	300 (RAI-A) or 300 or 1200 (RAI-B)
	Stop bit length	1
	Data bit length	8
	Parity	None

Signaling Characteristics

Table 7-14. Signaling to CO

Item	Specification
Dial pulse	8 to 11 pulses per second (PPS)
Break ratio	58 to 64%
Minimum pause	0.7 to 1.0 seconds
Trunk start	Loop or ground start

Table 7-15. Signaling levels

Item	Level	Distortion
Trunk input (DISA)	-40 dBm (minimum)	Less than 10%
Output from DBS (at MDF)	High level: -8 dBm (minimum) Low level: -10 dBm (minimum)	
Analog station input (Dial status)	-35 dBm (minimum)	Less than 10%
Analog station output (Talk Path originated from a key phone to an SLT)	High level: -8 dBm +/- 0.5 dBm Low level: -6 dBm +/- 0.5 dBm	Less than 5%

Table 7-16. Transmission specifications

Item	Specification
Impedance	600 Ohms
Overload level	600 Ohms
Insertion Loss	
CO trunk to analog station	0 dB
Analog station to CO trunk	0 dB
CO trunk to digital station	0 dB
Digital station to CO trunk	0 dB
Digital station to digital station	6dB
Digital station to analog station	6 dB
Analog station to digital station	6dB
Analog station to analog station	6dB

Tone Characteristics

Table 7-17. Tone Plan

Tone Name	Frequency	Timing (seconds)
CO Call Tones		
CO incoming call	550/400 Hz at 16 Hz	Programmable
Hold recall	550/400 Hz at 16 Hz	0.5 on/3.5 off
Transfer recall	550/400 Hz at 16 Hz	0.5 on/3.5 off
Trunk queuing	550/400 Hz at 16 Hz	0.5 on/O.5 off/O.5 on/2.5 off
CO offhook signal	550 Hz	1 on/7 off
Internal Tones (Key Phones)		
Dial tone	400 Hz	Continuous
CO incoming call	550 Hz	1 on/3 off (Prior to CPC-B 3.1) Programmable (CPC-AII and CPC-B 3.1 or higher)
Callback	400 Hz	1 on/3 off
Busy	400 Hz	0.5 on/0.5 off
Busy override	400 Hz	0.25 on/O.25 off/O.25 on
Splash	550 Hz	0.5 on
Error	400 Hz	0.5 on/O.5 off
Reminder call	550 Hz	4 on/1 off/4 on/1 off/4 on 1 off/4 on/silence
Call waiting	550 Hz	0.25 on/O.25 off/O.25 on/7.25 off
Key press	1 kHz	Duration of the key press
Internal Tones (SLTs)		
CO/Station ringing Hold recall Callback	20 Hz	1 on/3 off
Transfer (Prior to CPC-B 2.11)	20 Hz	0.5 on/3.5 off
Transfer (CPC-AII and CPC-B 2.11 or higher)	20 Hz	Programmable

Tone Name	Frequency	Timing (seconds)
Dial tone	400 Hz	Continuous
Ringing	400 Hz	1 on/3 off
Busy	400 Hz	0.5 on/0.5 off
Voice mail ringing	550/400 Hz at 16 Hz	2 on/2 off

Table 7-18. DTMF frequencies

Digit	Frequency (Hz)
1	697 + 1209
2	697 + 1336
3	697 + 1477
4	770 + 1209
5	770 + 1336
6	770 + 1477
7	852 + 1209
8	852 + 1336
9	852 + 1477
*	941 + 1209
0	941 + 1336
#	941 + 1477

- A**
- Analog extensions 4-37
 - guidelines 4-37
 - installation 4-37
 - see also SLTA
- B**
- Background music
 - see Peripheral equipment, BGM
 - Battery backup
 - capacities 7-3
 - guidelines 3-9
 - installation 3-9
 - DBS 40 3-10
 - DBS 72 and 96 3-11
 - part numbers 3-9
 - specifications 7-3
 - BGM
 - see Peripheral equipment, BGM
- C**
- Cabinet description 2-3
 - Cabinet installation 3-1
 - batteries 3-9
 - guidelines 3-9
 - installation
 - DBS 40 3-10
 - DBS 72 and 96 3-11
 - circuit cards 3-6
 - guidelines 3-6
 - installation 3-8
 - DSL T wall mounting 3-15
 - desk stand attachment 3-16
 - desk stand removal 3-15
 - grounding 3-5
 - guidelines 3-5
 - installation 3-5
 - initialization 3-17
 - key phone wall mounting 3-13
 - mount adaptor removal 3-13
 - mount adaptor replacement 3-14
 - test phone 3-18
 - guidelines 3-18
 - installation 3-18
 - wall mounting 3-3
 - cover removal 3-3
 - guidelines 3-3
 - installation 3-3
 - mounting brackets 3-4
 - mounting illustration 3-4
 - Cabling
 - distances 7-13
 - specifications 7-13
 - C a r d s
 - see Circuit cards
 - Channel service unit 4-12
 - Circuit cards
 - CPC**
 - description 2-9
 - strap S 1 3-7
 - SW1 3-17
 - installation 3-6, 3-8
 - guidelines 3-6
 - MDF card 4-23
 - MFR slots 2-8
 - SCC-B switch 4 3-6
 - slot locations 2-8
 - Cleaning 1-6
 - Clock sync cable 4-29
 - Communications parameters 7-14
 - Configuration 2-5
 - extension capacities 2-5
 - trunk capacities 2-5
 - Connector panel 2-3
 - Connectors
 - pinouts** for trunks 4-4
 - trunks 4-3
 - Cover removal 3-3
 - CPC**
 - description 2-9
 - RAM clear 3-17
 - RAM hold 3-17
 - strap S 13-7
 - SW1 3-17
 - CSU 4-12

D

Data communications ports 7- 14

DBS

- cabinet description 2-3
- configurations 2-5
- model numbers 1-3
- requirements 1- 1

DID trunks 4-9

- guidelines 4-9
- installation 4- 10

Digital extension

- see DSLT

Dimensions of system 7-4

Door 5-27, 5-31

Door box 5-3 1

Door box adaptor 5-3 1

Door box adaptor (extension port) 5-3 1

Door box adaptor (trunk port)

- see Peripheral equipment, door box adaptor (Trunk Port)

Door phone 5-31

- see Peripheral equipment, door box adaptor (trunk port)

Double-cabinet systems 6- 1

- guidelines 6-3
 - DBS 40 + DBS 40 6-4
 - DBS 72 + DBS 40 6-5
 - DBS 72 + DBS 72 6-6
 - DBS 96 + DBS 40 6-7
 - DBS 96 + DBS 72 6-8
 - DBS 96 + DBS 96 6-9
- maximum capacities 6-3
- installation 6- 10
- MFR cards 6-4
- strap S3 6-10

DSLIT

- installation 4-40
 - DSS/72 4-41
 - guidelines 4-40
 - EM/24 4-42
 - guidelines 4-42
- wall mounting 3- 15
 - desk stand attachment 3-16
 - desk stand removal 3-15

DSS/72 4-40

DTMF frequencies 7- 17

E

Electrical

- characteristics 7-3
- noise 1-5

EM/24 4-42

EM1 filter 4-39

Environmental requirements 1-5,7-4

- electrical noise 1-5
- gas and airborne particles 1-5
- humidity 1-5, 7-4
- lightening protection/grounding 1-6
- lighting 1-6
- temperature 1-5,7-4
- ventilation 1-5
- vibration 1-5
- water exposure 1-6

Extensions

- analog
 - guidelines 4-37
 - installation 4-37
- analog -- See also SLTA
- connectors 4-3 1
 - pinouts 4-32
- digital 4-40
 - DSS/72 4-40
 - guidelines 4-40
 - installation 4-41
 - EM/24 4-42
 - guidelines 4-42
 - installation 4-42
- EM1 filter 4-39
- maximum capacities 2-5
- pinouts 4-32

External ringer

- see Peripheral equipment, external ringer

F

FCC information

- network address signaling code 1-3
- registration number 1-3
- ringer equivalence 1-3

Feature-related capacities 7-5

Fractional T1 4-13

G**Gas** and airborne particles 1-5

Grounding 1-6, 3-5

guidelines 3-5

installation 3-5

T1 4-26

Ground-start trunks 4-9

guidelines 4-9

installation 4-10

H

Hardware maximums

double-cabinet systems 7-9

single-cabinet systems 7-7

Heat generation 7-3

Humidity 1-5, 7-4

I

Initialization of system 3-17

Input power 7-3

Installation

analog extensions 4-37

background music 5-8

cabinet 3-1

batteries 3-9

DBS 40 3-10

DBS 72 and 96 3-11

guidelines 3-9

grounding 3-5

guidelines 3-5

installation 3-5

circuit cards 3-6, 3-8

CPC strap S 1 3-7

guidelines 3-6

SCC-B switch 4 3-6

DID trunks 4-10

door box adaptor 5-28

double-cabinet systems 6-1, 6-10

extensions

analog 4-37

digital 4-40

DSS/72 4-40

EM/24 4-42

external ringer 5-18

ground-start trunks 4-10

initialization of system 3-17

line expansion 4-43

loop-start trunks 4-7

OPX adaptor 5-11

with central office 5-12

without central office 5-11

paging 5-14

PCAS terminal 5-4

power failure unit 5-19

remote administration interface 5-6

SMDR device 5-4

T1 interface 4-20

double cabinet

T1 in both cabinets 4-29

T1 in slave 4-27

single cabinet 4-21

test phone 3-18

guidelines 3-18

trunk expansion 4-43

voice announce unit 5-22

wall mounting cabinet

cover removal 3-3

illustration 3-4

mounting brackets 3-4

wall mounting DSLT 3-15

desk stand attachment 3-16

desk stand removal 3-15

wall mounting key phone 3-13

mount adaptor removal 3-13

mount adaptor replacement 3-14

wall-mounting cabinet 3-3

guidelines 3-3

Introduction to system 2-1

K

KTEL- to-DB S voice path 7-14

L

Lighting 1-6

Lightning protection 1-6.

Lines 4-1, 4-31

expansion 4-43

guidelines 4-43

installation 4-43

extensions

- see Extensions
 - maximums 7-5
- Local Terminal
 - see Peripheral equipment, local terminal
- Loop-start trunks 4-7
 - guidelines 4-7
 - installation 4-7
- M**
- Maximums
 - cabling distances 7- 13
 - double-cabinet systems 6-3
 - feature-related 7-5
 - hardware
 - double-cabinet systems 7-9
 - single-cabinet systems 7-7
 - lines 7-5
 - MFR cards in double-cabinet system 6-4, 6-5, 6-6, 6-7, 6-8, 6-9
 - OPX adaptor distances 5- 11
 - OPX direct connect distances 5- 10
 - system resources 7-5
 - T1 4-12
 - T1 trunk assignments 4-14, 4-15
 - trunk connections 4-3
 - trunks 7-5
- MDF card 4-23
- MFR cards
 - in double cabinet systems 6-4. 6-5, 6-6, 6-7, 6-8, 6-9
 - slot locations 2-8
 - strap S3 6-10
- Model numbers for DBS 1-3
- Mounting brackets 3-4
- Music on hold
 - see Peripheral equipment, BGM
- N**
- Network
 - address signaling code 1-3
- O**
- Off-premises adaptor
 - see Peripheral equipment, OPX
- OPX**
 - see Peripheral equipment, OPX
- Overview of system 2-1
- P**
- Paging
 - see Peripheral equipment, Paging
- Part numbers
 - VA-43703 5- 19
 - VB-2450A-2P 3-9
 - VB-2650-2P 3-9
 - V-B-43030 1-3
 - VB-43110 4-12
 - VB - 4 3 1 2 0 4 - 4 3
 - VB-43121 4-43
 - VB-43 130 3-9
 - VB -435 11 4-7
 - VB-43561 4-11, 4-12
 - VB-43562 4-11, 4-12
 - VB-43563 4-11, 4-12, 4-21
 - VB-43564 4-12, 4-27
 - VB-43701 5-27, 5-3 1
 - V-B-43702 5- 10
 - VB -43705 5-3 1
 - VB -43706 5-6
 - VB-43707 5-6
 - VB-43708 5-27, 5-3 1
 - VB-437 11 5-3 1
 - VB-5353 1 4-9
- Peripheral equipment 5- 1
 - BGM
 - guidelines 5-8
 - installation 5-8
 - SCC variable resistors 5-9
 - door box adaptor
 - guidelines 5-27
 - installation 5-28
 - door box adaptor (trunk port)
 - external ringer
 - guidelines 5-17
 - installation 5- 18
 - Local terminal
 - OPX
 - guidelines 5- 10
 - installation 5-11
 - with central office 5-12
 - without central office 5- 11

see **Peripheral** equipment, voice announce
unit

Voice path from **KTEL** to DBS 7- 14

W

Wall mounting

cabinets 3-3

cover removal 3-3

guidelines 3-3

installation 3-3

mounting brackets 3-4

mounting illustration 3-4

DSL 3-15, 3-16

key phones 3- 13

mount adaptor removal 3- 13

mount adaptor replacement 3- 14

Water exposure 1-6

Weight of system 7-4