Panasonic®

DBS 576
Digital Business System

Technical Manual

Section 300
Installation

⚠ **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 MUNICIPLE WASTE STREAM. PLEASE CALL 1-800-SAV-LEAD FOR INFORMATION ON HOW TO RECYCLE THESE BATTERIES.

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About This Manual

Overview

This manual provides installation instructions for the DBS 576. Please carefully observe the contents of this manual.

The following table summarizes the purpose of each chapter.

Chapter No.	Title	Purpose
1	Requirements	Includes DBS 576 model Nos, information on the installation environment, and how to clean the DBS 576.
2	System Overview	Provides an overview of the DBS 576. This overview includes descriptions of the cabinet, system configurations, and unit cards.
3	Cabinet Installation	Explains how to prepare for base cabinet installation, how to remove and replace the cabinet cover, install the battery and install cards.
4	Installing Additional Cabinet	Explains how to prepare for additional cabinets, how to install them, and how to link the respective systems, how to set the expansion cabinet ID No., and how to connect to the DBS.
5	Exchange Lines and Internal Lines	Explains how to connect exchange lines and dedicated, and how to connect different types of digital and analog internal lines, and how to mount telephones on the wall.
6	Peripheral Equipment	Describes how to install and connect DSS, doorphone adaptors, other peripheral equipment, and replacing the back up battery of CPC card.
7	Specifications	Lists the specifications of the equipment constituting the DBS 576.

Related Documents

- For instructions on DBS 576 programming, see the Programming Manual (Section 400).

- For detailed descriptions of DBS 576 operations, see the Operating Instruction (Section 700).

About Marks Used in This Manual

XXXXX card ⊗

Card names shown at the side of function titles indicate cards that must be mounted to enable connections.

Cards marked with an ⊗ at the side of the card name indicate that the card must not be removed or inserted while the power is ON.

For details on removing and inserting cards, refer to "Maintenance Switches" on page 5-1.

Chapter 1. Requirements

This chapter describes DBS 576 model numbers, information on the installation environment, and how to clean the DBS 576.

Model Numbers

Table 1-1. DBS 576 model numbers

Designation	Product Name	Product Number
96 port Cabinet	Base Cabinet	VB-44020
96 port Expansion Cabinet	Expansion Cabinet	VB-44021

FCC Requirements

General Requirements

- The Federal Communications Commission (FCC) has established Rules which permit the DBS 576 to be directly connected to the telephone network. FCC Compliant standardized jacks are used for these connections.

- This equipment may not be used on coin service provided by the telephone company. This equipment should not be used on party 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: JNVUSA-32340-KF-E
	When used as a PBX: JNVUSA-32339-MF-E
Ringer Equivalence Number	Loop start - 0.5B/2.8DC* ; DID - 0.0B*
Network Address Signaling Code	E
* 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, but not all areas, the sum of the RENs of all devices on any one line should not exceed five (5). 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.	

- Before connecting the DBS 576, 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
DID Trunk	2-wire DID	RJ21X	AS.2	02RV2-T
T1 Trunk	T1	Not Applicable	6.0P	04DU9-DN, 04DU9-1SN
ISDN	T1	Not Applicable	6.0P	04DU9-DN, 04DU9-1SN
E&M	Type I 2-wire Type I 4-wire Type II 2-wire Type II 4-wire	RJ1CX	9.0F	TL11M TL31M TL12M TL32M

- 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, provide this information to your telephone company.

- If the DBS 576 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.

- 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 576, please contact Panasonic Telecommunication 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 or you are sure that the equipment is not malfunctioning.

- When programming emergency number and/or making test calls to emergency numbers:

    - remain on the line and briefly explain to the dispatcher the reason for the call.

    - Perform such activities in the off-peak hours, such as early morning or late evening.

- The software contained in the DBS 576 to allow user access to the network must be upgraded to recognize newly established network area codes and exchange codes as they are placed in service.

    - Failure to upgrade the premises systems of peripheral equipment to recognize the new codes as they are established will restrict the customer and the customer's employees from gaining access to the network and to these codes.

    - Bell Communications Research (Bellcore) publishes the North American Numbering Plan (NANP) information in paper, microfiche and tape. An abbreviated summary of the newly established area codes and exchange codes is also available. Bellcore may be contacted on (908) 699 6700 to obtain appropriate information to keep customer equipment upgraded.

DID Requirements

Allowing this equipment to be operated in such a manner as to not provide for proper answer supervision is a violation of Part 68 of the FCC Rules.

Proper answer supervision is when:

A. 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.

B. This equipment provides answer supervision on all DID calls forwarded to the PSTN. Permissible exceptions are:

    - A call is unanswered

    - A busy tone is received

    - a reorder tone is received

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 should range 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 10ft. (3m) 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 576 is an electrical 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 it from lightning damage.

- 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 wire that is as thick or thicker 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 a ground terminal at the service equipment. Bare, 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 a ground terminal at the service equipment.

- The attachment-plug receptacles of the same type as that used by the systems that are in the vicinity of the DBS 576 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 grounding conductors for peripheral equipment 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 provides an overview of the DBS 576. This overview includes descriptions of system configurations and unit cards.

Cabinet Description

Panasonic's DBS 576 is a hybrid telephone system capable of supporting up to 576 ports.

The DBS 576 cabinet includes the following:
- Power unit
- Card slots
- Unit cards (optional)
- Backup battery (VB-44025) (optional)
- Switch box (VB-44023) (One required per base cabinet with one or more expansion cabinets attached)
- -48V Power Supply (VB-44022) (optional) (when one or more Ground Start, DID or E&M cards are installed in this cabinet)

Figure 2-1. The DBS 576 Base Cabinet
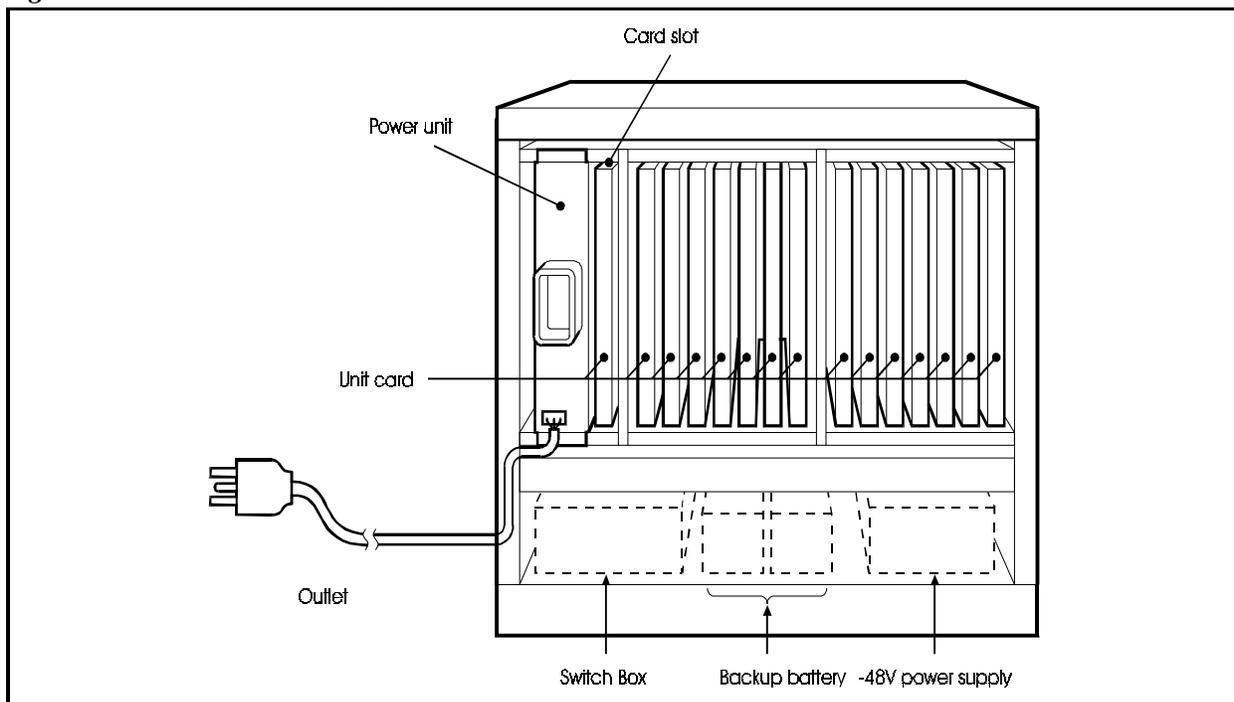
Peripherals such as paging speakers, external music-on-hold sources, background music sources, PCs, printers, and SMDR connect to the unit cards.

Figure 2-2 shows the trunk and extension line connections as well as some peripheral connections. Trunk and extension line connections are covered in detail in Chapter 5. Peripheral connections are covered in detail in Chapter 6.

Figure 2-2. System Connections
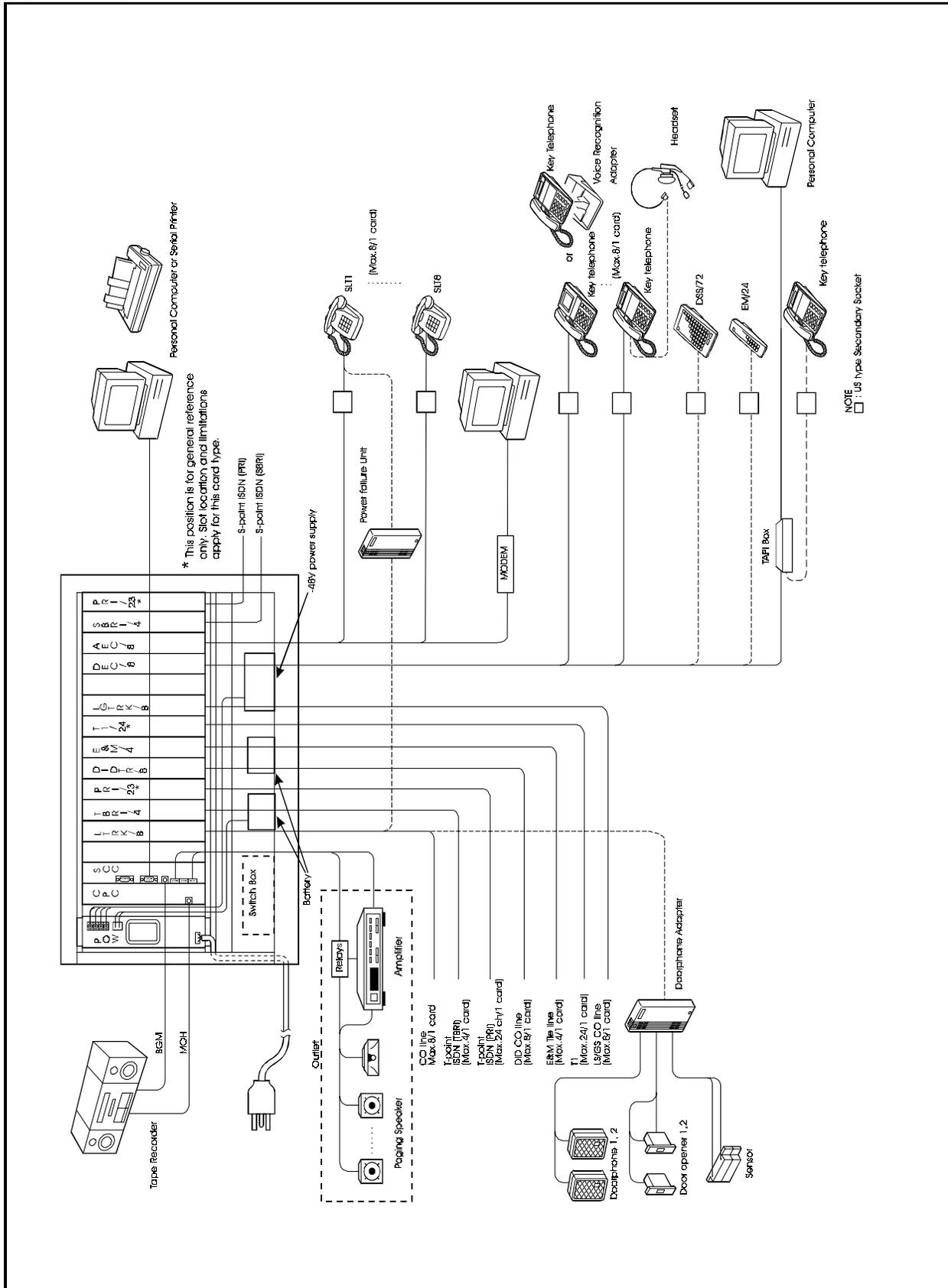
Cabinet Configurations

Two types of cabinets are used with the DBS 576. The DBS 576 base cabinet (VB-44020) supports 96 ports. A DBS 576 system may contain up to two base cabinets. Each base cabinet can be combined with up to 2 expansion cabinets (VB-44021) to configure systems for up to 576 ports. They can also be combined with an existing DBS to increase the number of digital extension line ports. For details, see Chapter 4, "Connection to DBS" (page 4-28).

Figure 2-3. Example Cabinet Combinations
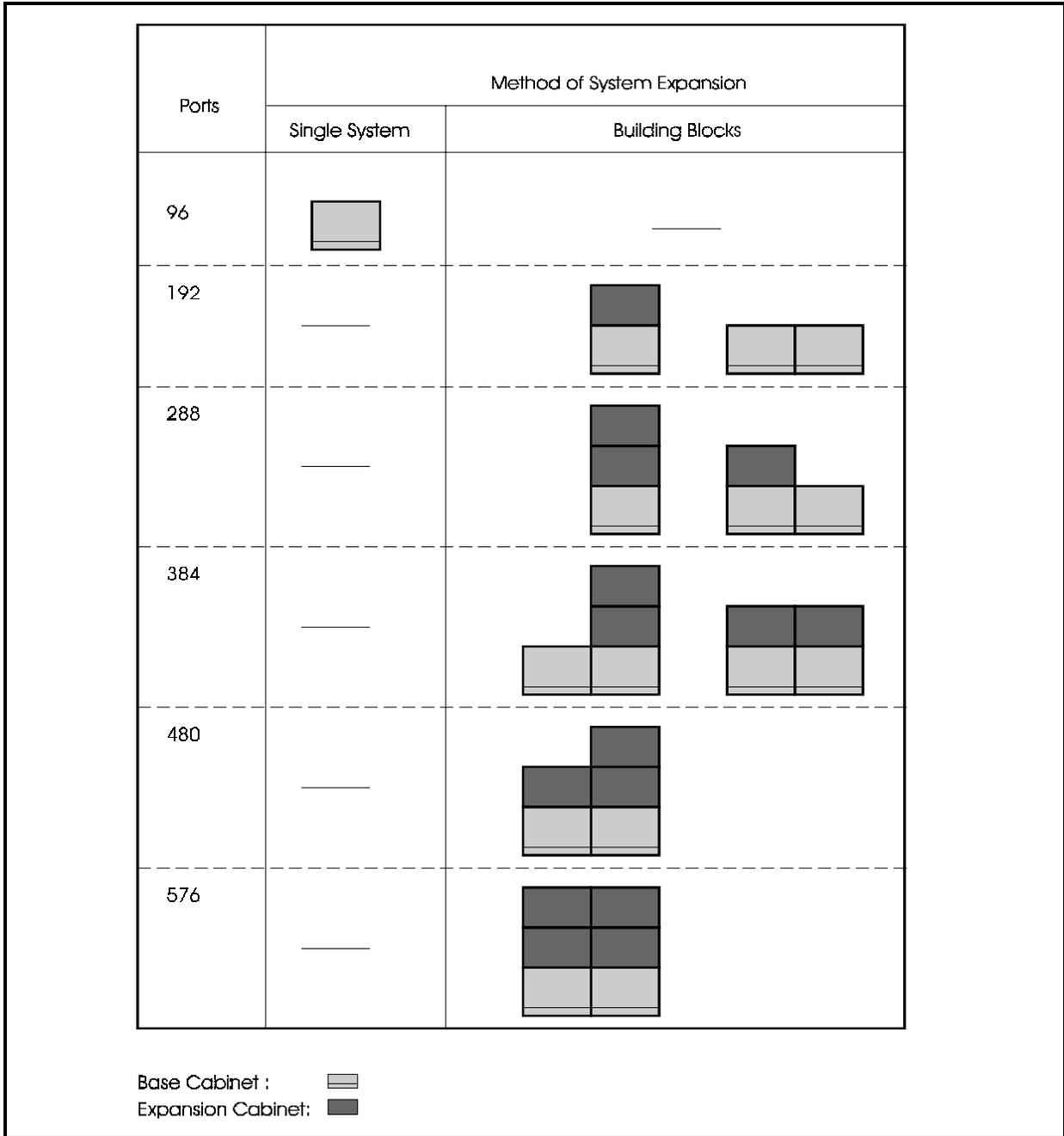
Circuit Cards

Circuit Card Configuration

Table 2-1 shows the unit cards and packages that can be used with the DBS 576.

Table 2-1.   Unit card configuration

Card Type	Card Designation	Product Name	Product No.	Card Description	Remarks
Analog Trunk	Loop Start Trunk Card	LTRK/8	VB-44510	8-port loop-start trunk card	An optional CID card can be attached (see below)
	Loop Start/Ground Start Trunk Card	LGTRK/8	VB-44511	8-port loop-start/ground start trunk card	
	DID Trunk Card	DID/8	VB-44520	8-port DID trunk card	Dial Pulse and DTMF
	E&M Tie Line Trunk Card	E&M	VB-44560	4-port type 1/type 2 E&M tie line trunk card	
Digital Trunk	BRI Card	TBRI/4	VB-44530	T-point ISDN interface ports	
	PRI Card	PRI/23	VB-44540	T-point ISDN primary interface port and S-point primary interface port	
	T1 Card	T1	VB-44550	24-circuit T1 interface card	
Digital Extension	Digital Extension Card	DEC/8	VB-44610	8-port digital extension card	
	BRI Unit (S-Point)	SBRI/4	VB-44630	S-point ISDN interface ports	
	PRI Card	PRI/23	VB-44540	T-point ISDN primary interface port and S-point primary interface port	
Analog Extension	Analog Extension Card	AEC/8	VB-44620	8-port analog extension card Including Ringer circuit	
Service Circuit	Service Control Card	SCC	VB-44181	Service circuit card (high level) RS232C port × 2, BGM I/F External paging I/F	
Processor Cards	CPC-96 Card	CPC96	VB-44410	Call processor card for 96 port system (single cabinet)	Supports up to 96 ports, 16 bit CPU
	CPC-288 Card	CPC288	VB-444201	Call processor card for up to 288 port system (up to 3 cabinets)	Supports up to 288 ports, 16 bit CPU
	CPC-576 Card	CPC576	VB-444301	Call processor card for 576 port system (up to 6 cabinets)	Supports up to 576 ports 32 bit CPU
DTMF Circuits	8 DTMF Receiver Card	MFR/8	VB-44110	8-circuit DTMF receiver	
Interface cards	Building Block Expansion Card	CBL	VB-44451	Interface card for additional cabinet	Mounts in CPC slot of all but first base cabinet
	Connection Cable Card-DBS	CBLDBS	VB-44452	DBS 576-to-DBS interface card	Install in AUX slot of DBS.
	Trunk MDF Card	MDF-CO	VB-44512	Trunk MDF interface card	Mounts on side of cabinet
	Extension MDF Card	MDF-EX	VB-44611	Extension MDF interface card	Mounts on side of cabinet
	API Card	API	VB-44131	Applications Processor Interface card	Data for External Integrated VM or ACD products
	8-Party Conference Card	CONF	VB-44120	Interface card for 8-party conference interface	
Time-Switch Circuits	Time Switch Card/288	TSW288	VB-444202	Time-switch circuit card (standard)	Required with CPC288 card
	Time Switch Card/576	TSW576	VB-444302	Time-switch circuit card (high-level)	Required with CPC576 card
Audio applications	Voice Storage Service Card	VSSC	VB-44170	2-way Voice storage cards	
	Voice Processing Card/4	VPU/4	VB-44160	Voice processing card Built-in ACD voice × 4 processing card (4ch)	
	Voice Processing Card/8	VPU/8	VB-44150	Voice processing cards × 8	
	ACD Card	ACD	VB-44140	Built-in ACD unit	
Daughter package	Sync. Package/Network Unit	SYNC	VB-44460	Network sync circuit unit (standard)	Mounts on CPC96, TSW288, or TSW576 card.
	Caller ID	CID	VB-44513	Caller ID interface card	Mounts on LTRK/8 card

Card Descriptions

This section provides an overview of each card to be installed in the main cabinet.

CPC96 card (VB-44410)

The CPC96 card is a high-level CPU card for a 96 port system. This card incorporates a 16-bit CPU.

The CPC96 card provides a time switch (4 Highway x 4 Highway), a 4-circuit MFR (DTMF receiver circuit), a 3-party conference circuit, service tone, a DTMF transmitter, an input terminal for external hold tone source (RCA jack), a connecting terminal for synchronization package (VB-44460), an interface connector for external PC card and modem (300 bps) functions. The system control program is downloaded to the internal memory of the system through the PC card. Memory is retained with a backup battery. (See "Replacing the Backup Battery of CPC card" on page 6-29 for more information on battery replacement.)

Note: J1 must be cut for the system to operate in Hybrid/PBX mode. Otherwise, the system will operate in Key mode.

Figure 2-4. CPC96 card
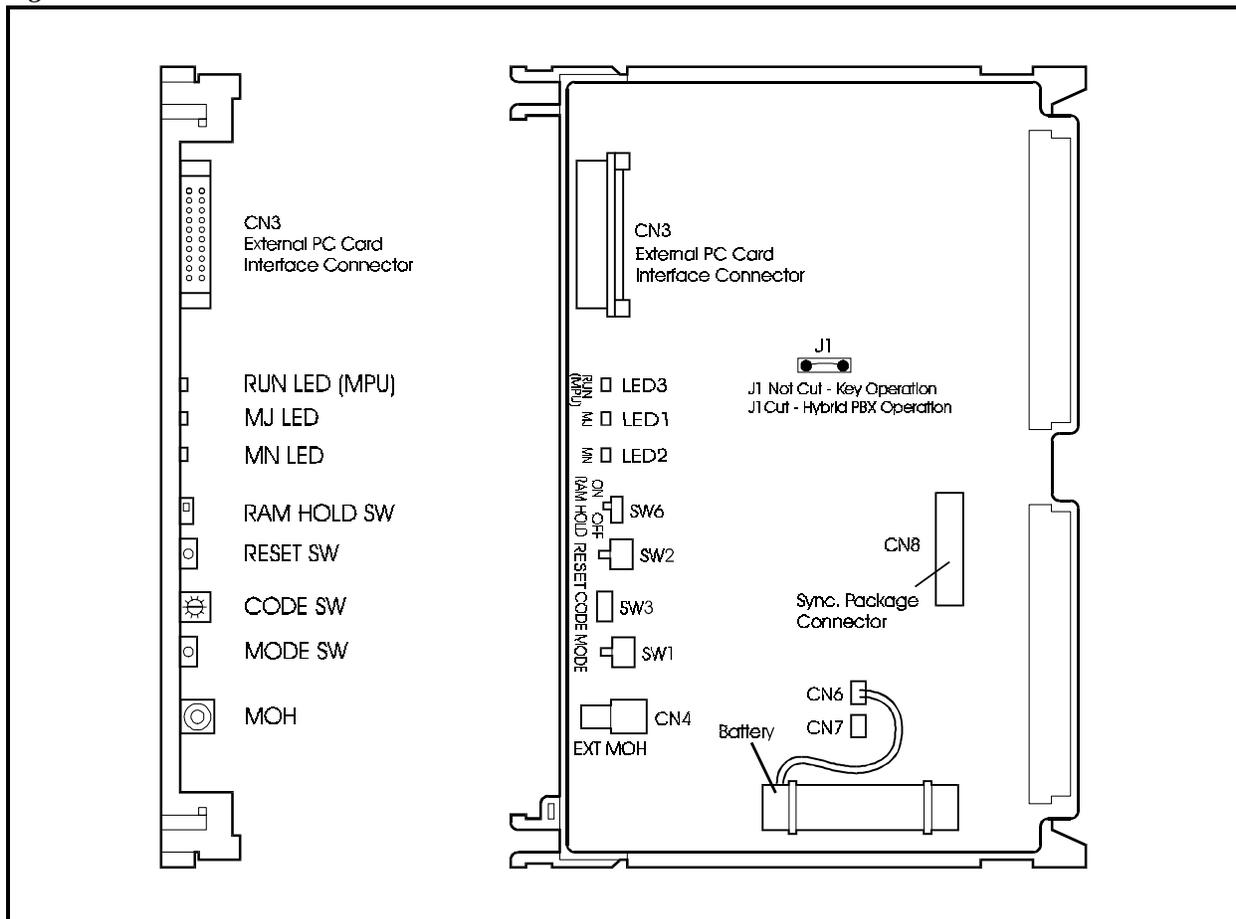
Table 2-2 shows the switch settings and Table 2-3 shows the LED indicators.

Table 2-2.   Switch settings of CPU96 card

SW No.	Description
SW1 : Black (MODE)	Push switch for setting modes of system.
SW2 : Red (RESET)	Push switch for resetting.
SW3 : (CODE)	Rotary switch for setting startup mode of system.
SW6 : (RAM HOLD)	Switch for selecting battery backup of memory.

Table 2-3.   LED indication of CPC96 card

LED indication	Description
LED3 (RUN)	Flashes red when Main Processing Unit (MPU) is operating.
LED1 (MJ)	Turns ON red when Major (MJ) alarm is detected.
LED2 (MN)	Turns ON red when Minor (MN) alarm is detected.

CPC288 card (VB-444201)

The CPC288 card is a standard CPU unit for a system with up to 288 ports. A 16-bit CPU is incorporated.

The CPC288 card provides a 4-circuit MFR (DTMF receiver circuit), an input terminal for external hold tone source (RCA jack), an interface connector for external PC card and modem (300 bps) functions.

This card requires the use of the TSW288 card (VB-444202).

The system control program is downloaded to the internal memory of the system through the PC card.

Memory is retained with a backup battery. (See "Replacing the Backup Battery of CPC card" on page 6-29 for more information on battery replacement.)

The switch settings are listed in Table 2-4. The LED indicators are listed in Table 2-5.

Note: J1 must be cut for the system to operate in Hybrid/PBX mode. Otherwise, the system will operate in Key mode.

Figure 2-5. CPC288 card
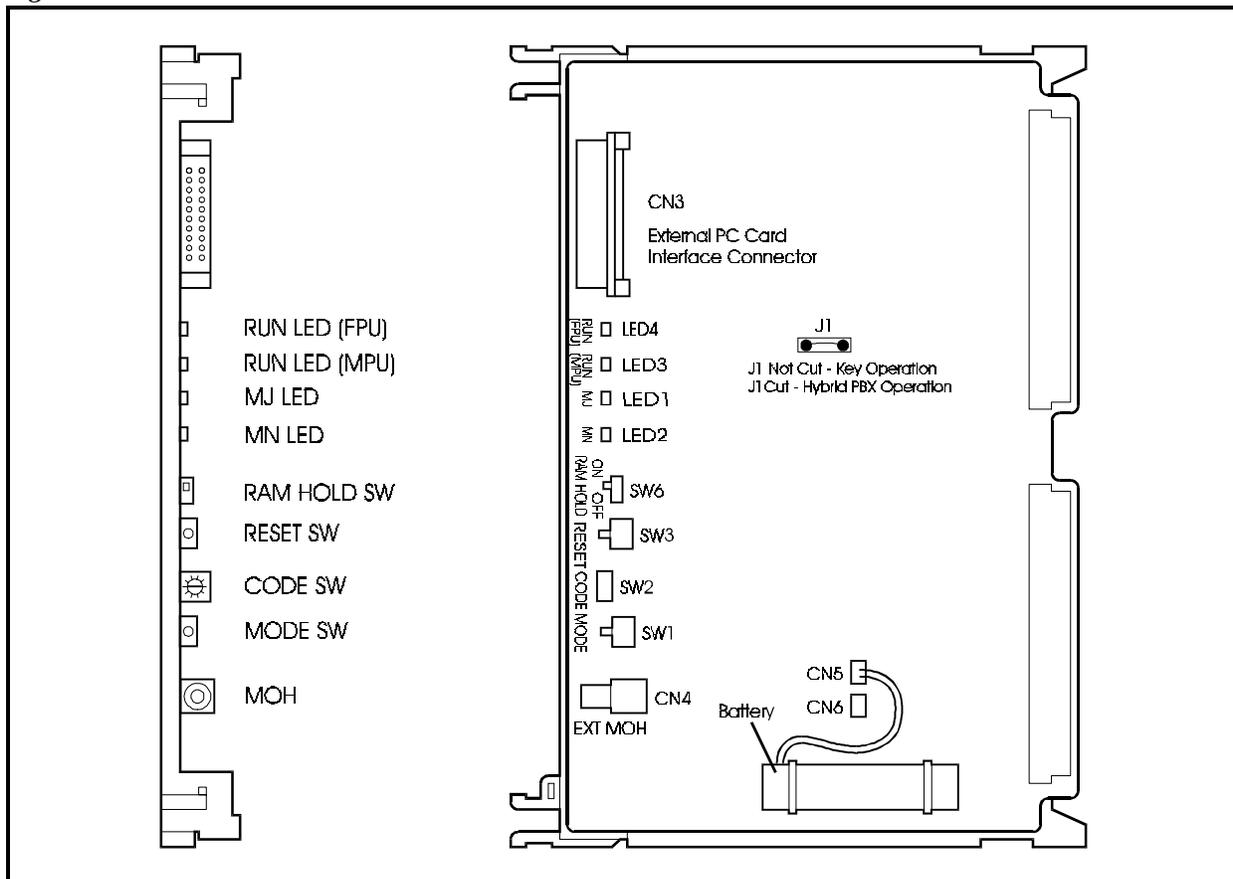
Table 2-4.   Switch settings of CPC288 card

SW No.	Description
SW1 : Black (MODE)	Push switch for setting modes of system.
SW2 : Red (RESET)	Push switch for resetting.
SW3 : (CODE)	Rotary switch for setting startup mode of system.
SW6 : (RAM HOLD)	Switch for selecting battery backup of memory.

Table 2-5.   LED indications of CPC288 card

LED indication	Description
LED4 (RUN)	Flashes red when (FPU) is operating.
LED3 (RUN)	Flashes red when Main Processing Unit (MPU) is operating.
LED1 (MJ)	Turns ON red when Major (MJ) alarm is detected.
LED2 (MN)	Turns ON red when Minor (MN) alarm is detected.

CPC576 card (VB-444301)

The CPC576 card is a high-performance CPU unit for system with up to 576 ports. A 32-bit CPU is incorporated.

The CPC576 card provides a 4-circuit MFR (DTMF receiver circuit), an input terminal for music on hold tone source (RCA jack), an interface connector for PCM-CIA (PC card interface connector) and modem (300 bps) functions.

This card requires the use of the TSW576 card (VB-444302).

Memory is retained with a backup battery. (See "Replacing the Backup Battery of CPC card" on page 6-29 for more information on battery replacement.)

The system control program is downloaded to the internal memory of the system through the PC Card (VB-44431). The PC Card is also necessary during normal operating time (do not remove the PC Card).

Note: J7 must be cut for the system to operate in Hybrid/PBX mode. Otherwise, the system will operate in Key mode.

⚠ **CAUTION:**
  - A replacement Single Inline Memory Module (SIMM) is provided through the service parts route. Panasonic does not take any responsibility if a SIMM, other than Panasonic service parts, or PC Card, other than VB-44431 is connected to the CPC576 card.

Figure 2-6. CPC576 card
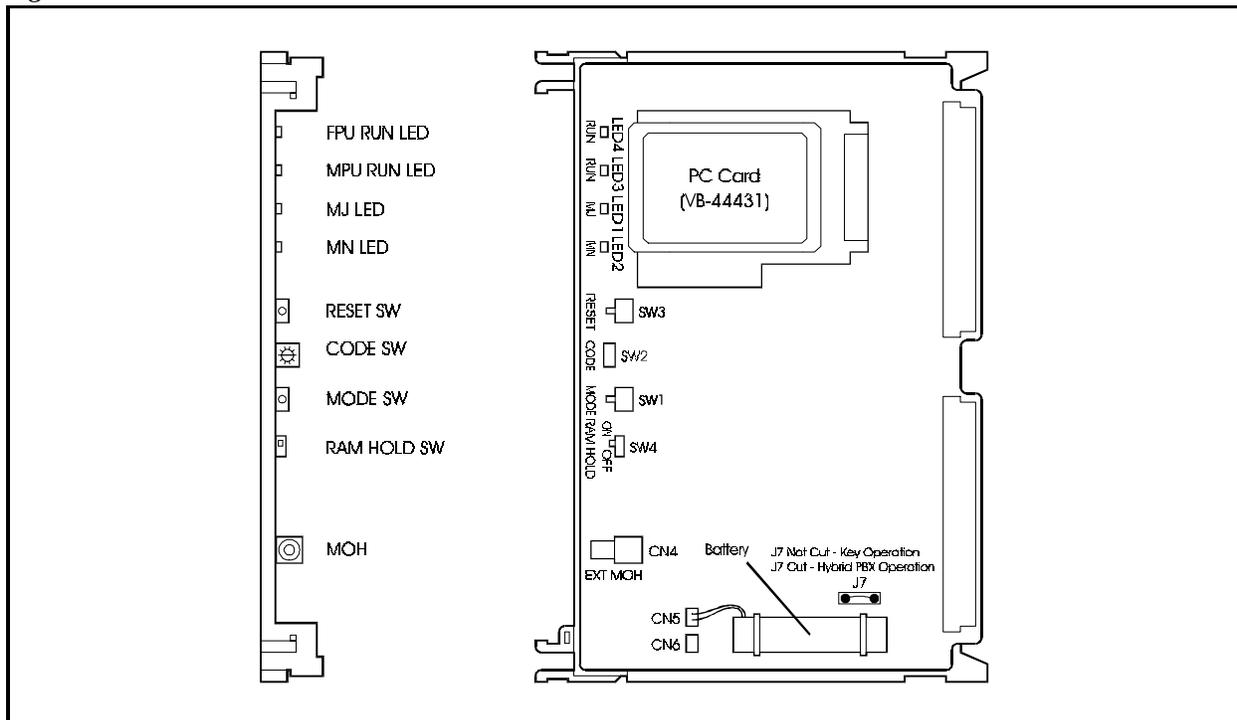
Table 2-6 shows the switch settings of the CPC576 and Table 2-7 shows the LED indications.

Table 2-6.   Switch settings of CPC576 card

SW No.	Description
SW1 : Black (MODE)	Push switch for setting modes of system.
SW2 : Red (RESET)	Push switch for resetting.
SW3 : (CODE)	Rotary switch for setting startup mode of system.
SW6 : (RAM HOLD)	Switch for selecting battery backup of memory.

Table 2-7.   LED indications of CPC576 card

LED indication	Description
LED4 (RUN)	Flashes red when FPU is operating.
LED3 (RUN)	Flashes red when Main Processing Unit (MPU) is operating.
LED1 (MJ)	Turns ON red when Major (MJ) alarm is detected.
LED2 (MN)	Turns ON red when Minor (MN) alarm is detected.

TSW288 card (VB-444202)

The TSW288 card is the time switch card for the CPC288 card. The TSW288 card is mounted on the option slot of the main cabinet. Only one TSW288 card can be mounted for each system (maximum 288 ports).

When connecting to additional cabinets, this card is cabled to the CBL card (VB-44451) installed into CPC card slot of the additional cabinet(s).

The TSW288 card provides functions for a time switch (14 Highways x 14 Highways), service tone, DTMF output, a connecting terminal for synchronization package (VB-44460) and eight 3-party conference circuits.

Figure 2-7. TSW288 card
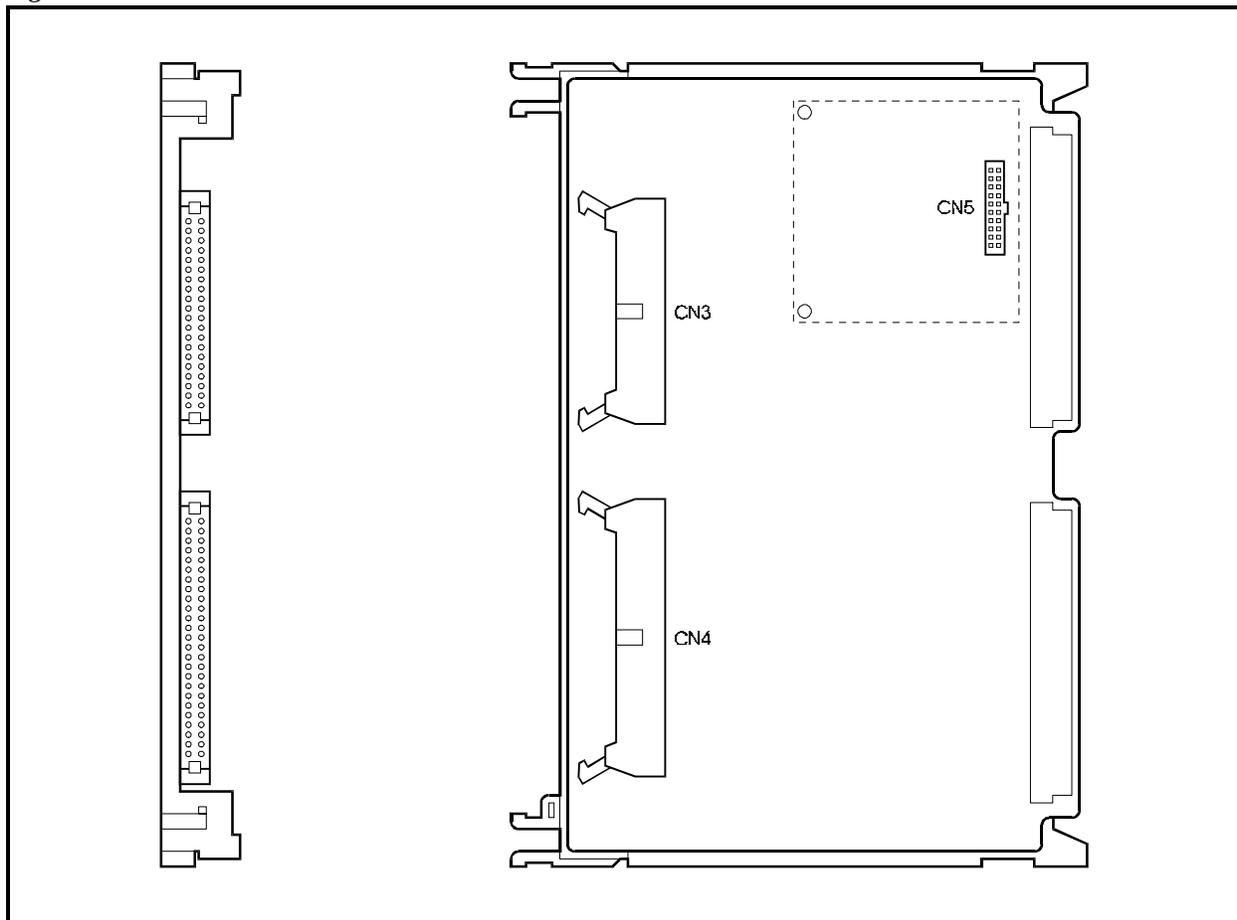
TSW576 card (VB-444302)

The TSW576 card is the time switch card required for the system using a CPC-576 card. This card supports a maximum of 576 ports.

The TSW576 card is mounted in the option 1 slot of the main cabinet. Only one TSW576 card can be mounted for each system.

When connecting to additional cabinets, this card and CBL card (VB-44451) installed into CPC card slot of the additional cabinet are connected.

The TSW576 card provides functions for a time switch (24 Highways X 24 Highways), service tone, DTMF output, a connecting terminal for synchronization package (VB-44460), and eight 3-party conference circuits.

Figure 2-8. TSW576 card
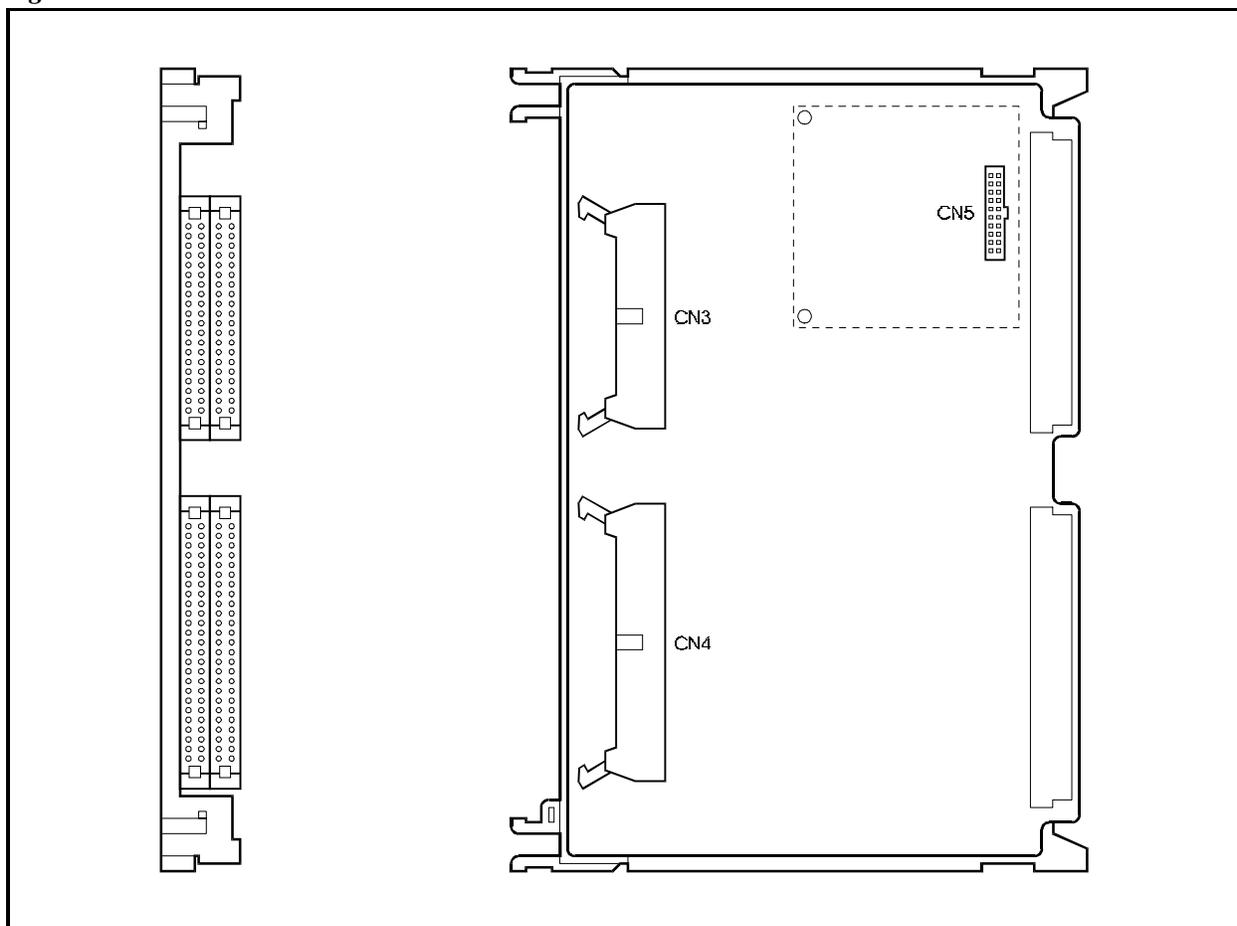
CBL card (VB-44451): Building Block card

The CBL card is required for interconnecting cabinets in the DBS 576 system. The TSW288 or TSW576 card is also necessary for the interconnection of cabinets (building block connection).

The CBL card must be mounted in the CPC slot of all cabinets other than the master cabinet. A dedicated interconnect cable pair connects between cabinets. The connection to the master base cabinet is to the TSW288/TSW576 card, which is mounted in the OP1 slot.

A rotary switch on the CBL card identifies the cabinet to the rest of the system (1 - first additional cabinet, 2 - second additional cabinet, etc.). Up to 5 additional cabinets can be installed and each must be uniquely identified.

Figure 2-9. CBL card
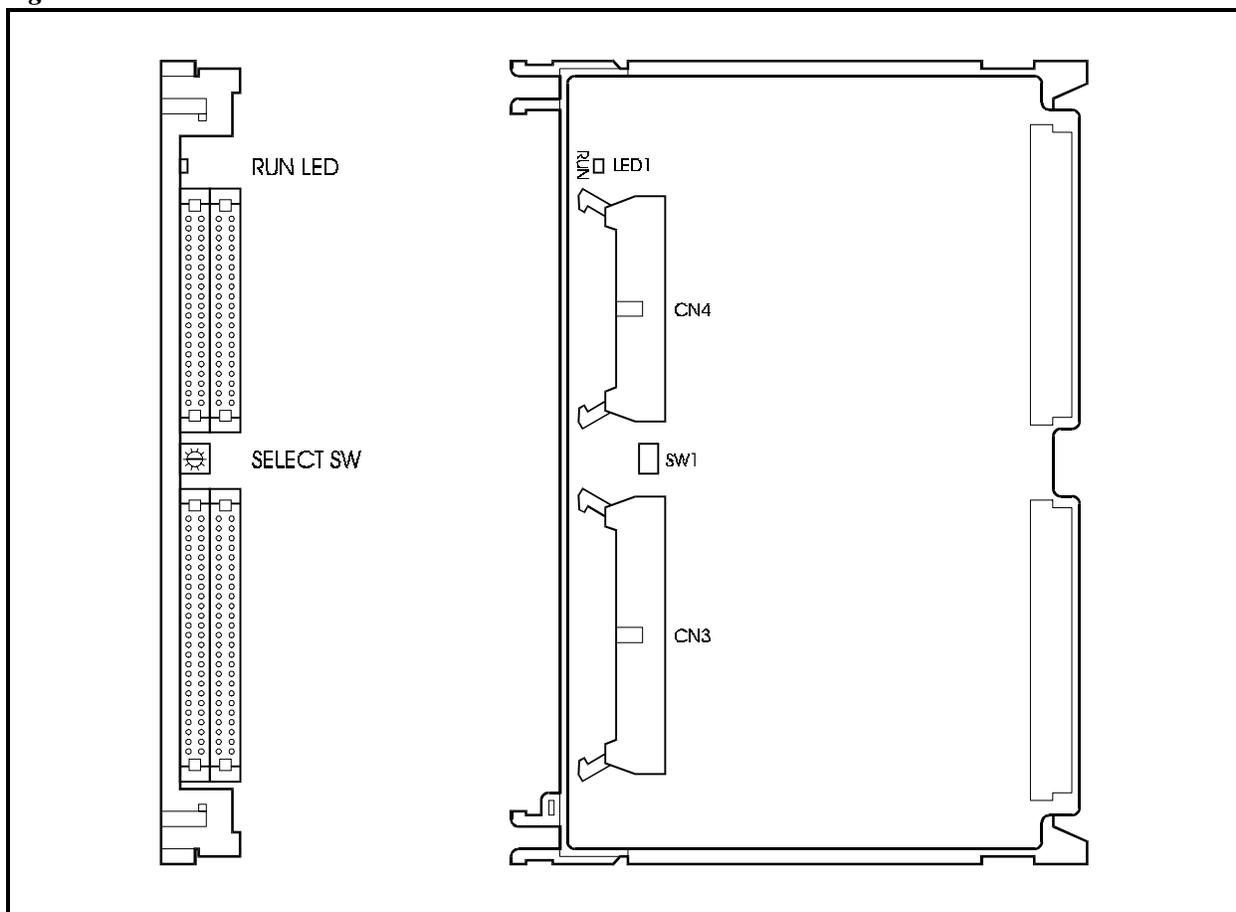
Table 2-8 shows the LED indication.

Table 2-8.   LED indications of CBL card

LED indication	Description
LED1 (RUN)	Flashes red when operating.

CBLDBS Card Kit (VB-44452): Connection Cable card-DBS

The CBLDBS kit includes an interface card and cables for connecting between the DBS 576 and the DBS 96 cabinet and a new MDF interface card for the DBS.

The TSW288 / TSW576 card is necessary for connecting a DBS 576 to a DBS 96 cabinet.

The CBLDBS card must be mounted in the AUX1 slot of the DBS (AUX2 cannot be used). A dedicated cable connects this card and the TSW288 / TSW576 card, which is mounted on the OP1 slot of the Main Cabinet.

Only DEC cards can be installed in the DBS system.

Figure 2-10. CBLDBS interface card
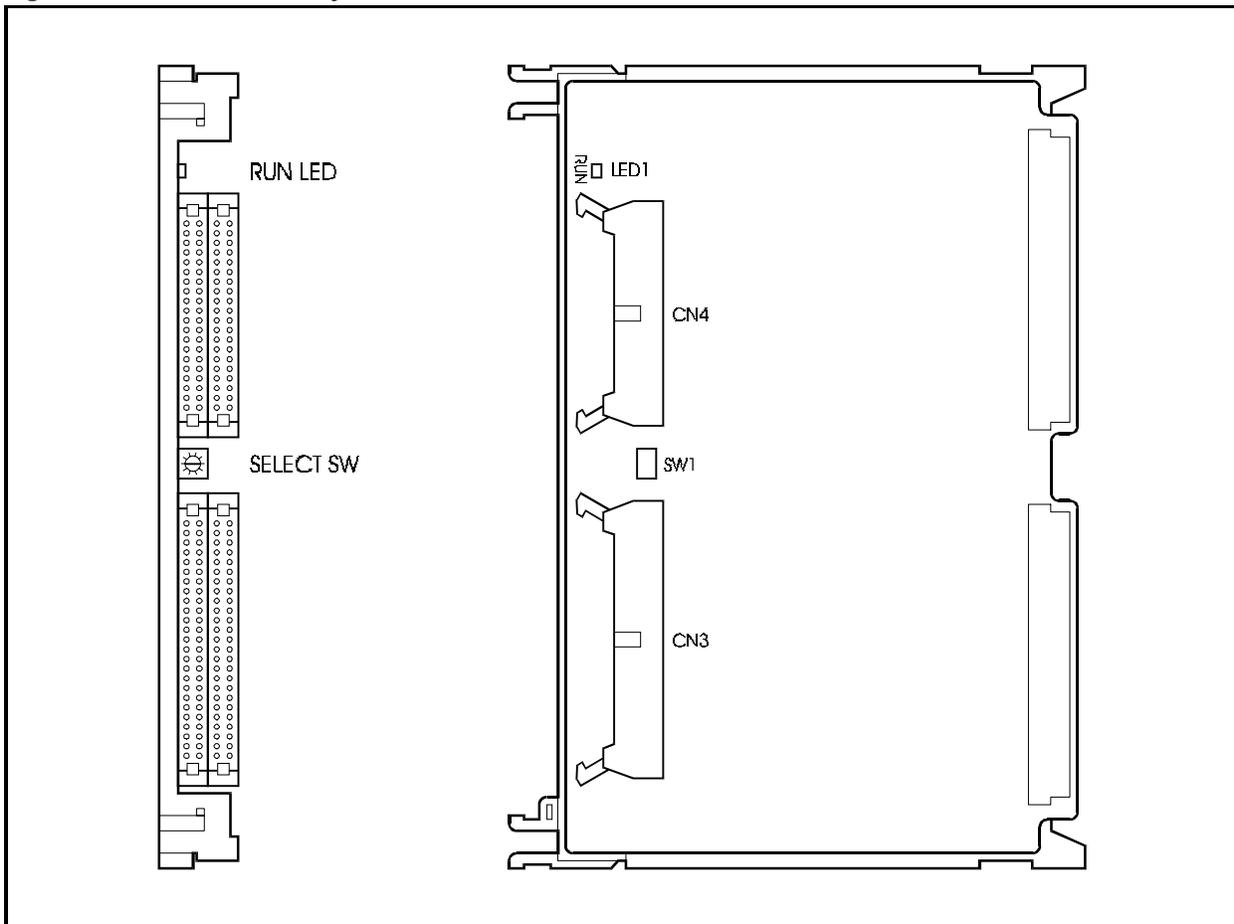
Table 2-9 shows the LED indications.

Table 2-9.   LED indications of CBLDBS card

LED indication	Description
LED1 (RUN)	Flashes red when FPU is operating.

The CBLDBS interface card provides connection points between the DBS and the MDF.

Figure 2-11. CBLDBS MDF card
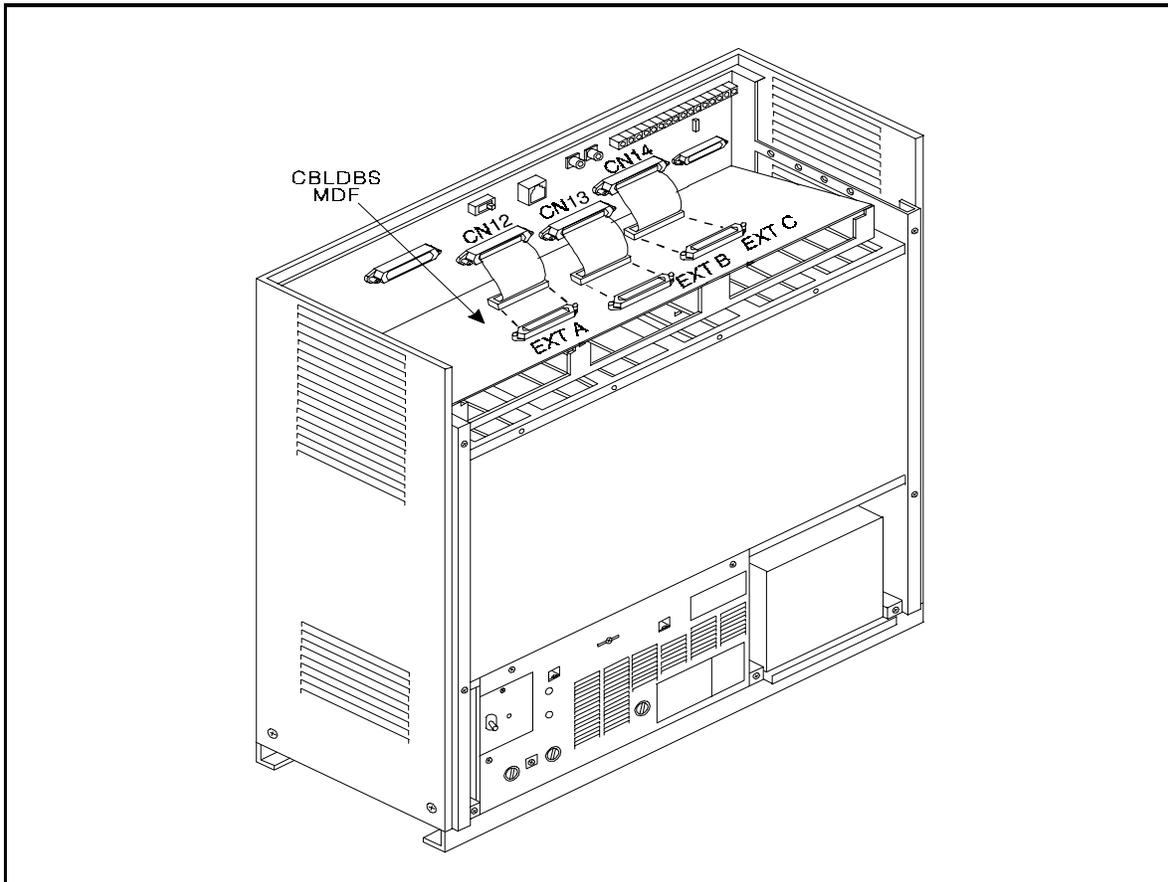
EXT MDF card (VB-44611): Extension MDF Interface Card

The EXT MDF card provides a standard 25-pair connection at the DBS 576 Cabinet. This interface board installs in one of five possible positions on either side of the DBS 576 Cabinet and supports up to three extension cards (either DEC/8 or AEC/8). Since each extension card contains 8 extension ports, the EXT MDF supports a maximum total of 24 extensions.

A standard 25-pair cable must be run from this interface board to the MDF.

Figure 2-12. EXT MDF Interface card
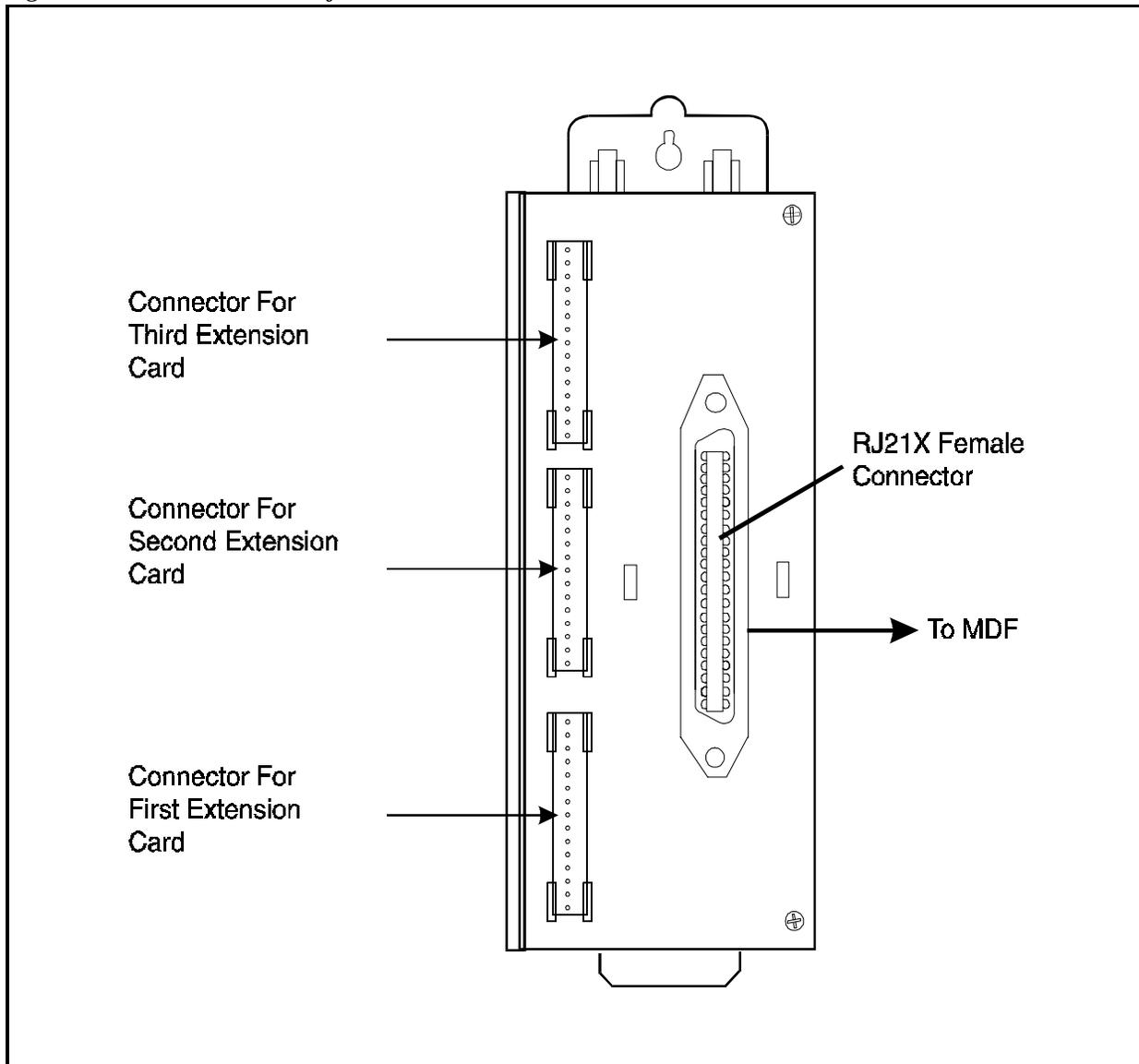
TRK MDF card (VB-44512): Trunk MDF Interface Card

The TRK MDF card provides a standard 25-pair connection at the DBS 576 Cabinet. This interface board installs in one of five possible positions on either side of the DBS 576 Cabinet and supports up to three trunk cards (LTRK/8, LGTRK/8 or DIDTR/8). Since each of these trunk cards contains 8 extension ports, the TRK MDF supports a maximum total of 24 trunks.

A standard 25-pair cable must be run from this interface board to the MDF.

Figure 2-13. TRK MDF Interface card
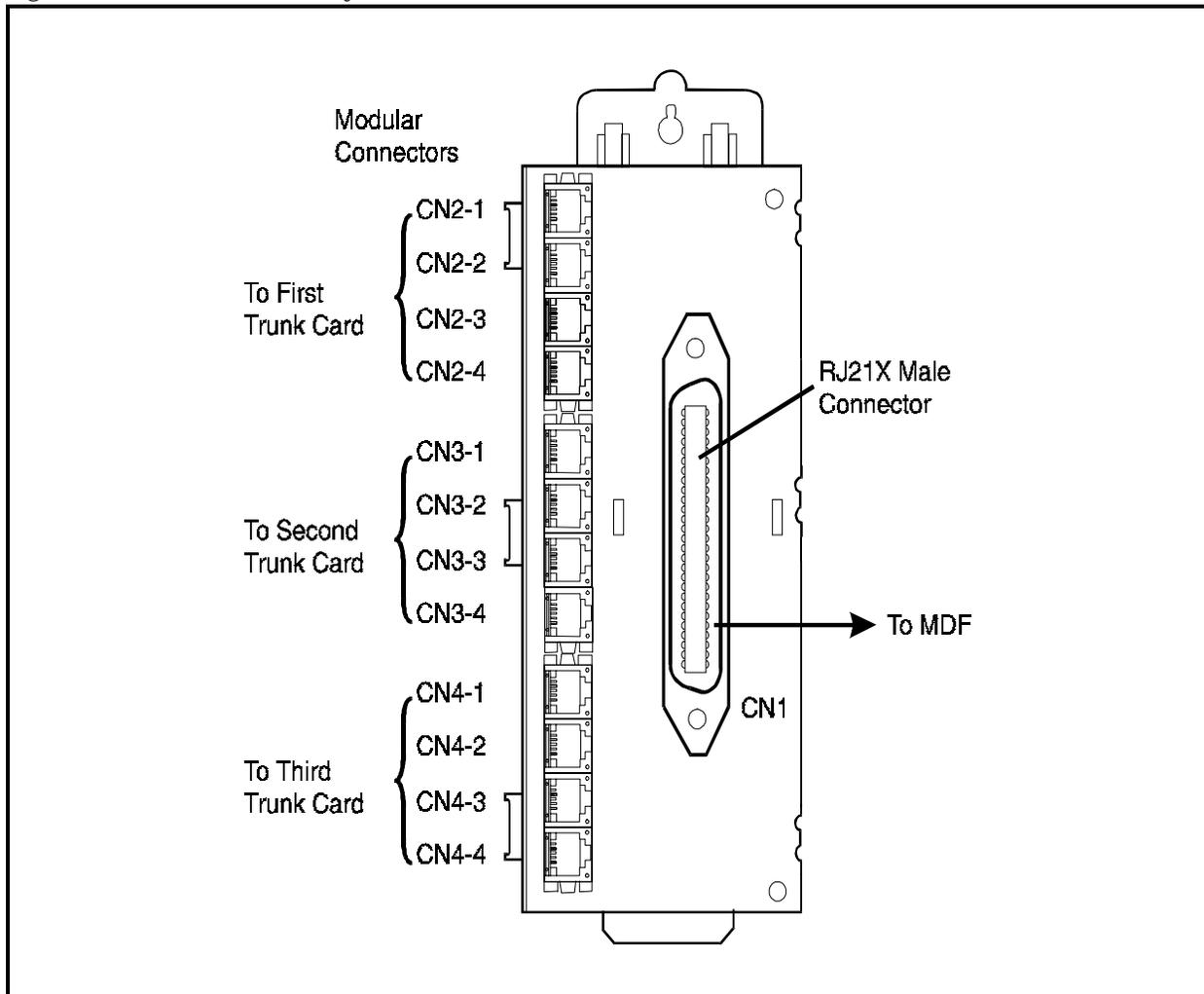
SYNC Package (VB-44460): SYNC Package/Network Unit

The SYNC package supplies a network synchronizing circuit, and is required when a digital circuit, such as ISDN, is used.

The SYNC package generates a PCM clock that is synchronized with a digital network by the PLL circuit, supplying the PCM clock to the TSW288 / TSW576 card or CPC96 card.

The SYNC package is mounted on either the CPC96 card or the TSW288/TSW576 card.

For details on how to mount the SYNC package, see page 5-20.

Figure 2-14. SYNC Package
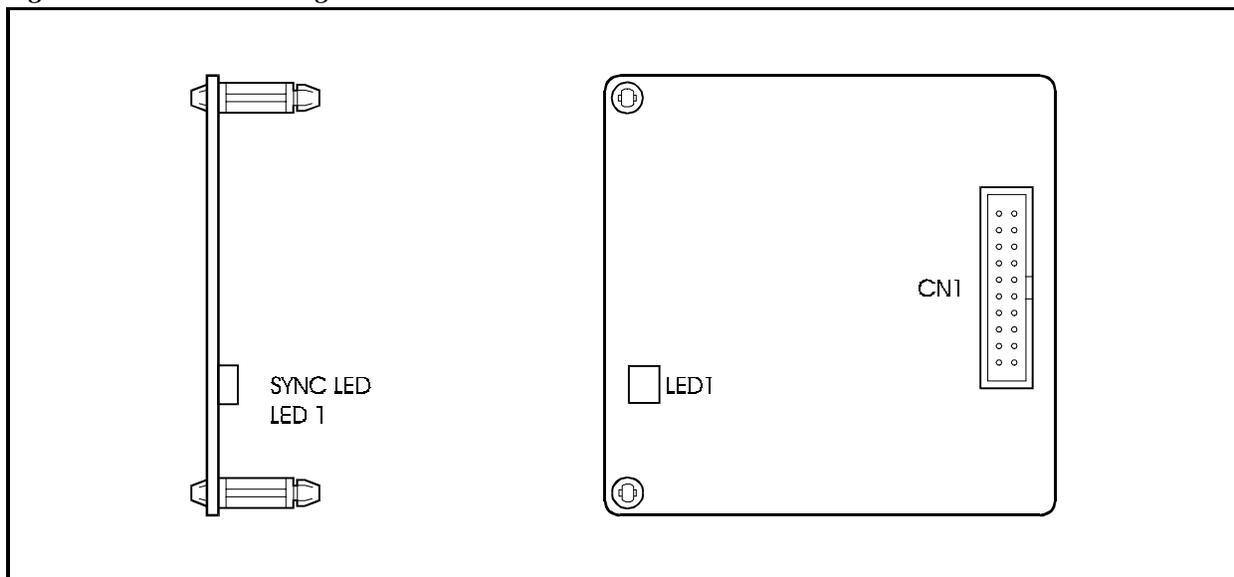
Table 2-10 shows the LED indications.

Table 2-10. LED indications of SYNC package

LED indication	Description
LED1 (SYNC)	Turns on when synchronizing to the CO clock.

SCC card (VB-44181): Service Control Card

The SCC card is used to extend service functions. This card is mounted in the option slot to support RS-232C port control, background music (BGM) input and external paging (external paging with talkback) control.

Only one SCC card can be mounted for each system.

The major specifications of this card follow:

- RS-232C port: 2 ports (max. 9600 bps)
  CN5: SMDR or customized tool
  CN6: Bus monitor
- BGM input terminal: 1 port (with RCA jack)
- External paging input terminal
- External amplifier ON/OFF control: 1 contact
- Number of contacts for external equipment ON/OFF control: 5 contacts
- Maximum drive current controlling ports for external equipment control board: 25mA (Total)

Figure 2-15. SCC card
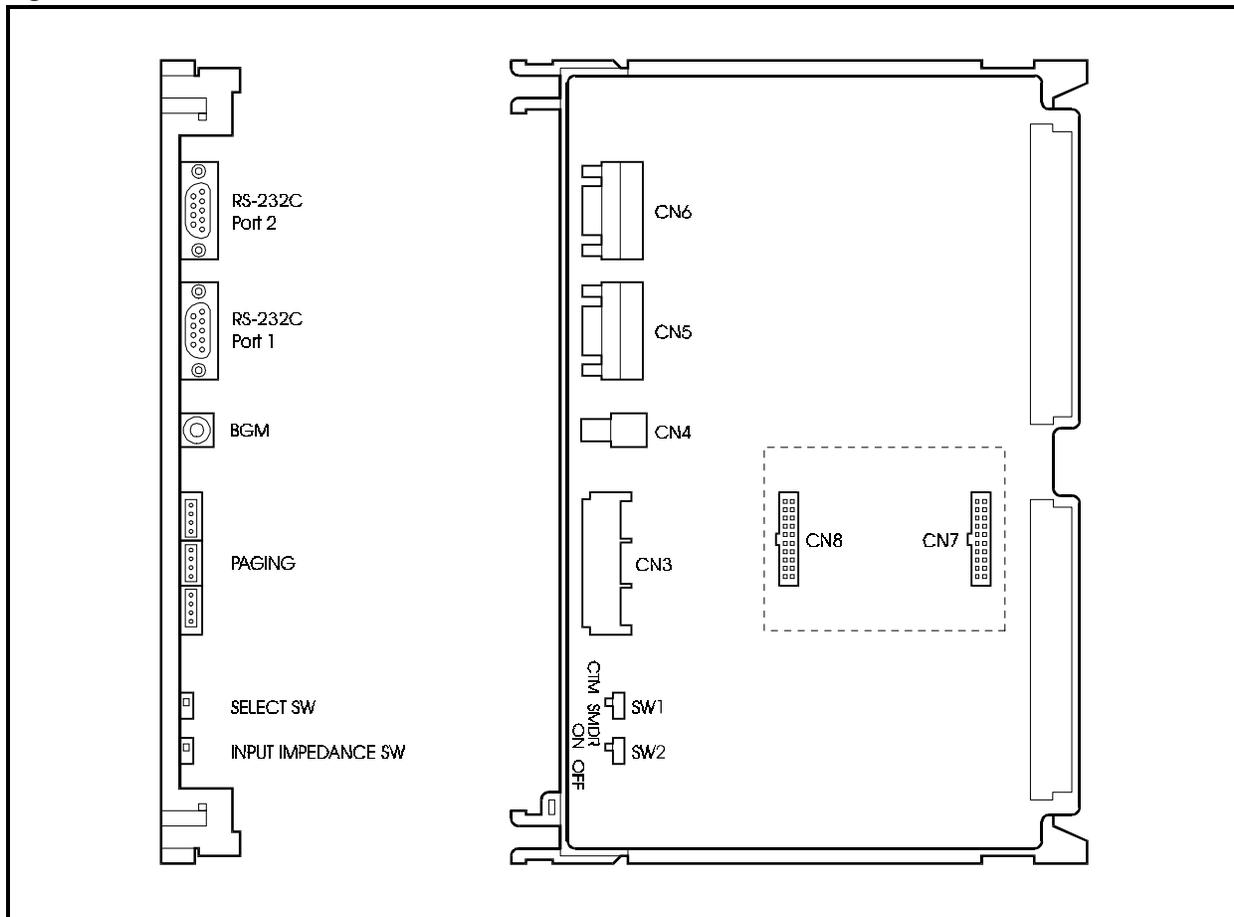
Table 2-11shows the switch settings.

Table 2-11. SCC card switch settings.

Switch No.	Setting	Description
SW1	CTM	Connects customized tool to RS-232C port (CN5).
	SMDR	Connects SMDR to RS-232C port (CN5) (default)
SW2	ON	Sets input impedance of external paging device to 600 Ohms.
	OFF	Sets input impedance of external paging device to high impedance. (This is set before shipping.)

LTRK / 8 card (VB-44510): Loop Start Trunk Card

The LTRK/8 card is an interface that accommodates loop start type analog trunks. This card is mounted on a flexible slot to connect analog telephone lines. An optional "piggyback" daughter circuit card (VB-44513) may be installed on this card to receive Caller ID. See "CID card (VB-44513): Caller ID Interface Card" on page 2-23 for more information.

The LTRK/8 card provides 8 circuit trunk interface, detection and answering of call signals from the trunk, sending signals to the trunk, dialing and speech.

The LTRK/8 card provides a lightening arrester and a safety circuit to directly connect with general telephone lines.

Figure 2-16. LTRK/8 card
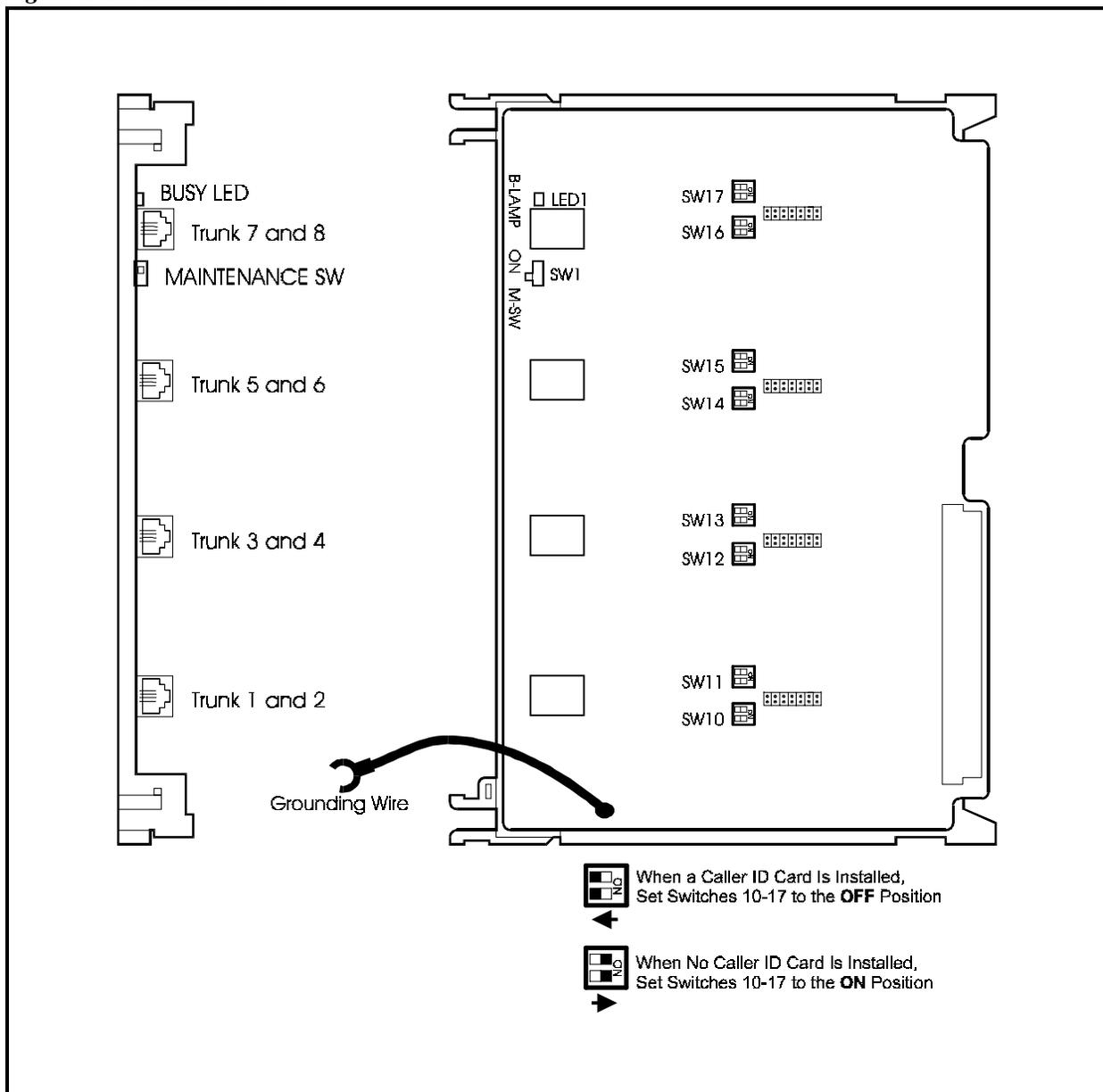
Table 2-12 and Table 2-14 show the switch settings and LED indications.

Table 2-12. Maintenance switch (SW1) settings of LTRK/8 card

Setting	Description
ON	Card is in closed status, and can be mounted and removed when power is ON. (Sending/receiving of calls is disabled. If this is set while a trunk is in use, sending/receiving of calls is disabled after the call ends.)
OFF (**M-SW**)	Normal operation (This switch is set to OFF for normal operation.)

Table 2-13. Caller ID switch (SW10-17) settings of LTRK/8 card

Switch	Setting	Description
SW10	ON	Circuit 1 is in loop start mode and does not receive caller ID information.
	OFF	Circuit 1 is set to receive Caller ID information (requires CID card).
SW11	ON	Circuit 2 is in loop start mode and does not receive caller ID information.
	OFF	Circuit 2 is set to receive Caller ID information (requires CID card).
SW12	ON	Circuit 3 is in loop start mode and does not receive caller ID information.
	OFF	Circuit 3 is set to receive Caller ID information (requires CID card).
SW13	ON	Circuit 4 is in loop start mode and does not receive caller ID information.
	OFF	Circuit 4 is set to receive Caller ID information (requires CID card).
SW14	ON	Circuit 5 is in loop start mode and does not receive caller ID information.
	OFF	Circuit 5 is set to receive Caller ID information (requires CID card).
SW15	ON	Circuit 6 is in loop start mode and does not receive caller ID information.
	OFF	Circuit 6 is set to receive Caller ID information (requires CID card).
SW16	ON	Circuit 7 is in loop start mode and does not receive caller ID information.
	OFF	Circuit 7 is set to receive Caller ID information (requires CID card).
SW17	ON	Circuit 8 is in loop start mode and does not receive caller ID information.
	OFF	Circuit 8 is set to receive Caller ID information (requires CID card).

Table 2-14. LED indications of LTRK/8 card

LED indication	Description
LED1 (LINE BUSY)	Turns ON when any trunk on the card is in use.

CID card (VB-44513): Caller ID Interface Card

The Caller ID card is an interface that attaches to the loop start card (VB-44510) and receives Caller ID information.

The CID card provides 8 circuits. DIP switches on the Loop Start Card must be properly set for CID to operate. (See "LTRK / 8 card (VB-44510): Loop Start Trunk Card" on page 2-21 for more information.

Figure 2-17. CID card
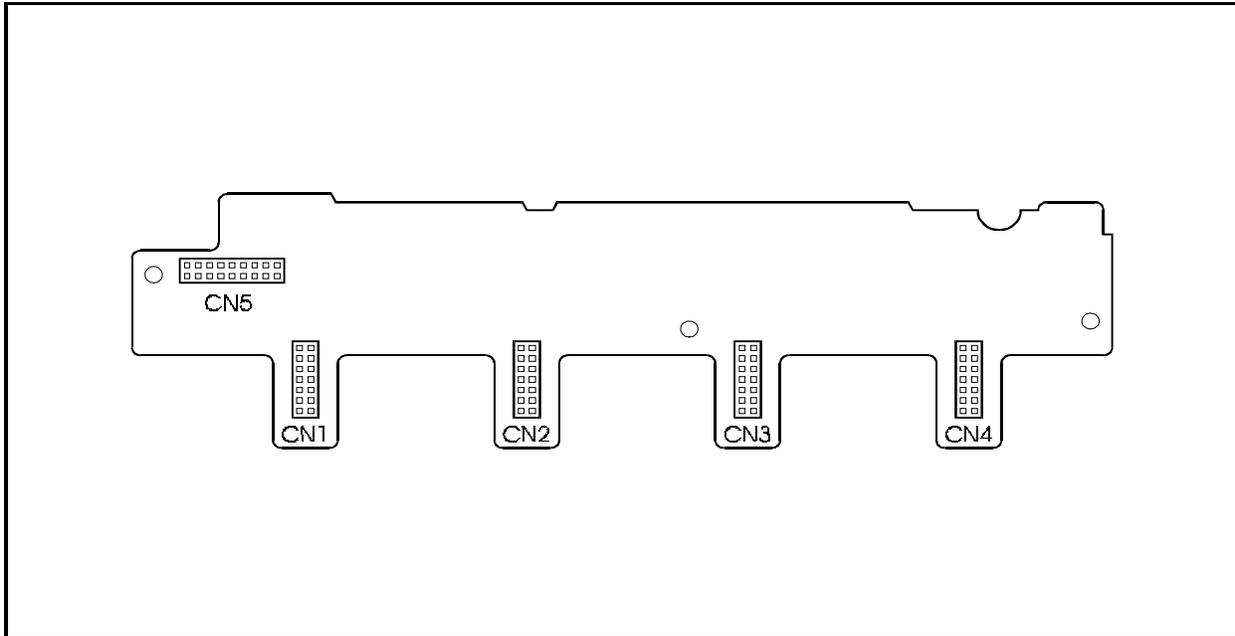
LGTRK / 8 card (VB-44511): Loop Start/Ground Start Trunk Card

The LGTRK/8 card is an interface that accommodates both loop start type analog trunks and ground start analog trunks. Each trunk circuit type (either ground start or loop start) is specified by a program setting as well as by two jumpers settings.

This card is mounted on a flexible slot to connect general analog telephone lines.

The LGTRK/8 card provides an 8 circuit trunk interface and can serve the functions of detection and answering of call signals from the trunk, sending call signals to the trunk, dialing and speech.

The LGTRK/8 card provides a lightening arrester and a safety circuit to directly connect with general telephone lines.

Note: To use the LGTRK/8 card, a built-in -48V power supply is required in the same cabinet. The -48V power supply signal ground (SG) connector must be properly connected to ground for the ground start trunks to operate correctly.

Each circuit has two jumper connectors (CNX01 and CNX02). When jumpers are installed on both jumper connectors, the circuit is set for Ground Start operation. When the jumpers are not installed, the circuit is set of Loop start operation.

Table 2-15. Ground Start/Loop Start jumper settings of LGTRK/8 card

Jumper Connector	Jumper	Description
CN101 & CN102	ON	Circuit 1 is in ground start mode
	OFF	Circuit 1 is in loop start mode
CN201 & CN202	ON	Circuit 2 is in ground start mode
	OFF	Circuit 2 is in loop start mode
CN301 & CN302	ON	Circuit 3 is in ground start mode
	OFF	Circuit 3 is in loop start mode
CN401 & CN402	ON	Circuit 4 is in ground start mode
	OFF	Circuit 4 is in loop start mode
CN501 & CN502	ON	Circuit 5 is in ground start mode
	OFF	Circuit 5 is in loop start mode
CN601 & CN602	ON	Circuit 6 is in ground start mode
	OFF	Circuit 6 is in loop start mode
CN701 & CN702	ON	Circuit 7 is in ground start mode
	OFF	Circuit 7 is in loop start mode
CN801 & CN802	ON	Circuit 8 is in ground start mode
	OFF	Circuit 8 is in loop start mode

The switch settings and LED indications are the same as for the LTRK/8 card (VB-44510). See Table 2-12 and Table 2-14.

Figure 2-18. LGTRK/8 card
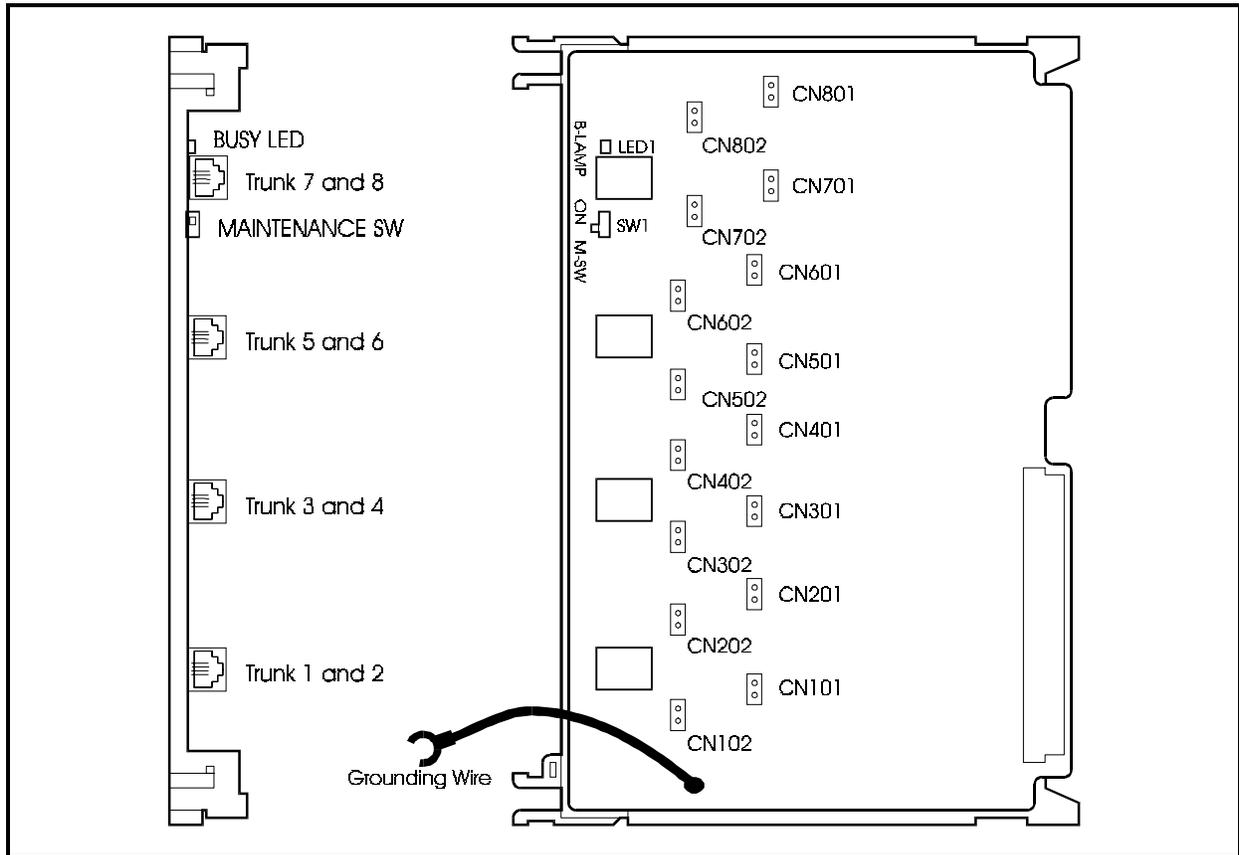
DID/8 card (VB-44520): DID Trunk Card

The DID/8 card is a trunk interface that accommodates cards for the DID dedicated incoming function.

The incoming call address receiving control system supports the immediate and wink method, and supports DP (10 PPS) and DTMF (only for wink) as incoming call address signals. However, an MFR is required when the DTMF is selected. MFR is supplied in CPC96, CPC288 and CPC576 card. Additional MFRs are available in an MFR/8 card.

The DID/8 card is mounted on a flexible slot to connect to a DID telephone line, making detection and answering of call signals from the trunk and speech possible.

The DID/8 card provides an 8-circuit trunk interface on the card, and a lightening arrester to directly connect to a DID telephone line.

Note: To use the DID/8 card, a built-in -48V power supply is required in the same cabinet.

The switch settings and LED indications are the same as for the LTRK/8 card (VB-44510). See Table 2-12 and Table 2-14.

Figure 2-19. DIDTR 8 card
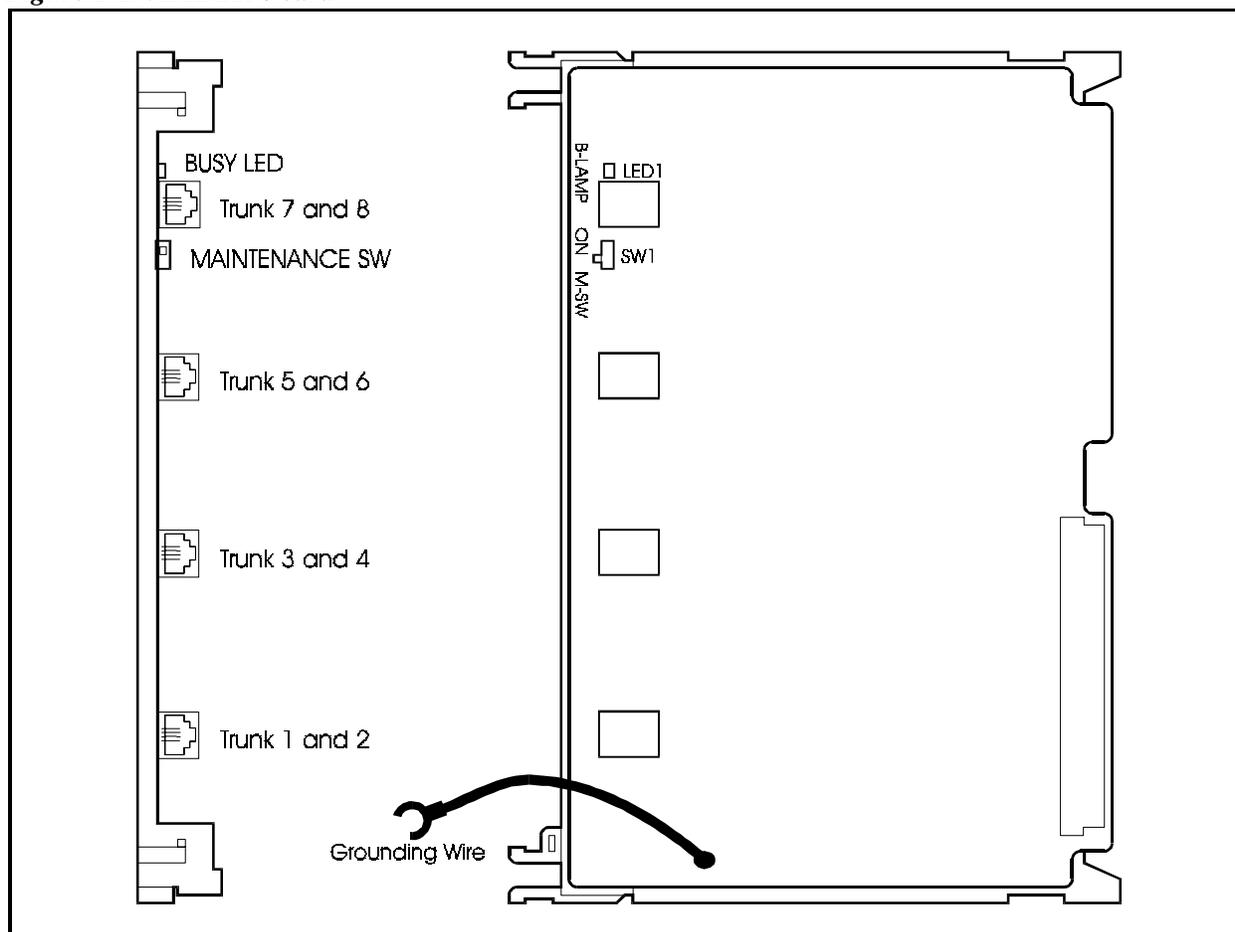
E&M/4 card (VB-44560): E&M Trunk Card

The E&M/4 card is a trunk interface that accommodates cards for the E&M Tie line connections. Typically, tie trunks are used in network connections and for direct connections to other PBX systems.

The incoming call address receiving control system supports the immediate and wink method, and supports DP (10 PPS) and DTMF (only for wink) as incoming call address signals. However, an MFR is required when the DTMF is selected. MFR is supplied in CPC96, CPC288 and CPC576 card. Additional MFRs are available in an MFR/8 card.

The E&M/4 card is mounted on a flexible slot to connect to a E&M telephone line.

The E&M/4 card provides a 4-circuit trunk interface on the card, and a lightening arrester to directly connect to a E&M telephone line.

Note: To use the E&M/4 card, a built-in -48V power supply is required in the same cabinet.

Figure 2-20. E&M/4 card
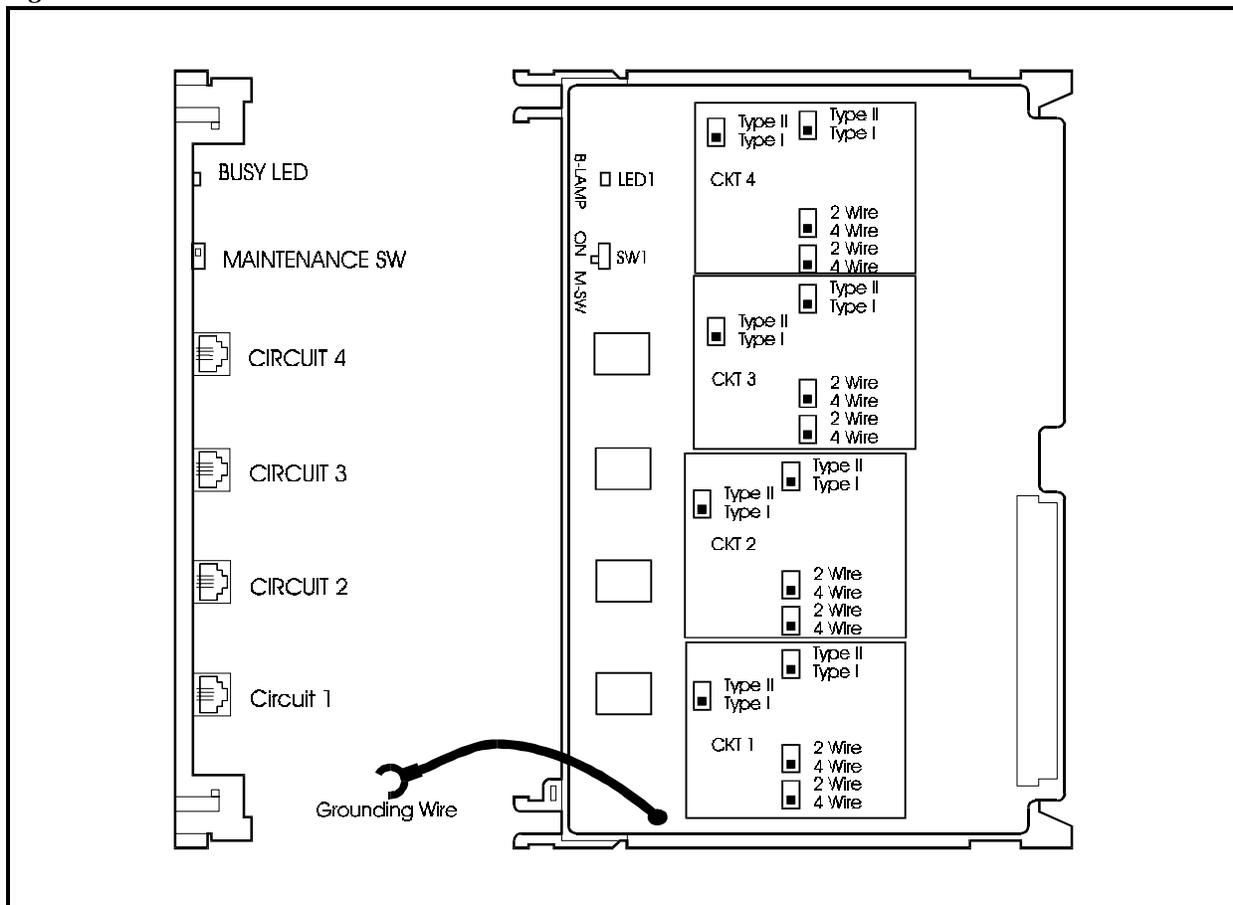
TBRI/4 card (VB-44530): BRI Card (T-point)

The TBRI/4 card is a T-point ISDN basic interface (2 B + D: 192 kbps) accommodation card.

The TBRI/4 card is mounted on a flexible slot to control the basic user network interface of ISDN.

The TBRI/4 card is connected through a Network Termination Unit (NT1) to the ISDN trunk which supports the T-point ISDN basic interface. (The NT1 is not provided.)

This card has an on-board, 4-circuit T-point ISDN basic interface, and a lightening arrester built-in, and also provides a network clock synchronizing function.

Figure 2-21. TBRI/4 card
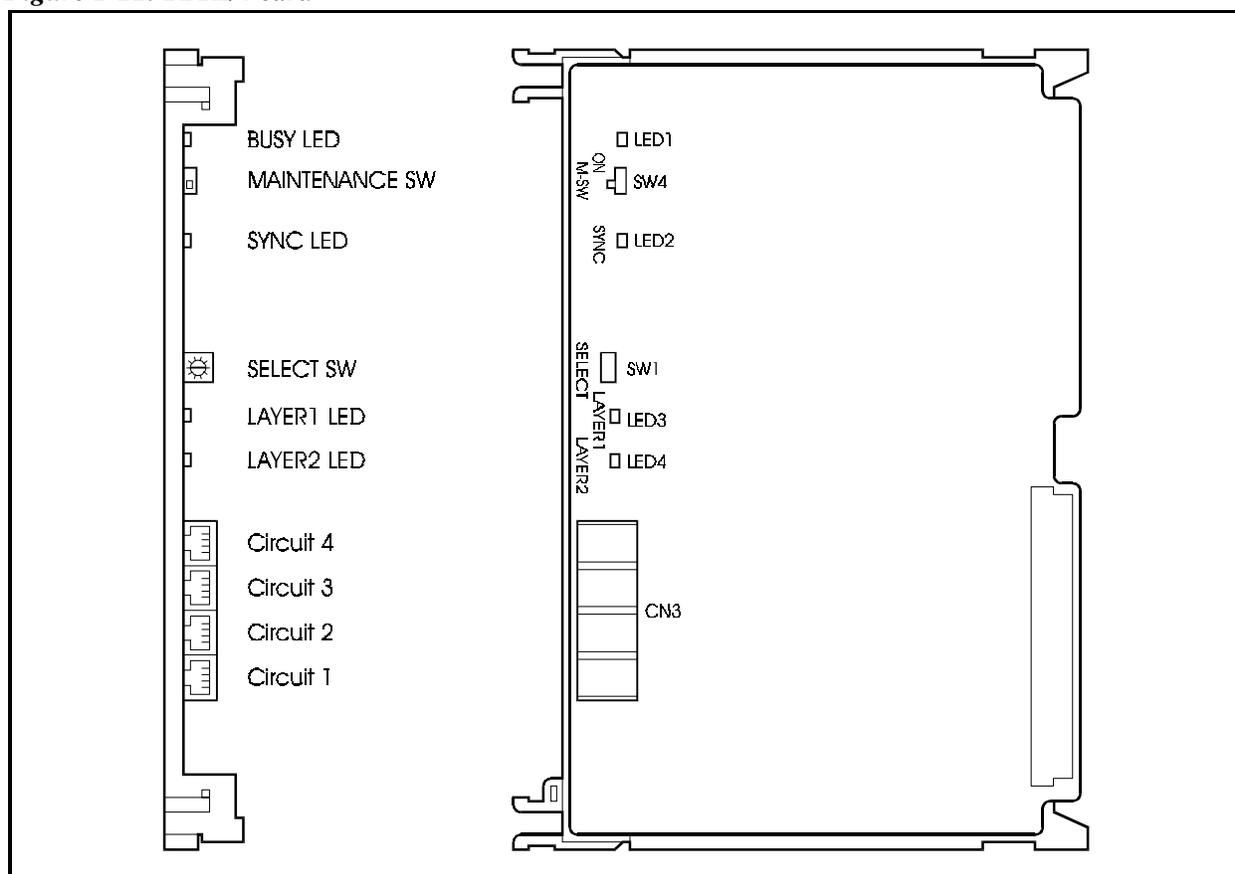
Tables 2-11, 2-12 and 2-13 show the switch settings and LED indications.

Table 2-16. Maintenance switch (SW4) settings of TBRI/4 card

Setting	Description
ON	Card is in closed status, and can be mounted and removed when the power is ON. (Sending/receiving of calls is disabled. If this is set during speech, sending/receiving of calls is disabled after speech ends.)
OFF	Normal operation (This switch is set to OFF for normal operation.)

Table 2-17. Circuit select switch (SW1) settings of TBRI/4 card

Switch Position	Description
0	OFF (default setting when unit is shipped)
1	1st interface condition displayed by LAYER1 LED and LAYER2 LED
2	2nd interface condition displayed by LAYER1 LED and LAYER2 LED
3	3rd interface condition displayed by LAYER1 LED and LAYER2 LED
4	4th interface condition displayed by LAYER1 LED and LAYER2 LED
5 to 7	Not used

Table 2-18. LED indication of TBRI/4 card

LED indication	Description
LED1 (LINE BUSY)	Turns ON when trunk is in use.
LED2 (SYNC)	Turns ON when network synchronization clock is sent.
LED3 (LAYER1)	Turns ON when synchronization is established.
LED4 (LAYER2)	Turns ON when data link (DL) is established.

PRI/23 card (VB-44540): PRI Card

The PRI/23 card is a T-point ISDN primary group interface (23B + D/24B: 1544 kbps) and also an S-point ISDN primary group interface accommodation card.

The PRI/23 card is mounted on a flexible slot to connect the system to ISDN (to access ISDN services). It is possible to use either the T- or S-point ISDN primary group interface by setting a switch on the card or by a program setting. By selecting the mode switch on the card, 8/16/24 channel modes can be selected, however, there are restrictions to the position of the slot to which the card is mounted. This depends on the number of accommodating channels. For details on the restrictions of the slot position, see page 2-39.

A maximum of three cards can be mounted in each cabinet. When there are six cabinets, a maximum of 18 cards can be mounted.

The PRI/23 card has an on-board lightening arrester, so that the card can be connected to the carrier trunk corresponding to the T-point primary group interface through a CSU. (The CSU is not provided.)

This clock provides a network clock synchronizing function.

Figure 2-22. PRI/23 card
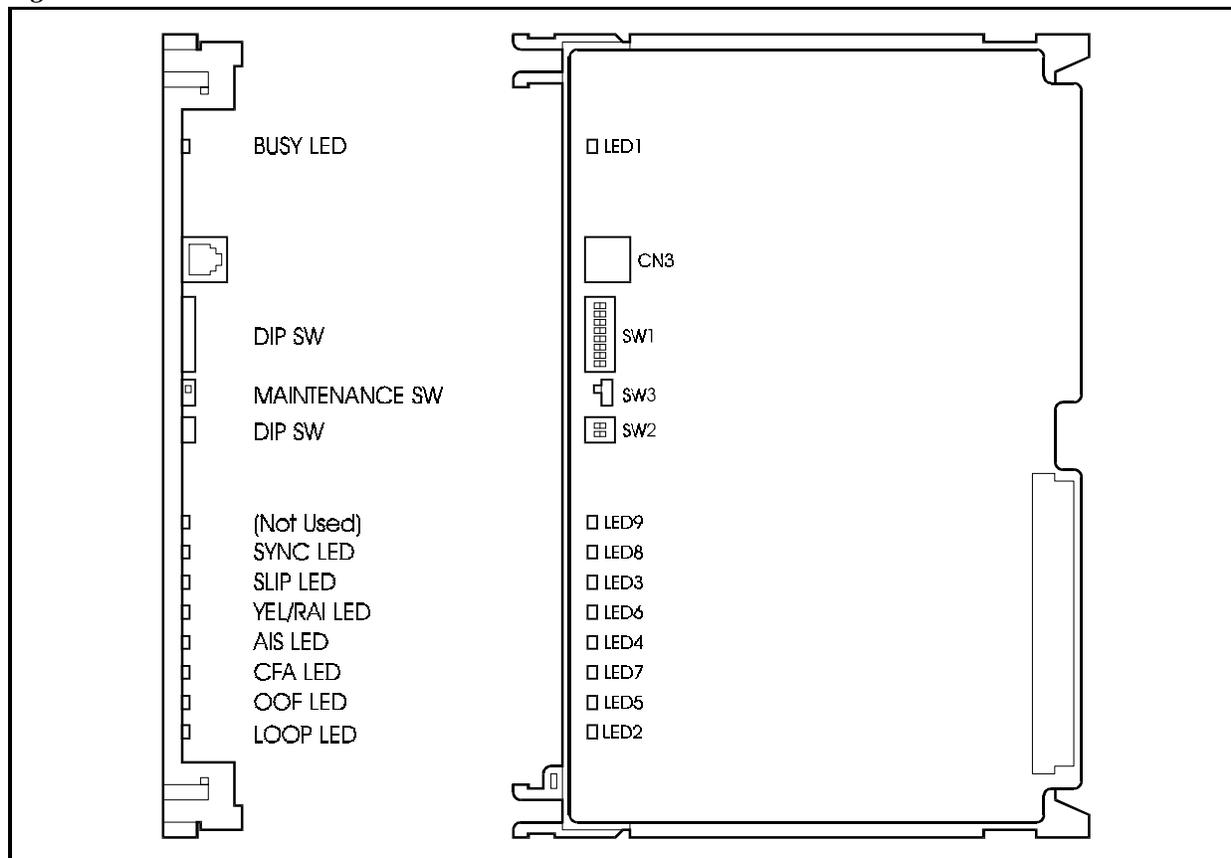
Tables 2-14 to 2-17 show the switch settings and LED indications.

Table 2-19. Maintenance switch (SW4) settings of PRI/23 card

Setting	Description
ON	Card is in closed status, and can be mounted and removed when power is ON. (Sending/receiving of calls is disabled. If this is set during speech, sending/receiving of calls is disabled after speech ends.)
OFF	Normal operation (This switch is set to OFF for normal operation.)

Table 2-20. Dip switch (SW1) settings of PRI/23 card

Switch No.	Distance from the DBS 576 to the CSU		
	0 to 150 ft.	150-450 ft.	450-655 ft.
SW1-1	ON	OFF	OFF
SW1-2	OFF	ON	OFF
SW1-3	OFF	OFF	ON
SW1-4	OFF	ON	OFF
SW1-5	OFF	OFF	ON
SW1-6	OFF	ON	OFF
SW1-7	OFF	OFF	ON
SW1-8	Not used		

Table 2-21. Dip switch (SW2) settings of PRI/23 card

Switch No.	Description	
SW2-1	ON	Sets to "trunk" for T-point.
	OFF	Sets to "extension line" for S-point.
SW2-2	ON	Sets to "other mode" where 1 to 16B+D or 1 to 23B+D channels set by program can be used.
	OFF	Sets to "8ch mode" where 1 to 8B+D channels can be used.

Table 2-22. LED indications of PRI/23 card

LED indication	Description
LED1 (LINE BUSY)	Turns ON red when B channel is in use.
LED8 (SYNC)	Turns ON red when set to adstracting Network synchronizing clock.
LED3 (SLIP)	Turns ON red when SLIP abnormality is detected.
LED6 (YEL/RA1)	Turns ON red when receiving YELLOW alarm signal.
LED4 (AIS)	Turns ON red when receiving AIS signal.
LED7 (CFA)	Turns ON red during RED alarm.
LED5 (OOF)	Turns ON red when frame failure is detected.
LED2 (LOOP)	Turns ON red when data receiving failure is detected.

T1 Interface card (VB-44550)

The T1 Interface card is mounted in a flexible slot to connect the system to T1 services. By selecting the mode switch on the card, 8/16/24 channel modes can be selected, however, there are restrictions to the position of the slot to which the card is mounted. This depends on the number of accommodating channels. For details on the restrictions of the slot position, see page 2-39.

A maximum of three cards can be mounted per cabinet. When there are six cabinets, a maximum of 18 cards can be mounted.

The T1 card has an on-board lightening arrester, so that the card can be connected to the carrier trunk through a CSU (not provided).

This card requires the system sync circuit card be installed for clock synchronization.

Figure 2-23. T1 card
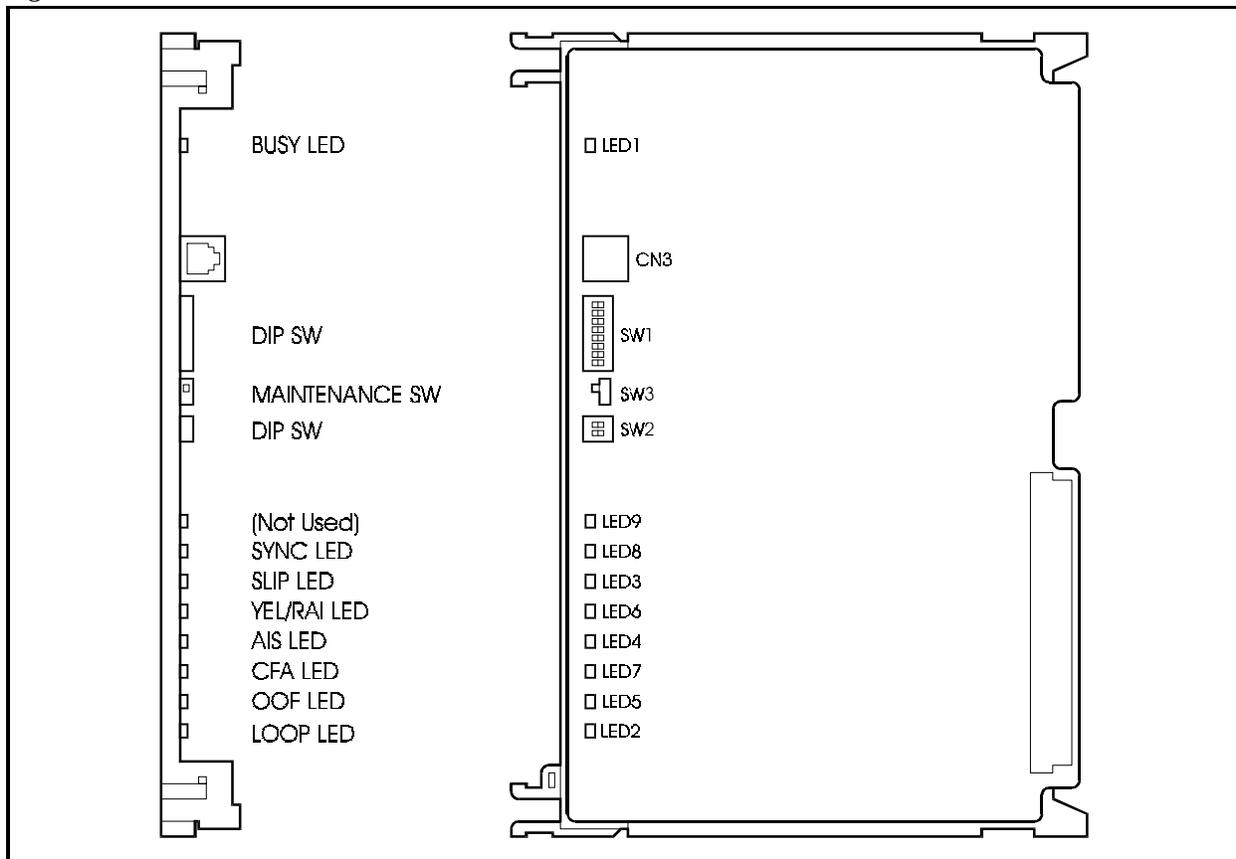
Table 2-23, Table 2-24, and Table 2-25 show the switch settings and Table 2-26 shows the LED indications.

Table 2-23. Maintenance switch (SW3) settings of T1 card

Setting	Description
ON	Card is in closed status, and can be mounted and removed when power is ON. (Sending/receiving of calls is disabled. If this is set during speech, sending/receiving of calls is disabled after speech ends.)
OFF	Normal operation (This switch is set to OFF for normal operation.)

Table 2-24. Dip switch (SW1) settings of T1 card

Switch No.	Distance from the DBS 576 to the CSU		
	0 to 150 ft.	**150-450 ft.**	**450-655 ft.**
SW1-1	ON	OFF	OFF
SW1-2	OFF	ON	OFF
SW1-3	OFF	OFF	ON
SW1-4	OFF	ON	OFF
SW1-5	OFF	OFF	ON
SW1-6	OFF	ON	OFF
SW1-7	OFF	OFF	ON
SW1-8	Not used		

Table 2-25. Dip switch (SW2) settings of T1 card

Switch No.	Description	
SW2-1	ON	Not used
	OFF	Not used
SW2-2	ON	Sets to "other mode" where 1 to 16 or 1 to 24 channels set by program can be used.
	OFF	Sets to "8ch mode" where 1 to 8 channels can be used.

Table 2-26. LED indications of T1 card

LED indication	Description
LED1 (LINE BUSY)	Turns ON red when B channel is in use.
LED8 (SYNC)	Turns ON red when set to adstracting Network synchronizing clock.
LED3 (SLIP)	Turns ON red when SLIP abnormality is detected.
LED6 (YEL/RA1)	Turns ON red when receiving YELLOW alarm signal.
LED4 (AIS)	Turns ON red when receiving AIS signal.
LED7 (CFA)	Turns ON red during RED alarm.
LED5 (OOF)	Turns ON red when frame failure is detected.
LED2 (LOOP)	Turns ON red when data receiving failure is detected.

DEC/8 card (VB-44610): Digital Extension Card

The DEC/8 card is an interface accommodating card for digital key telephones (1B+D: 64 kbps + 16 kbps).

The DEC/8 card is mounted in a flexible slot to connect digital extension line terminals (1B+D: digital multi-function telephones and DSS). This card accommodates an on-board 8-circuit extension port interface. The connection format is 2-wire non-polarized home run (star) wiring.

The major specifications on wiring are as follows:

- Supply voltage and current to telephone terminal: maximum +24V/200mA
- Allowable wiring distance: maximum 40 ohms with loop to terminal
- Maximum 20 Ohms with loop to DSS/72, EM/24, and Voice Recognition Telephone.

Figure 2-24. DEC/8 card
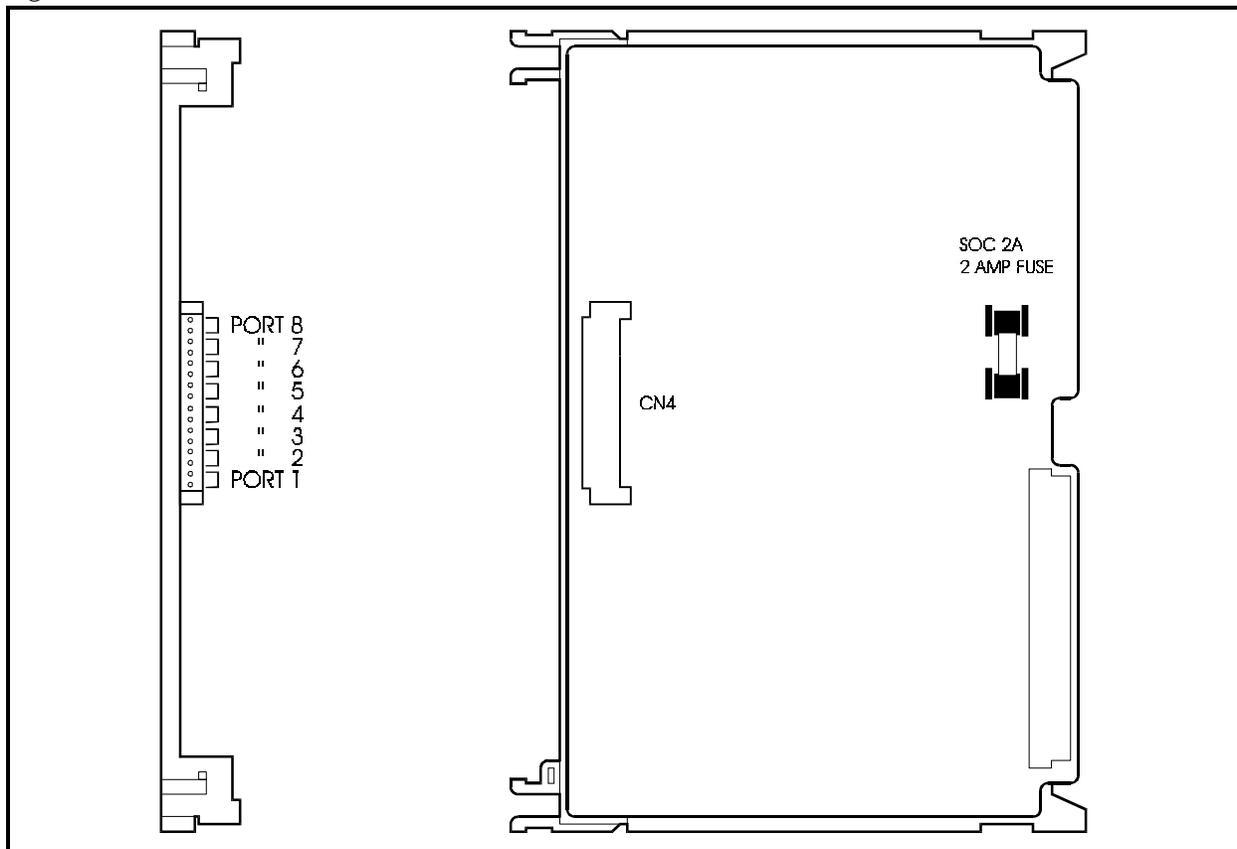
AEC/8 card (VB-44620): Analog Extension Card

The AEC/8 card is an extension line interface accommodating unit for standard telephones (SLT). The AEC/8 card is mounted on a flexible slot to connect a standard telephone (SLT) to the system.

The AEC/8 card has an 8-circuit analog extension line interface, and provides such functions as call signals from a standard SLT, detection of dialing (10 pps/DTMF) and speech.

The supply voltage to a standard SLT is +24V, and a ringer circuit is built-in.

The duration of one callup signal from the built-in ringer circuit is a maximum one second. Control is in three phases when eight trunks are simultaneously called up: the first phase for the first to third circuits, the second phase for the fourth to sixth circuit, and the third phase for the seventh and eighth circuits.

The major specifications on wiring are as follows:

- Supply voltage/current for speech path: +24 V/25mA or more
- Loop resistance: 100 Ohms or less
- Ringer signal frequency: 20Hz rectangular wave
- REN: 2
- CPC (Positive AEC Disconnect) control possible
- Ring trip detection possible

Figure 3-25. AEC/8 card
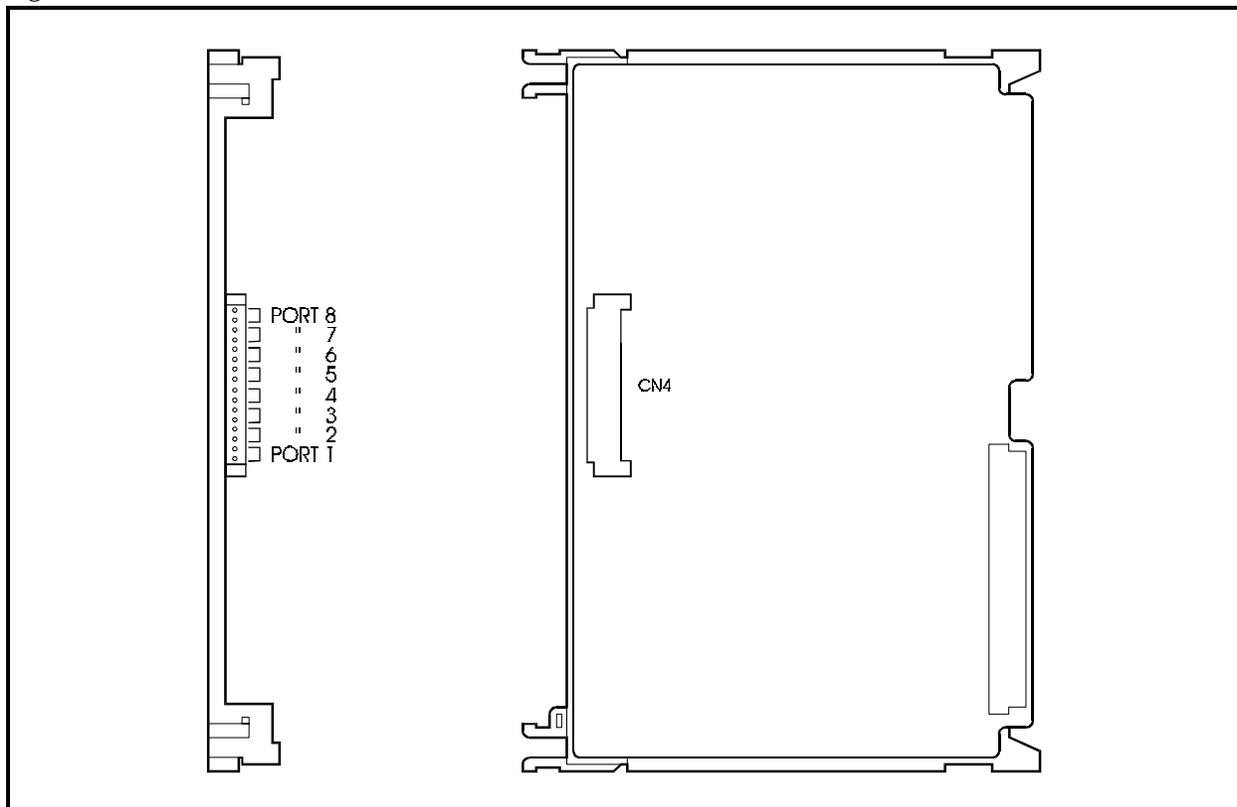
SBRI/4 card (VB-44630): BRI Card (S-point)

The SBRI/4 card is a basic interface (2B+D: 192Kbps) accommodating card for S-point IDSN.

The SBRI/4 card is mounted on a flexible slot to accommodate terminal extension lines of the basic user network interface of an ISDN terminal.

The system supplies +40V to the ISDN terminal which is mounted for extension lines.

The SBRI/4 card has an on-board 4-circuit S-point ISDN basic interface, and a lightening arrester.

Figure 3-26. SBRI/4 card
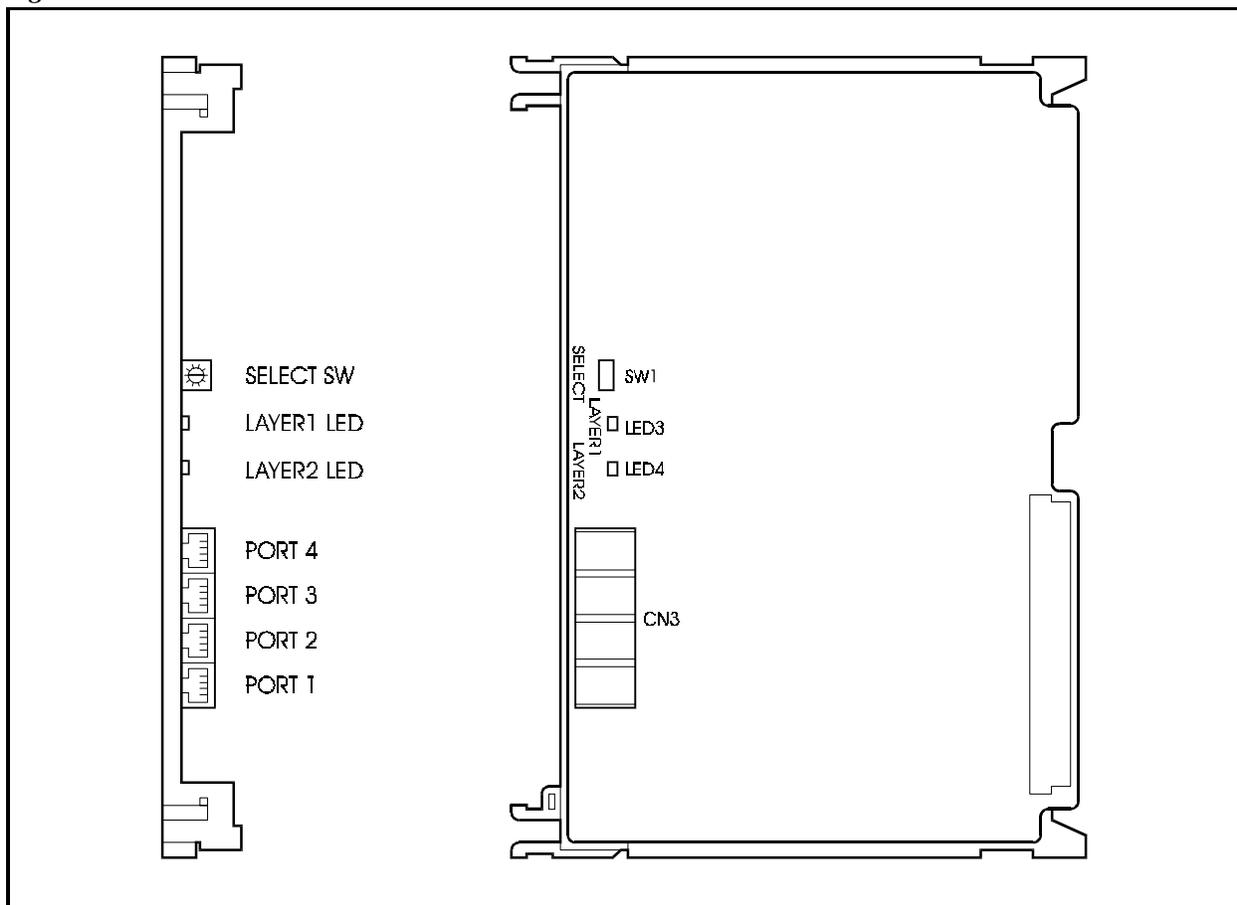
Table 2-27 and Table 2-28 show the switch settings and LED indications.

Table 2-27. Settings of circuit selection switch of SBRI/4 card

Switch Position	LED Indication
0	OFF (default setting when unit is shipped)
1	1st interface condition displayed by LAYER1 LED and LAYER2 LED
2	2nd interface condition displayed by LAYER1 LED and LAYER2 LED
3	3rd interface condition displayed by LAYER1 LED and LAYER2 LED
4	4th interface condition displayed by LAYER1 LED and LAYER2 LED
5 to 0	Not available

Table 2-28. LED indications of SBRI/4 card

LED indication	Description
LED3 (LAYER1)	Turns ON when synchronization is established
LED4 (LAYER2)	Turns ON when DL is established

MFR/8 card (VB-44110): 8 DTMF Receiver Card

The MFR/8 card is a receiving circuit accommodating card for DTMF signals.

The MFR/8 card is mounted in an option slot or flexible slot to receive DTMF signals which are sent from a standard telephone (SLT) to an extension line. The MFR/8 card also can receive DTMF signals sent from a trunk.

The MFR/8 card provides an on-board 8-circuit DTMF receiver circuit. Only one card can be mounted for each cabinet. Table 2-29 shows the relationship between the number of system ports and the maximum number of DTMF cards.

Table 2-29. Mounting restriction of MFR/8 card

Port number	96 to 192	192 to 288	288 to 384	384 to 480	480 to 576
Maximum number of cards	2	3	4	5	6

Figure 3-27. MFR/8 card
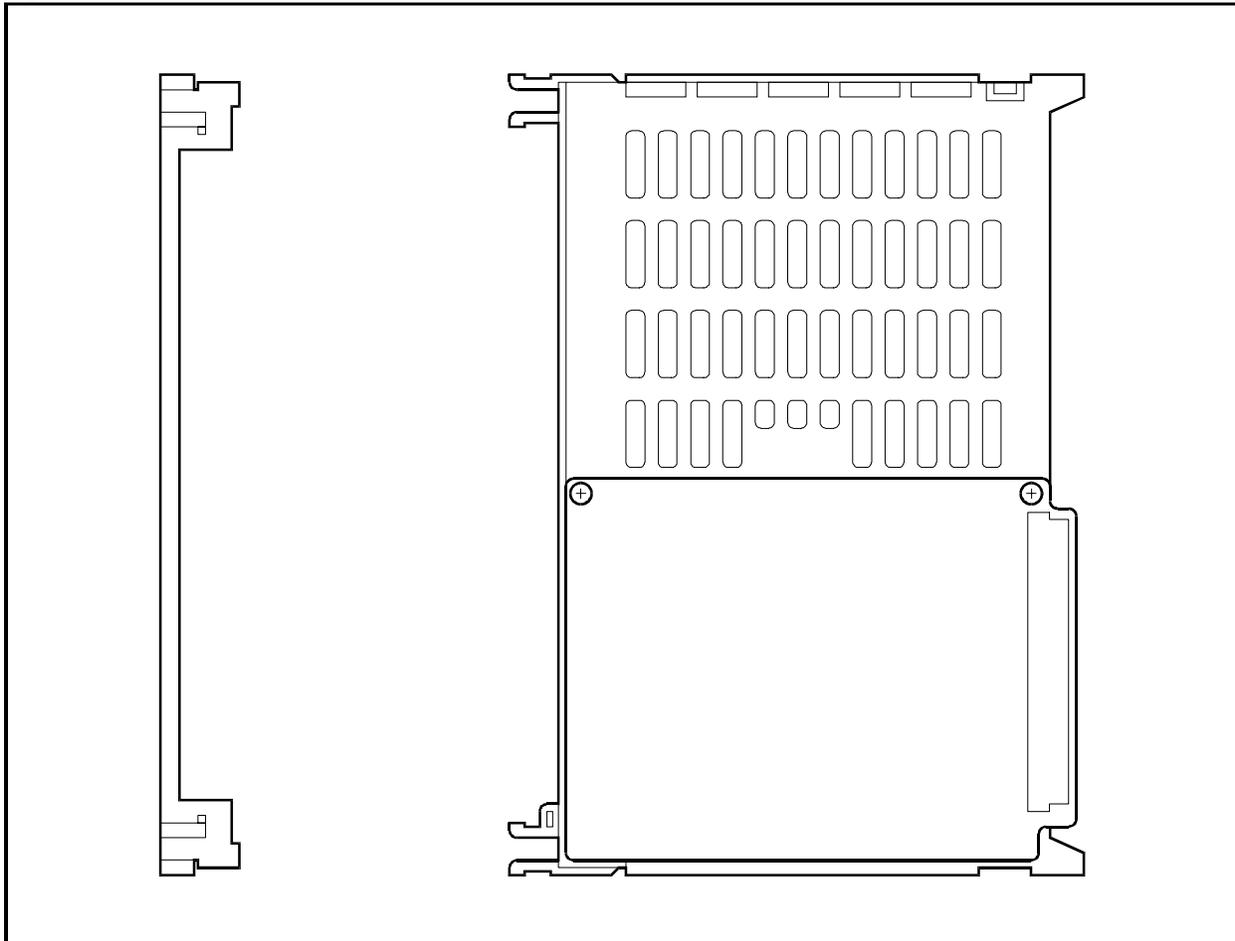
CONF card (VB-44120): Conference Card

The CONF card is a conference speech card.

The CONF card is mounted in a flexible slot to support two eight-party conferences.

Figure 3-28. CONF card
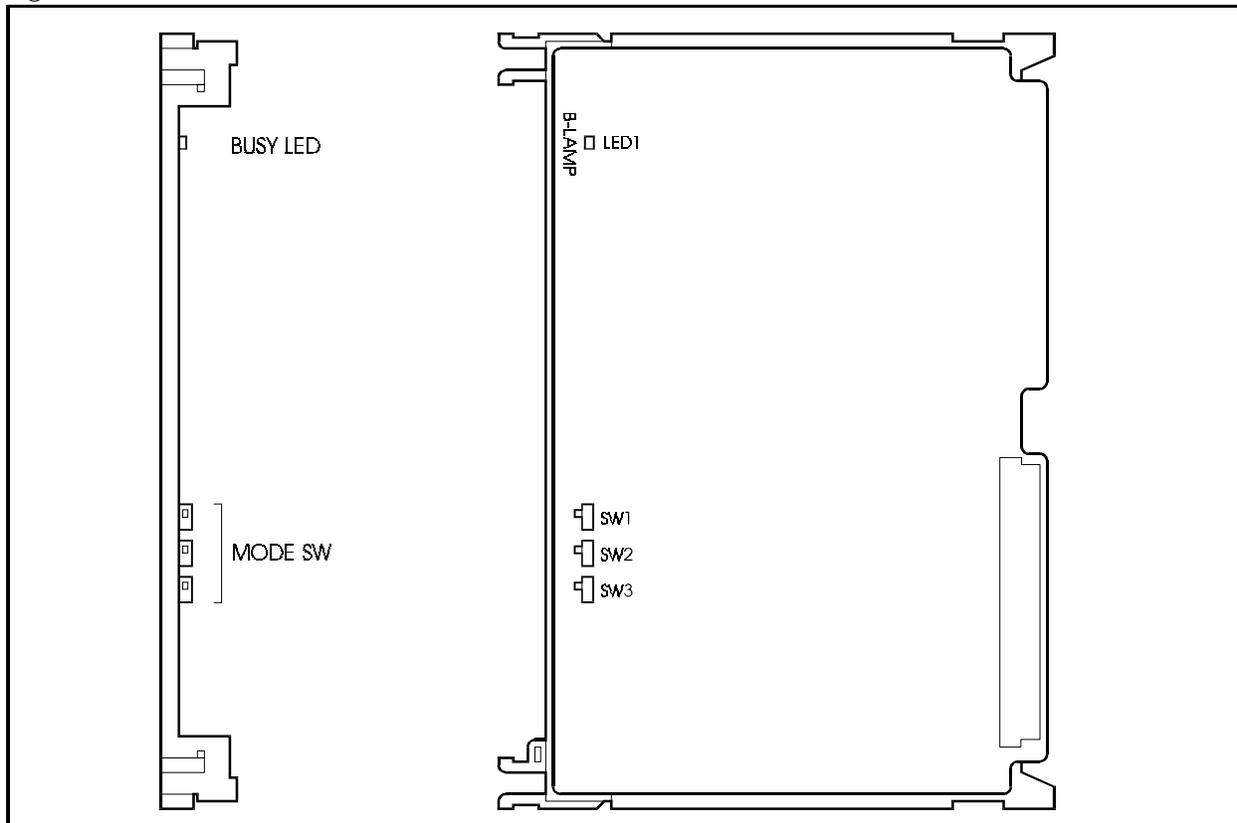
⚠ **CAUTION:**
  • Don't change the switches on the CONF card from the default setting.
    SW1, SW2 and SW3 must be set "OFF".
    Otherwise, the mounting slot position of the CONF card and other cards
    are restricted.

ACD card (VB-44140): ACD card

The ACD card is an Automatic Call Distribution (ACD) card which is mounted in the main cabinet.

By using the ACD card with one VPU/4 card (VB-44160), simplified ACD functions such as the incoming call distributing function and processed call number information for each terminal can be supported.

MIS reports may be sent output through an RS-232C port to either a printer or PC computer. This port is mounted in the ACD unit. This port requires a dedicated RS-232C cable.

Only one ACD card can be mounted for each cabinet. A maximum of two ACD cards may be used in a system.

The ACD card option and the build in voice mail option cannot be installed in the same cabinet.

For more information on the ACD card installation and the ACD option in general, see *Section 520 - ACD Reference*.

Figure 3-29. ACD card
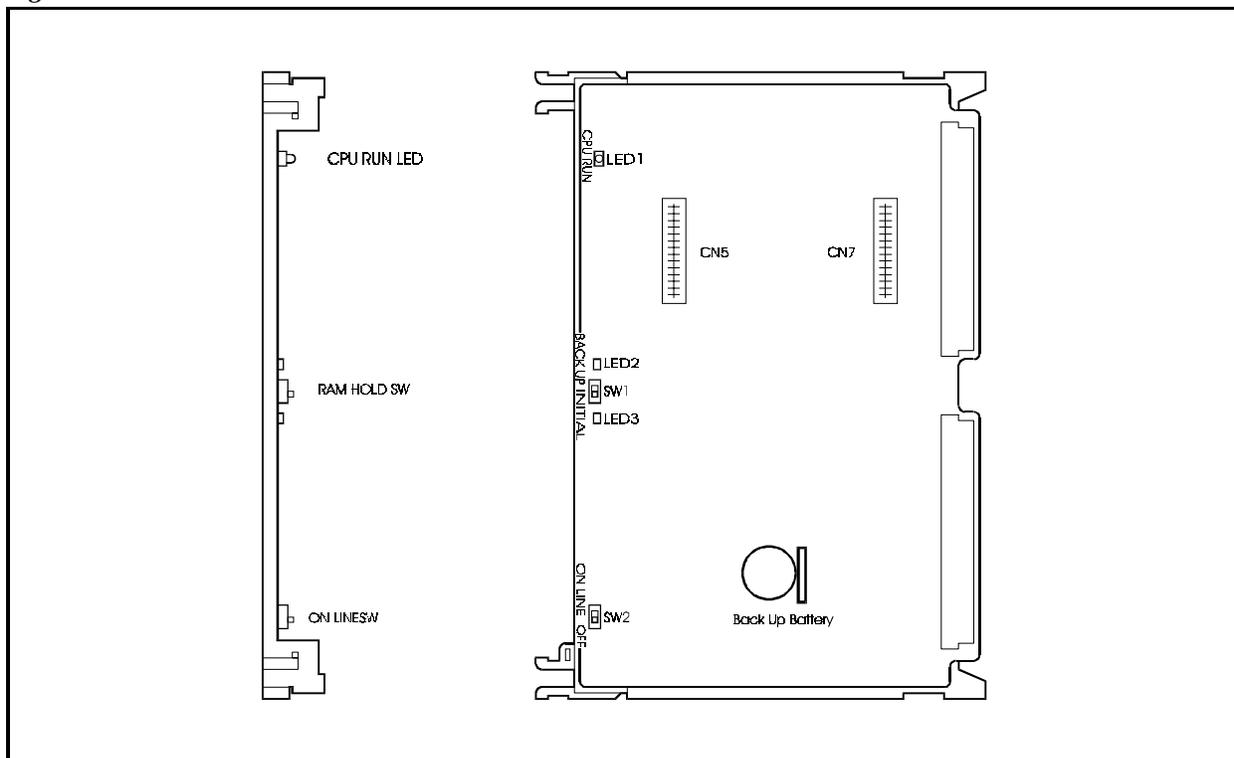
The following tables show the switch settings and LED indications.

Table 2-30. ACD Card Switch Settings

Switch No.	Setting	Description
SW1	BACK UP	Set when retaining RAM data.
	INITIAL	Set when clearing RAM data.
SW2	ON LINE	Normal operation (set to ON LINE during regular operation)
	OFF LINE	Not used.

Table 2-31. ACD Card LED Indications

LED Display	Description
LED1 (CPU RUN)	Blinks when the CPU is in operation.

VPU/4 card (VB-44160): 4-voice Processing card

The VPU/4 card can support simplified voice mail functions by using this card with the VSSC card (VB-44170). This card can also be used as a voice processing card for ACD when combined with the ACD card (VB-44140).

Two types of VPU cards are available; the VPU/8 card and the VPU/4 (VB-44150). The VPU/8 provides 8 voice paths to the voice mail system while the VPU provides 4 voice paths. Up to two VPUs of any type may be installed along with a VSSC card in a single cabinet to support built-in voice mail.

The VPU/4 card and ACD card (VB-44140) may be installed together in a single cabinet to support ACD.

Figure 3-30. VPU/4 card
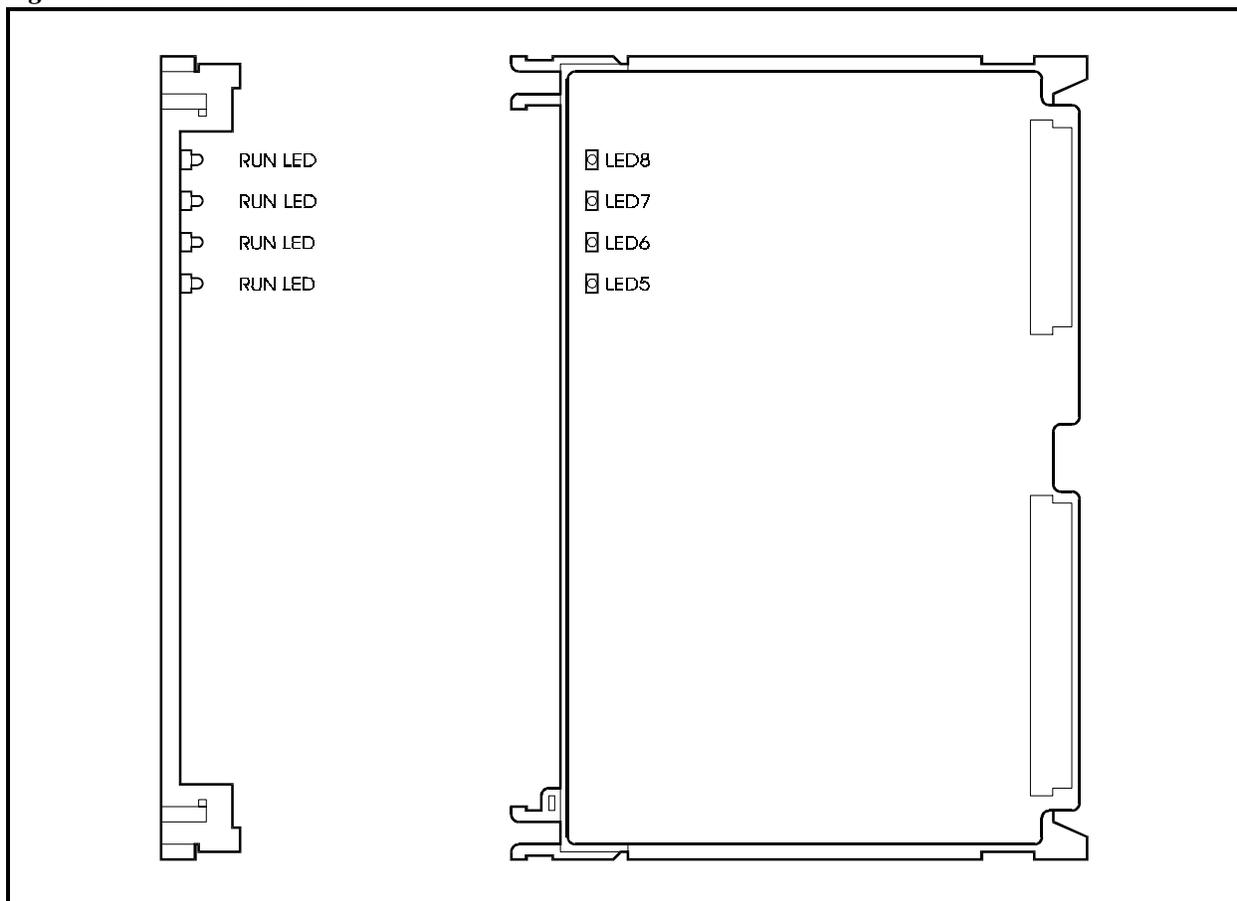
The following table describes LED indications.

Table 2-32. VPU/4 Card LED Indication

LED Display	Description
LED1-LED4 (RUN)	Blinks when the CPU is in operation.

VPU/8 card (VB-44150): 8-voice Processing card

The VPU/8 card is a voice processing card for voice mail (two-way), and is mounted in the main cabinet.

Two types of VPU cards are available; the VPU/8 and the VPU/4 (VB-44150). The VPU/8 provides 8 voice paths to the voice mail system while the VPU provides 4 voice paths. Up to two VPUs of any type may be installed in a single cabinet and must be combined with the VSSC card (VB-44170) to support voice mail.

The VPU/8 card cannot be used with the ACD card (VB-44140).

Figure 3-31. VPU/8 card
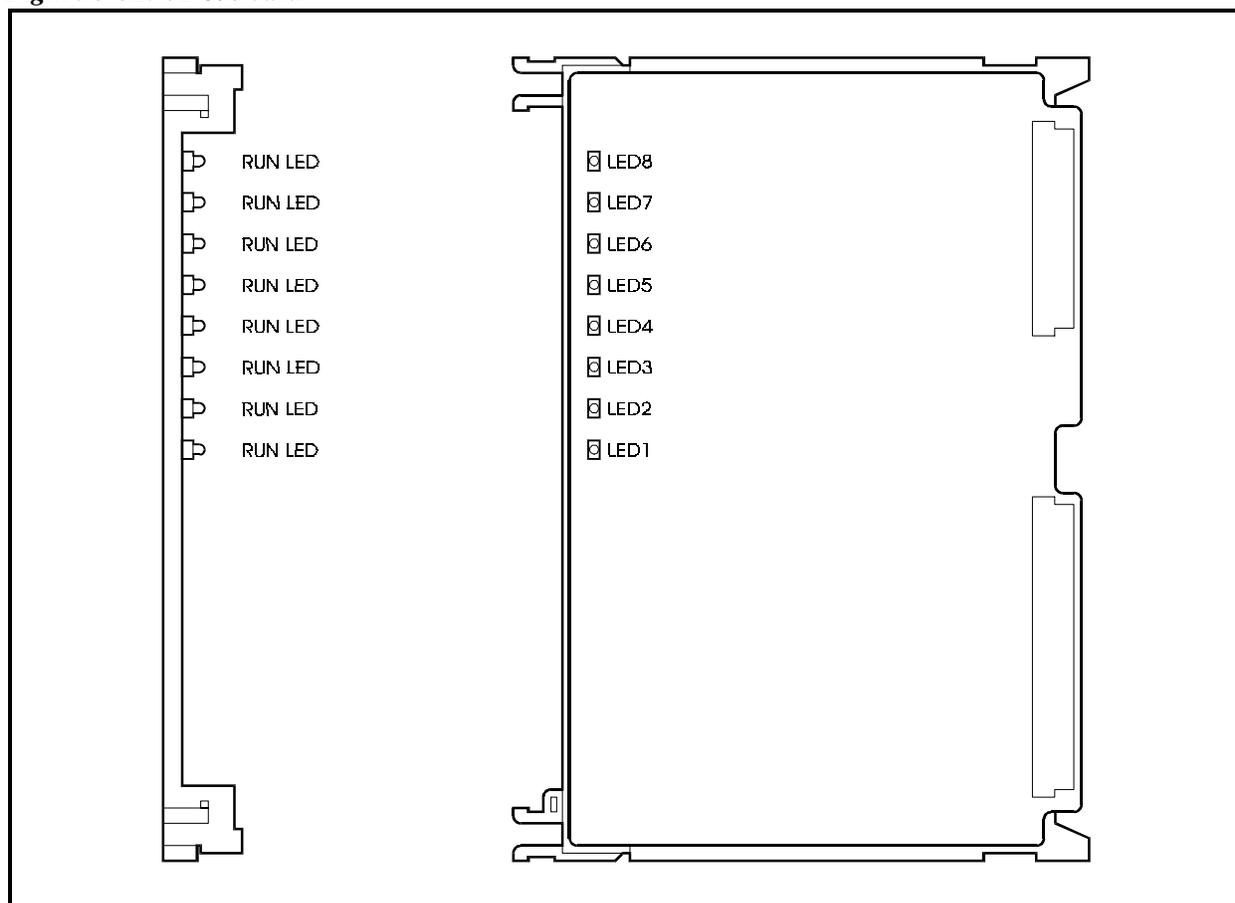
The following table describes LED indications.

Table 2-33. VPU/8 Card LED Indication

LED Display	Description
LED1-LED8 (RUN)	Blinks when the CPU is in operation.

VSSC card (VB-44170): Voice Storage Service card

The VSSC card is a voice storage card for built-in voice mail (two-way), and is mounted in the main cabinet.

The VSSC card provides a hard disk to store voice data of voice mail. This card must be combined with one or two VPU cards (VPU/8 card and/or VPU/4 card).

Only one VSSC card can be mounted in each cabinet.

This card must be installed into FS11. FS 12 must be left vacant. A maximum of four VSSC cards can be mounted in a single system..

The VSSC card and the ACD card (VB-44140) cannot be used together in the same cabinet.

For more information on the Built-in voice mail option, see *Section 510 - Built-In Voice Mail Reference Manual.*

Figure 3-32. VSSC card
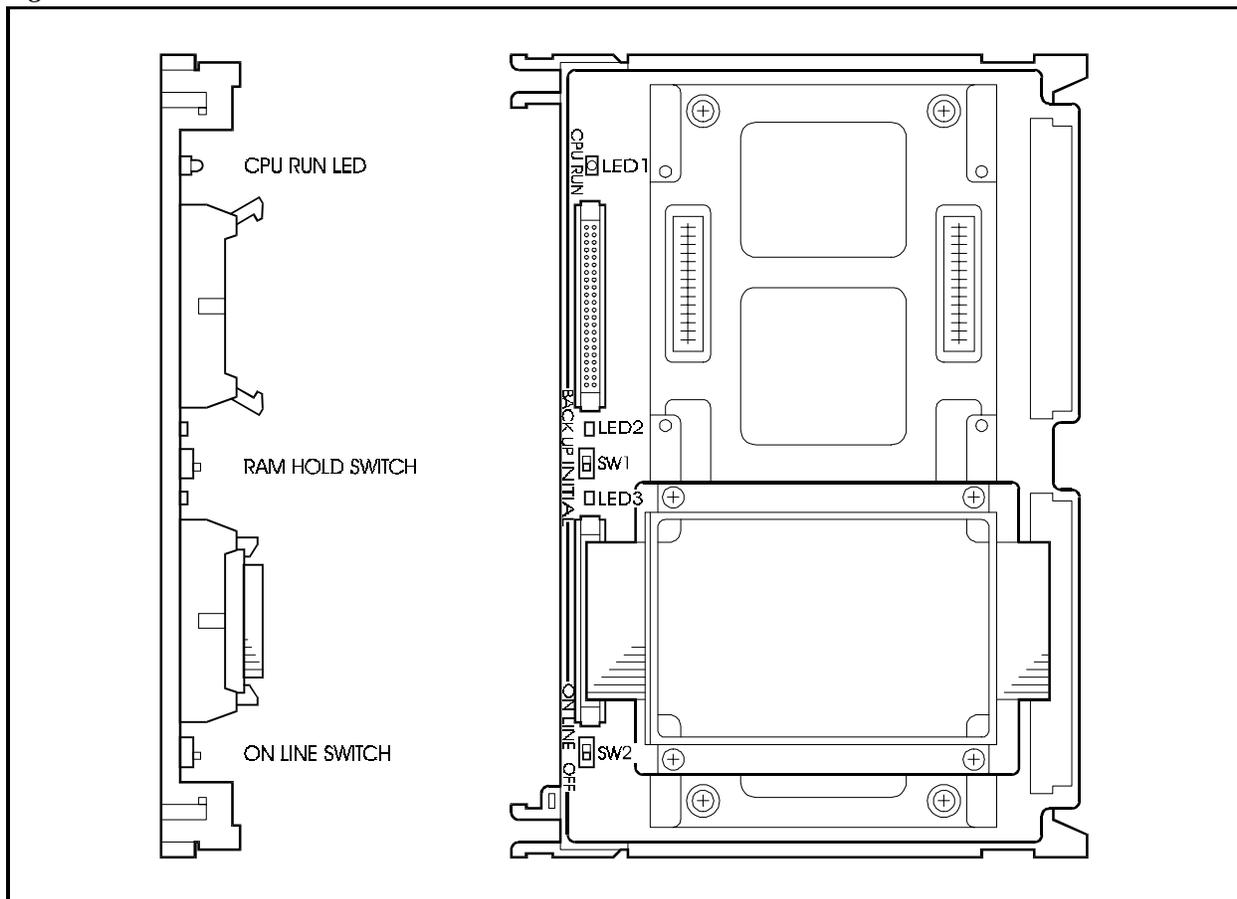
The following tables show the switch settings and LED indications.

Note: The Hard Disk Drive and the back up battery must be replaced every three years.

Table 2-34. VSSC Card Switch Settings

Switch No.	Setting	Description
SW1	BACK UP	Set when retaining RAM data.
	INITIAL	Set when clearing RAM data.
SW2	ON LINE	Normal operation (set to ON LINE during regular operation)
	OFF LINE	Set when replacing the HDD system.

Table 2-35. VSSC Card LED Indications

LED Display	Description
LED1 (CPU RUN)	Blinks when the CPU is in operation.
LED2	Not used.
LED3	Not used.

API card (VB-44131)

The API card is an interface card for applications such as voice mail and ACD.

The external interface is an RS-232C port (maximum 19200 bps).

Only one API card can be mounted for each system. This sheet is mounted to on option slot (OP1 or OP2) or on an expansion slot (FS1 to FS12).

Figure 3-33. API card
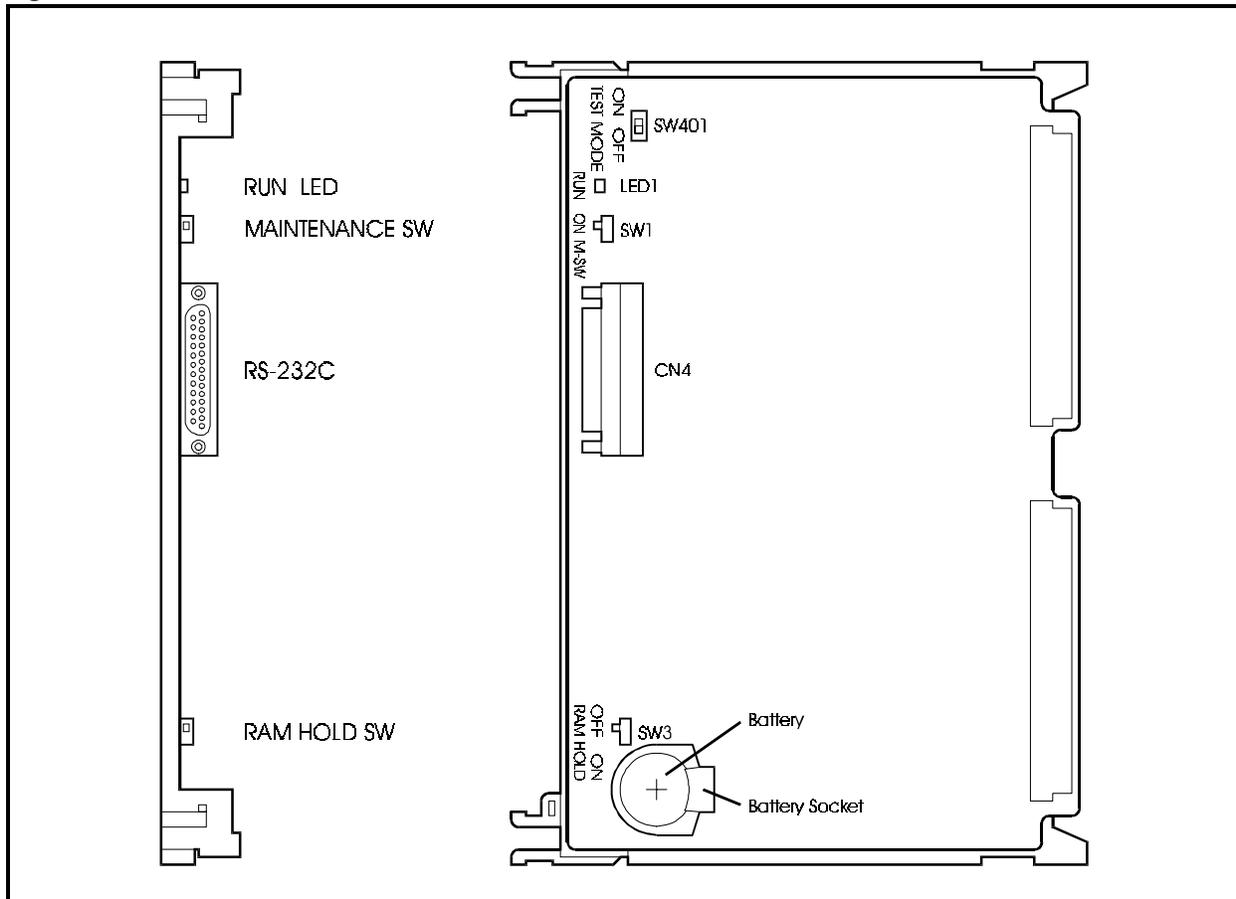
Tables 2-21 to 2-23 show the switch settings and LED indications.

Table 2-36. Maintenance switch (SW1) settings of API card

Setting	Description
ON (top)	Card is closed and can be mounted and removed when power is ON. (Sending/ receiving of calls is disabled. If this is set during speech, sending/receiving of calls is disabled after speech ends.)
OFF (bottom)	Normal operation (This switch is set to OFF for normal operation.)

Table 2-37. Internal diagnosis switch (SW2) settings of API card

Setting	Description
ON (top)	Normal operation (This switch is set to ON for normal operation.)
OFF (bottom)	Normal operation (This switch is set to OFF for normal operation.)

Table 2-38. Memory backup switch (SW3) settings of API card

Setting	Description
ON (top)	Self-diagnosis API card
OFF (bottom)	Can delete memory data of API card.

Table 2-39. LED indications of API card

LED indication	Description
LED1 (RUN)	Flashes green when LPU is operating.

Chapter 3. Cabinet Installation

This chapter explains how to prepare for a single cabinet installation, how to remove and replace the cabinet cover, install the battery and install cards.

Installation Location

Guidelines

• Before deciding where to install the single base cabinet, check the external dimensions shown below, the area required for maintenance, and the "Environmental Conditions" described in Chapter 1 (page 1-4).

Figure 3-1. Single base cabinet dimensions and maintenance area

Notes: o   Hatched area ▬ indicates the area that should be provided for maintenance.

           o   The dimensions shown in parenthesis indicate the dimensions required when the MDF interface cable is wired from the right of the cabinet.
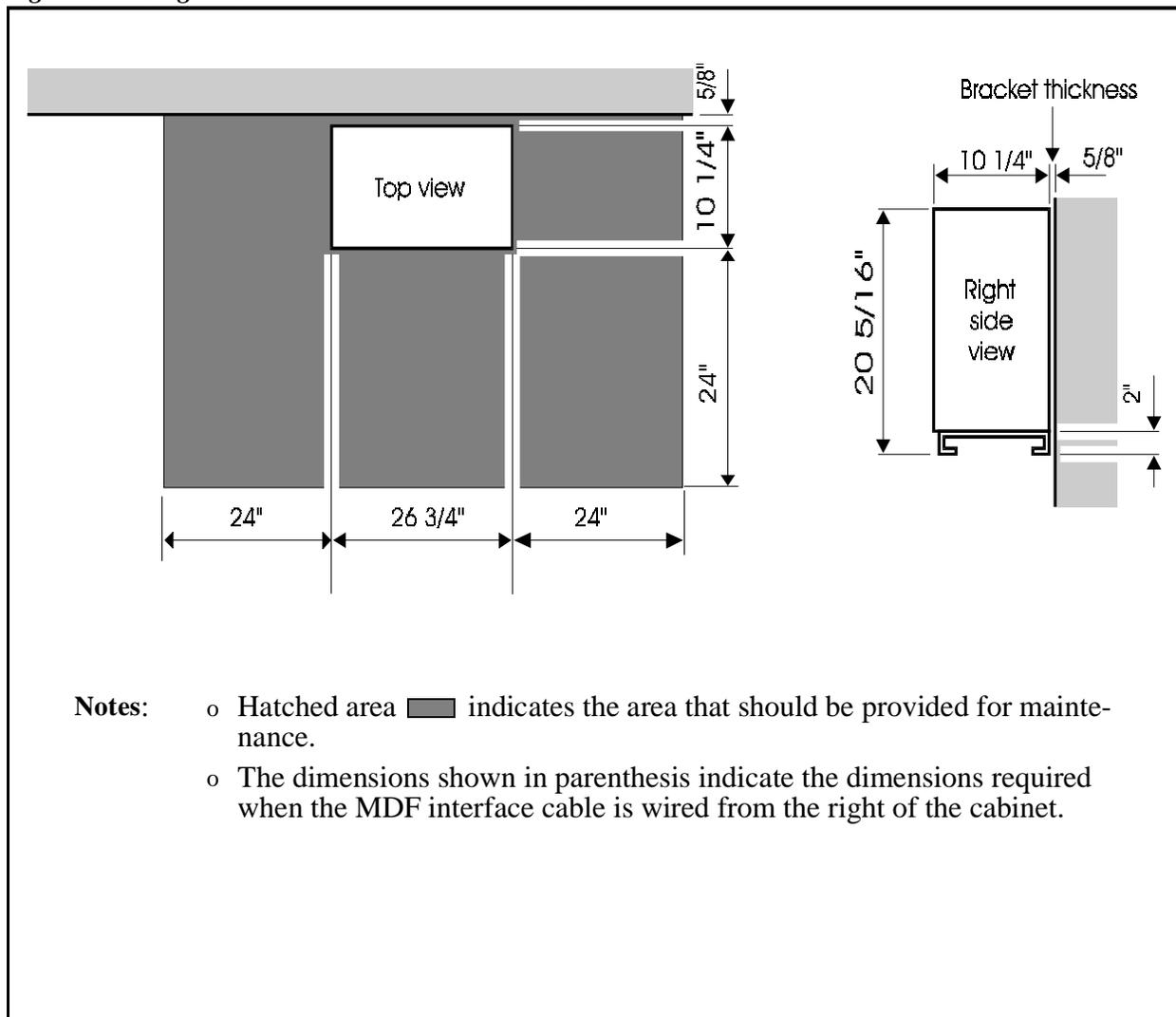
Removing and Replacing Covers

Guidelines

⚠️ **CAUTION:**
- Turn the power switch and the external breaker OFF, and disconnect the AC cable before removing any covers.

- Both left and right side covers can be removed. The following describes how to install and remove the left side cover. The identical procedure can be used for the right side cover.

- Replace the respective covers after the installation work has been completed.

Front Cover

Installation

Removing the front cover

1. Remove the four screws from the front cover.

2. Pull the bottom of the front cover out by about 3/4".

   Note: Do not exert excessive force when pulling out the bottom of the front cover as doing so may distort the claw slots.

3. Gently lift the cover off by sliding it up and away.

Replacing the front cover

1. Hook the front cover onto the front cover mounting claws of the cabinet.

2. Secure the four screws.

Figure 3-2. Removing and replacing front cover of base cabinet
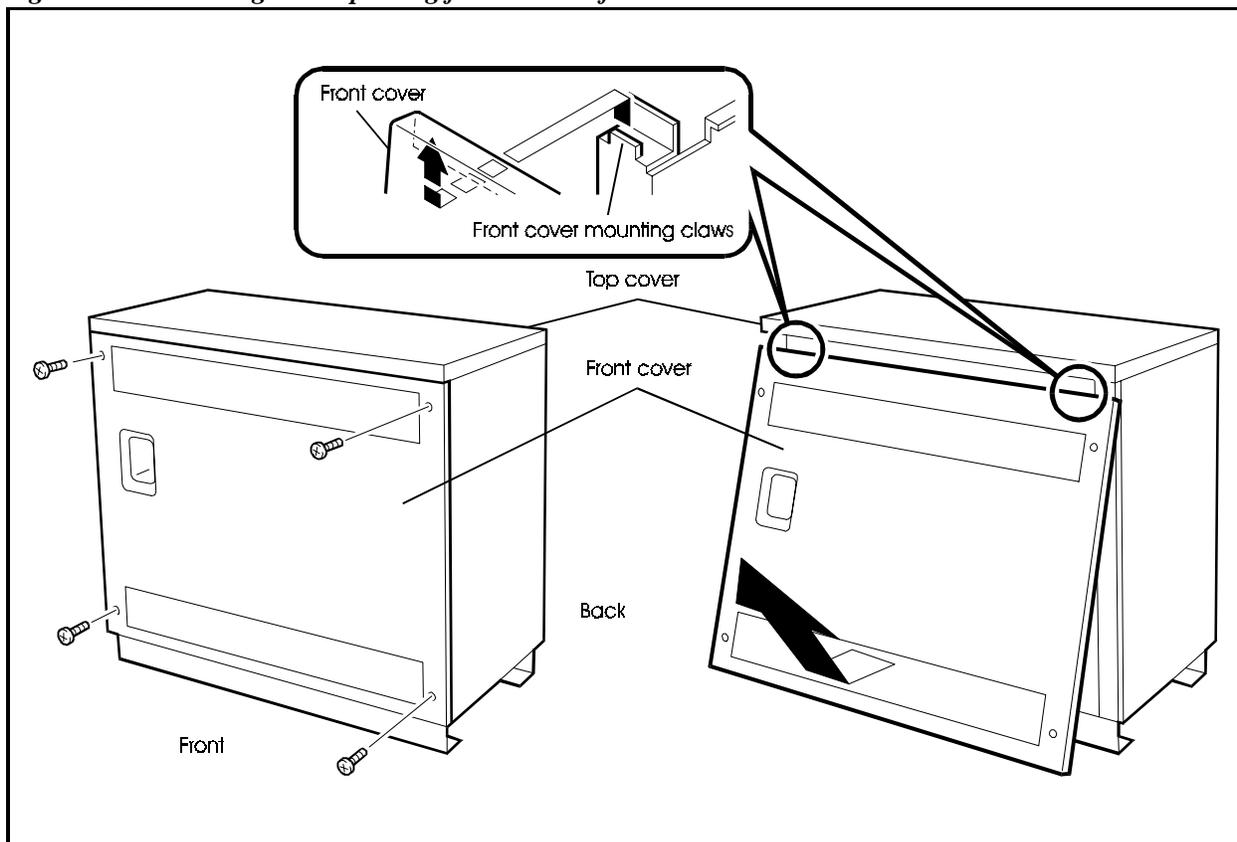
Side cover

Installation

Removing the side cover

Note: The front cover must be removed before the side cover may be removed.

1. Remove the two screws from the side cover.

2. Open the edge (with the screws) of the cover about 1".

Note: Do not exert excessive force when pulling out the side cover as doing so may damage the claw slots.

3. Gently lift the cover off by sliding it forwards.

Replacing the side cover

1. Hook the side cover onto the top and bottom side cover mounting claws of the cabinet.

2. Secure the two screws.

Figure 3-3. Removing and replacing side cover of base cabinet
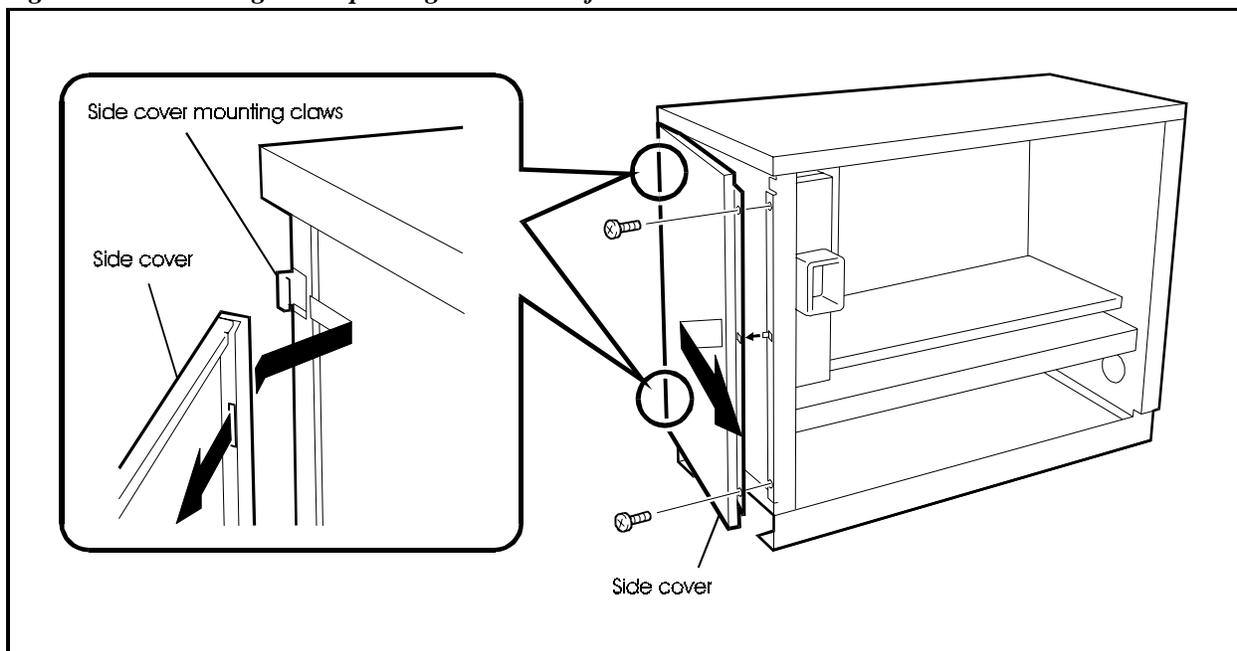
Top Cover (Base Cabinet Only)

Installation

Removing the top cover

Note: The front cover must be removed before the top cover may be removed.

1. Remove the two screws from the top cover.

2. Pull the top cover out about 2".

Note: Do not exert excessive force when pulling the top cover as doing so may damage the claw slots.

3. Gently lift the top cover off by sliding it up and forwards.

Replacing the top cover

1. Hook the top cover onto the top cover mounting claws of the cabinet.

2. Secure the two screws.

Figure 3-4. Removing and replacing top cover of Base Cabinet
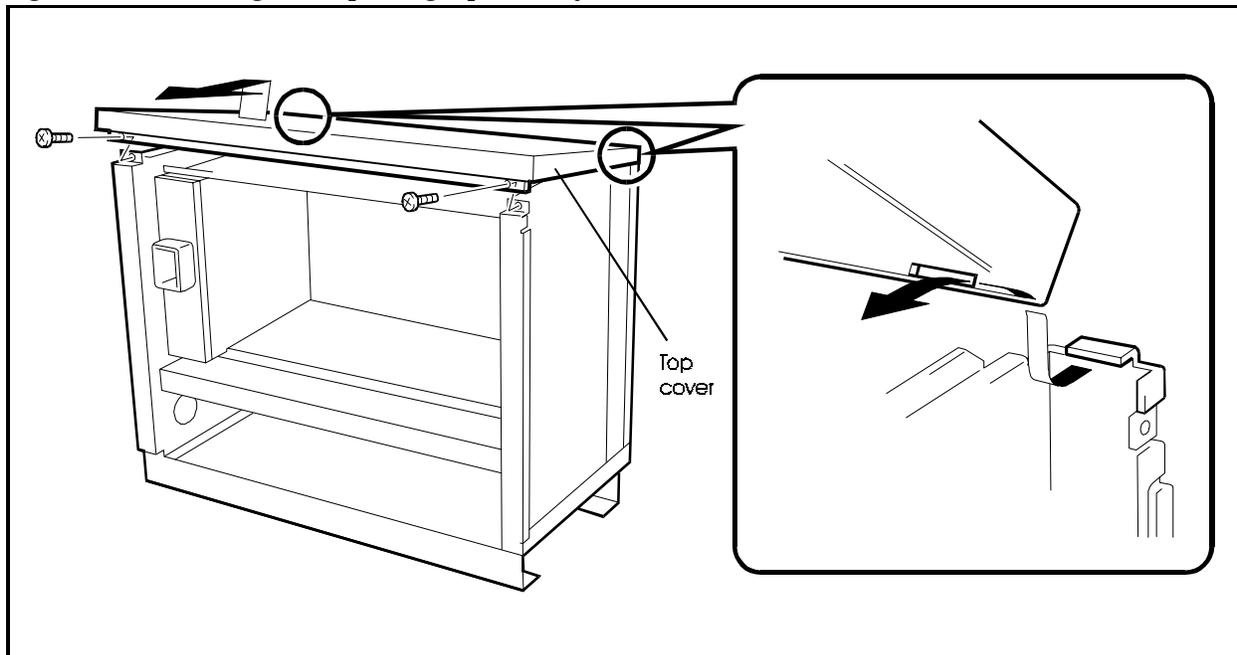
Cabinet Installation

Guidelines

⚠

CAUTION:
- Turn the power switch OFF, and make certain the AC cable is disconnected before installing the cabinet.
- Handle the cabinet carefully to avoid damage.
- Do not attempt to move the cabinet without assistance.
- The cabinet is heavy and should be secured to a wall so that it does not topple in the event of earthquake, etc.
- Remove all cabinet covers before installation (see page 3-2).

- If you are installing two or more cabinets, refer to Chapter 4, "Installing Additional cabinets" (page 4-1).

Floor Mounting Installation

1. Drill 4 holes in the floor for bolt anchors.

Note: Check the positions of the 4 bolt holes in the bottom of the cabinet, shown in Figure 3-1, before drilling the holes.

2. Bolt the cabinet to the anchors in the floor through the bolt holes in the bottom frame.

Figure 3-5. Securing the cabinet to the floor (base cabinet shown)
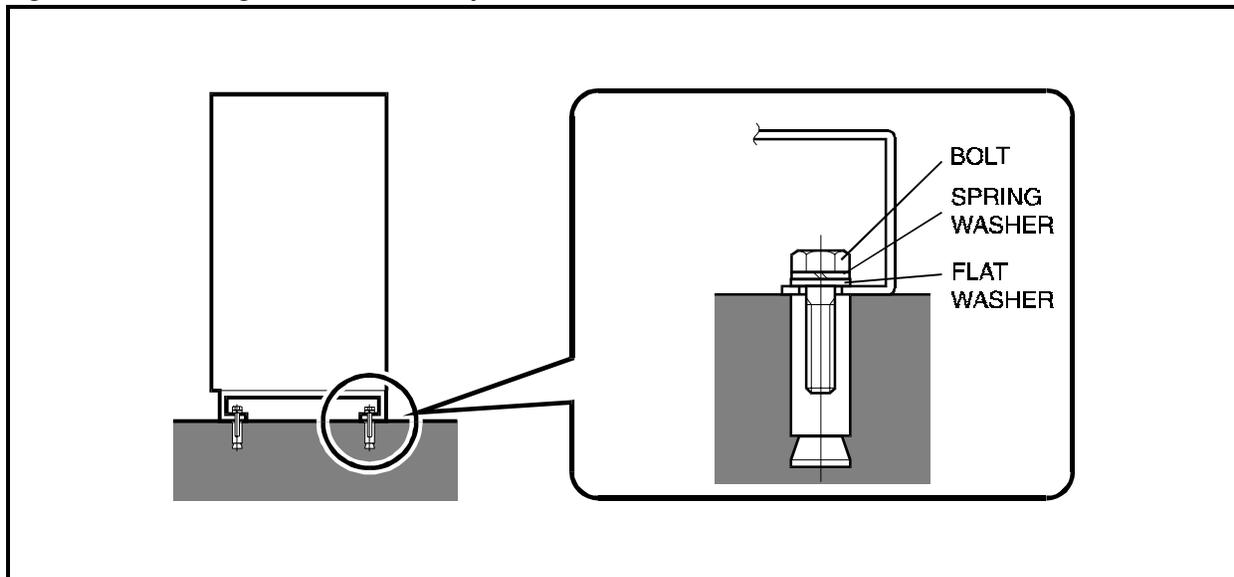
Wall Mounting Installation

Prior to mounting the DBS 576 to the wall, the plywood mounting backboard must be prepared as follows:

- Use 1/2" or larger plywood sized for the complete DBS 576 system.

- Secure the board to the wall with at least four #10 1 3/4" sheet metal screws for a single cabinet system. Each screw must be installed to the metal studs.

- Two or more additional screws should be installed into the metal studs for each additional cabinet to support the additional weight.

Figure 3-6. Cabinet plywood mounting backboard
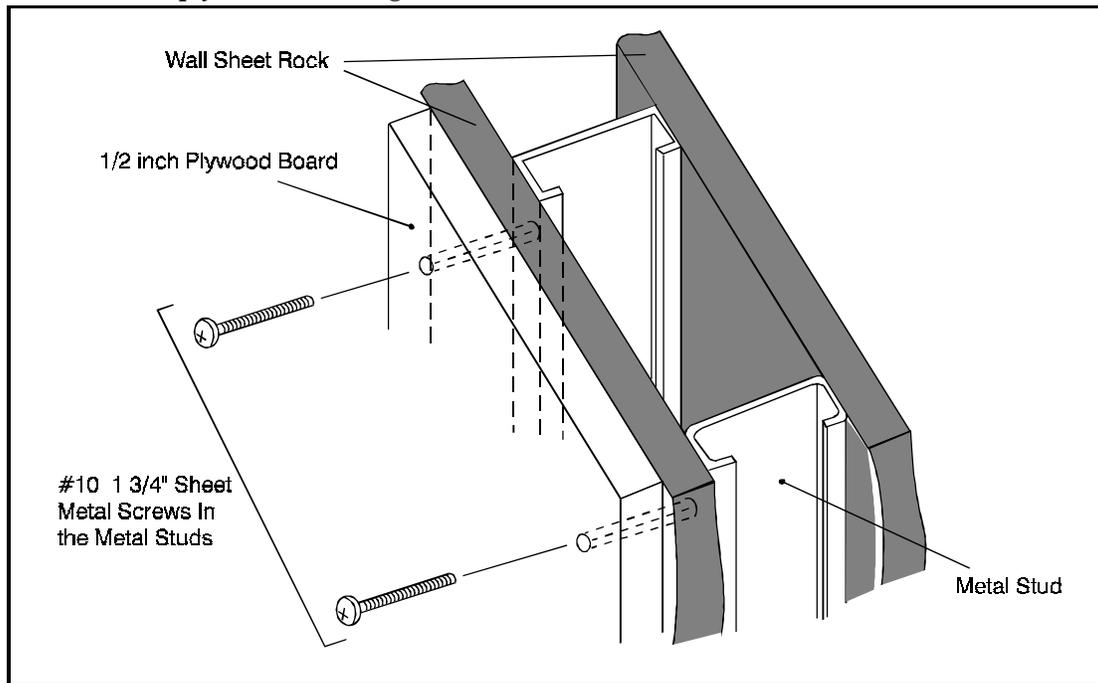
1. Attach wall-mounting brackets on the rear of the cabinet as shown in the figure below.

Figure 3-7. Wall-mounting Installation: Attaching the Wall-mounting Bracket
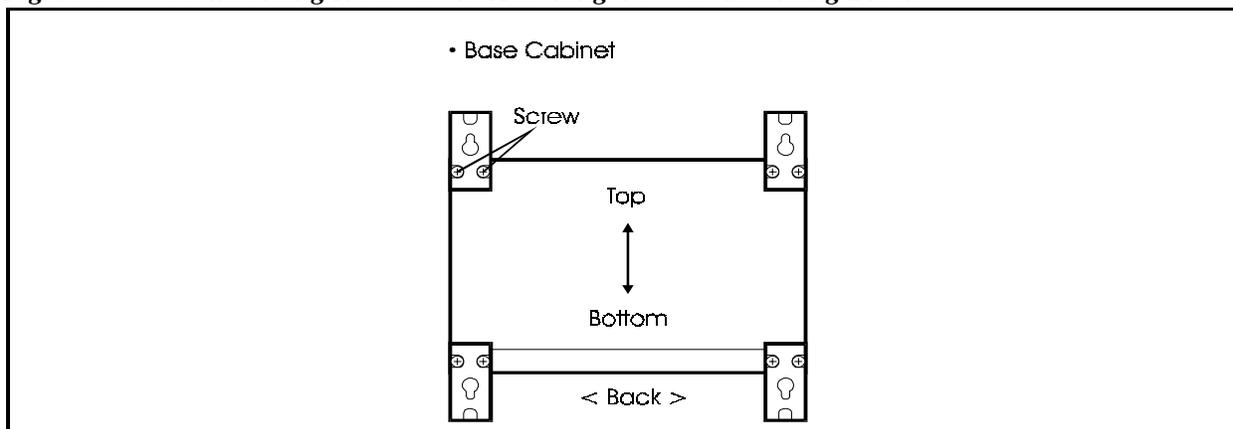
2. Temporarily fasten the 4 wall-mounting screws (#10 flat head recommended) to the wall.

3. Lift up the Base cabinet, and hook it onto the 4 screws that are temporarily fastening the wall-mounting angle.bracket.

4. Completely tighten the temporarily fastened screws.

Figure 3-8. Wall-mounting Installation: Attaching the Wall-mounting of cabinet-1
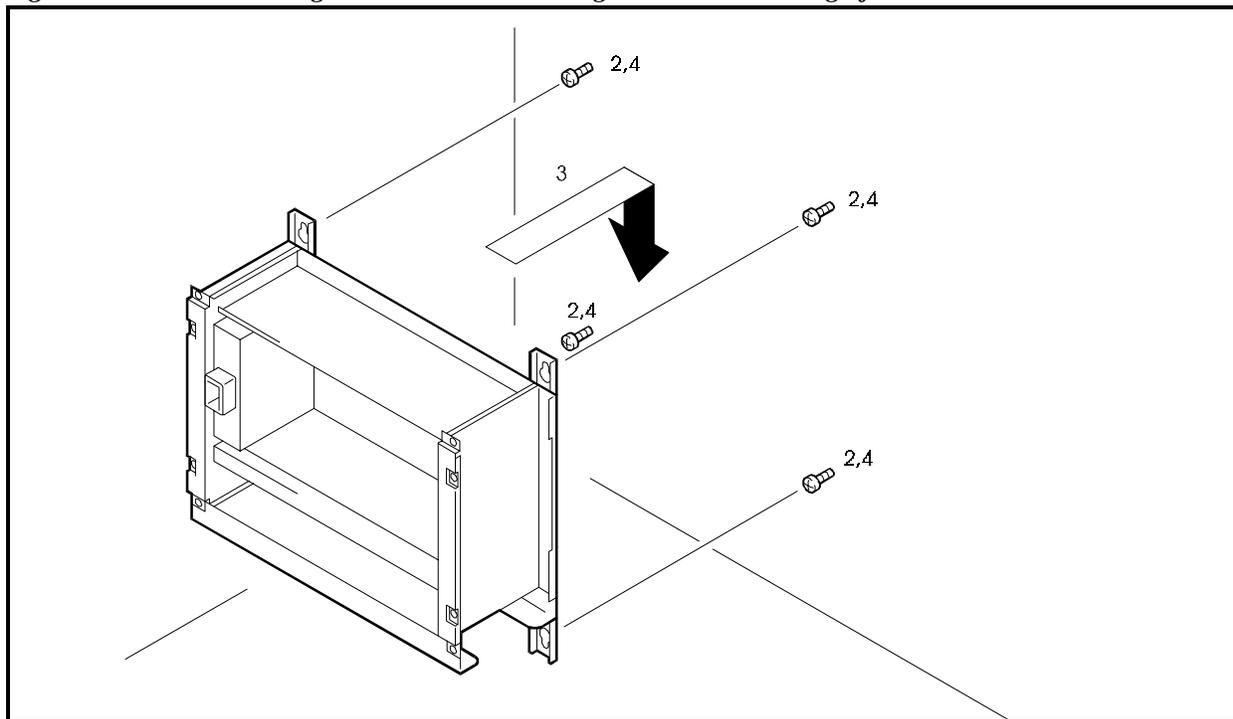
Grounding

Guidelines

⚠️ **CAUTION:**
   • Turn the power switch OFF, and make certain the AC cable is not plug in before grounding the cabinet.
   • Be sure to attach an EMI filter to the AC cable to reduce EMI interference.
   • For safety reasons, the DBS 576 must remain grounded at all times. This ground may be either via the power supply ground or the attached ground lead.

• The service ground cable must be 14 AWG minimum. It is recommend that the ground cable at least 12 AWG (stranded).

• Resistance to ground must be 10 Ohms or less.

Installation

1. Connect the Frame Ground terminal on the top of the front panel of the power supply unit to the cabinet chassis using a grounding wire.

2. Connect the base cabinet chassis to the building service ground using a grounding wire.

3. Connect the AC cable or Ground cable to the cabinet chassis.

4. Install an EMI filter on the AC cable.

Figure 3-9. Grounding the Master Cabinet

Battery Backup (VB-44025)

Guidelines

⚠ **CAUTION:**
- Turn the power switch and the external breaker OFF, and disconnect the AC cable before installing the backup battery.
- Carefully note the polarity of the batteries to prevent shorting.

- When installing batteries for battery backup, **each cabinet** must have a separate set of batteries.

- The battery cable must be at least 18 AWG.

- With normal condition, the backup batteries last for about 20 minutes.

- The backup batteries should be replaced about every 3 years.

♲ RECYCLE	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.

Installation

1. Connect the red +24V cable to the **+** terminal of battery B.

2. Connect the blue GND cable to the **-** terminal of battery A.

3. Using the supplied 8-inch black battery cable to the **+** terminal of battery A and to the **-** terminal of battery B.

4. Slide the batteries into the guides in the cabinet.

Figure 3-10. Installation of backup batteries (VB-44025)
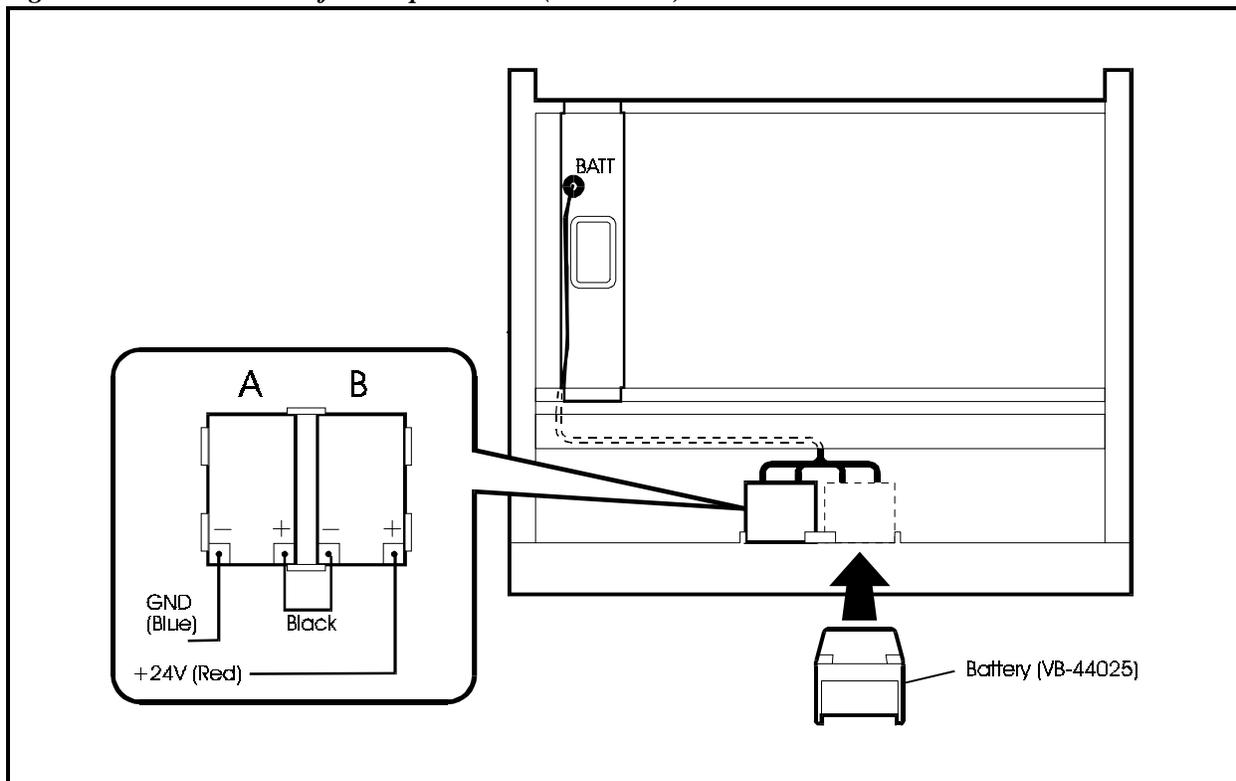
-48 Volt Power Supply (VB-44022)

Guidelines

⚠ **CAUTION:**
  - Turn the power switch and the external breaker OFF, and disconnect the AC cable before installing the -48V power supply.

- Any cabinet that contains an E&M Tieline Card, Ground Start/Loop Start Card or DID Card must have a -48 Volt Power Supply.

- Each cabinet must have a separate -48 Volt Power Supply.

Installation

1. Turn the power switch and the external breaker OFF, and disconnect the AC cable.

2. Insert the -48 Volt Power Supply into the -48 volt power supply slot as shown in Figure 3-11.

3. Secure the -48 Volt Power Supply into place by inserting the supplied lock washer and screw into the front tab.

4. Connect the provided 5-conductor power cable to the power connector on the front of the -48volt power supply.

5. Connect the green lead to the cabinet ground terminal as shown.

6. Connect the black lead to the **- 48** Volt terminal of the power supply.

7. Connect the orange lead to the SG terminal of the power supply.

8. Connect the red lead to the **24** Volt terminal of the power supply.

9. Connect the blue lead to the **GND** terminal of the power supply.

10. Connect the supplied green wire from the **SG** terminal of the power supply to the upper Power Supply ground screw.

11. Reconnect the AC cable, turn the external breaker to ON and turn the power switch to ON.

Figure 3-11. Installation of -48 Volt Power Supply (VB-44022)
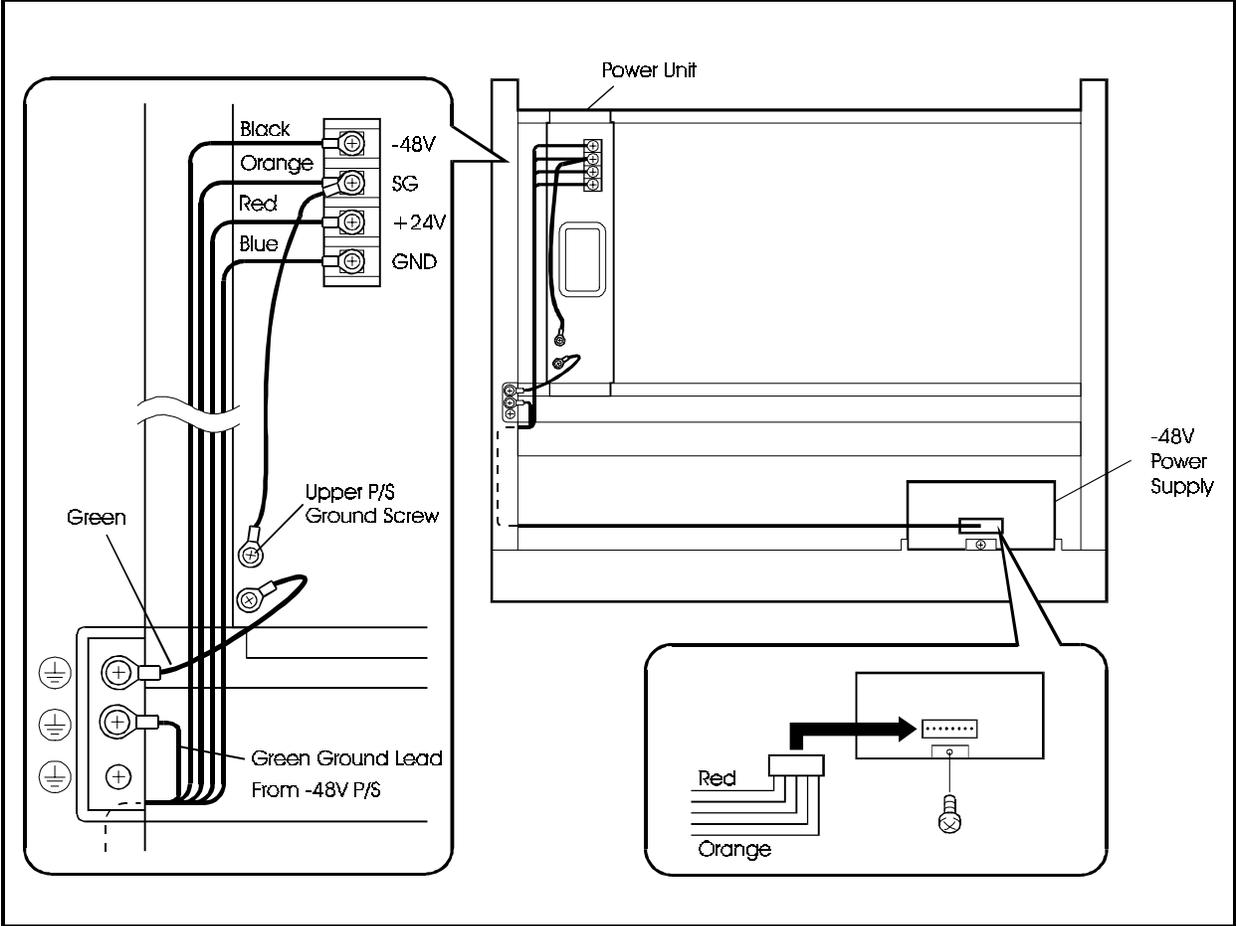
Card Installation

Guidelines

- Install the cards in the slots indicated under "Card Installation Position" in Chapter 4 (page 4-33).

  Note that cards may be damaged if installed in other than the specified slots.

- There is a limit to the number of PRI/23 and CONF cards that can be installed in the flexible slots. Please observe the restrictions described under "Card Installation Position" in Chapter 4 (page 4-33).

- Group the cards installed in the flexible slots as described Chapter 4 (page 4-33).

- When the system is to be automatically initialized, install the specified cards in the positions where they are automatically set. (See Section 400 - *Programming* for more information..)

Figure 3-12. Typical Initial configuration for automatic starting of base cabinet system

PW	CPC	OP1	OP2	FS1	FS2	FS3	FS4	FS5	FS6	FS7	FS8	FS9	FS10	FS11	FS12
				LTRK/8	LTRK/8	LTRK/8	DEC/8	DEC/8	DEC/8	DEC/8	DEC/8	DEC/8	DEC/8	DEC/8	DEC/8

- The DEC/8 card for connecting customized telephones must be installed in the first slot of the internal line group.

- Refer to "Installing Additional Cabinets" in Chapter 4 (page 4-1) if using two or more cabinets.

Installation

⚠

CAUTION:

- With the exception of selected cards as described in "Maintenance Switches" on page 5-1, many cards require power to be OFF before installing or removing the cards. Turn the power switch OFF and make certain the AC cable is disconnected before installing cards.
- Push the cards in so that they are securely seated. Failure to do so may result in the card being damaged.
  The card circuits include CMOS-ICs, which are susceptible to damage by static electricity.
- To avoid damaging the CMOS-ICs, observe the following precautions when handling the cards:
  1) Touch a ground or the cabinet to discharge any static that may have built up on your body.
  2) Do not directly touch the CMOS-ICs or electrical conductors.

---

1. With the lettering on the card pointing up, slide the card into the guide of the card slot in the cabinet.

2. Hold the card on the top and bottom edges with both hands and carefully push it into the slot.

3. When the connector row at the far end of the card touches the corresponding connector on the unit, press the card in somewhat more firmly until it is seated.

4. Repeat steps 1 through 3 for all other cards.

Figure 3-13. Unit card installation in cabinet
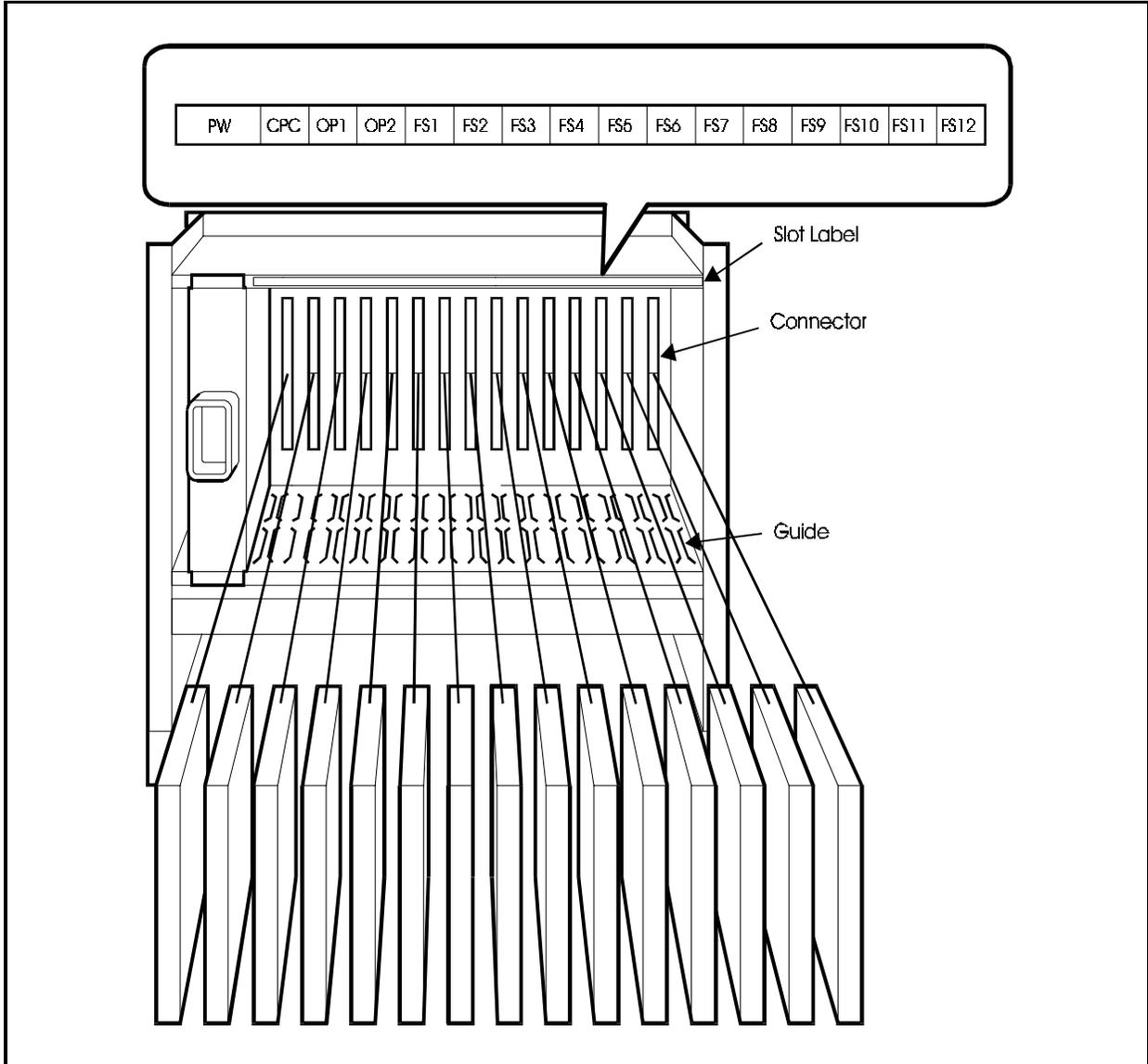
Chapter 4. Installing Additional Cabinets

The 576 system can be expanded using a building block system. It is also possible to increase the number of extension ports by linking the DBS 576 to a DBS 96.

This chapter explains how to prepare for additional cabinets, install them, link the respective systems, set the expansion cabinet ID No., install the switch box and options, install cards and connect to the DBS 96.

Installing the Building Block System

Installation Location

Guidelines

Before deciding where to install the building block system, check the external dimensions and the maintenance area shown below and the "Environmental Conditions" described in Chapter 1 (page 1-4).

Figure 4-1. Building block system dimensions and maintenance area
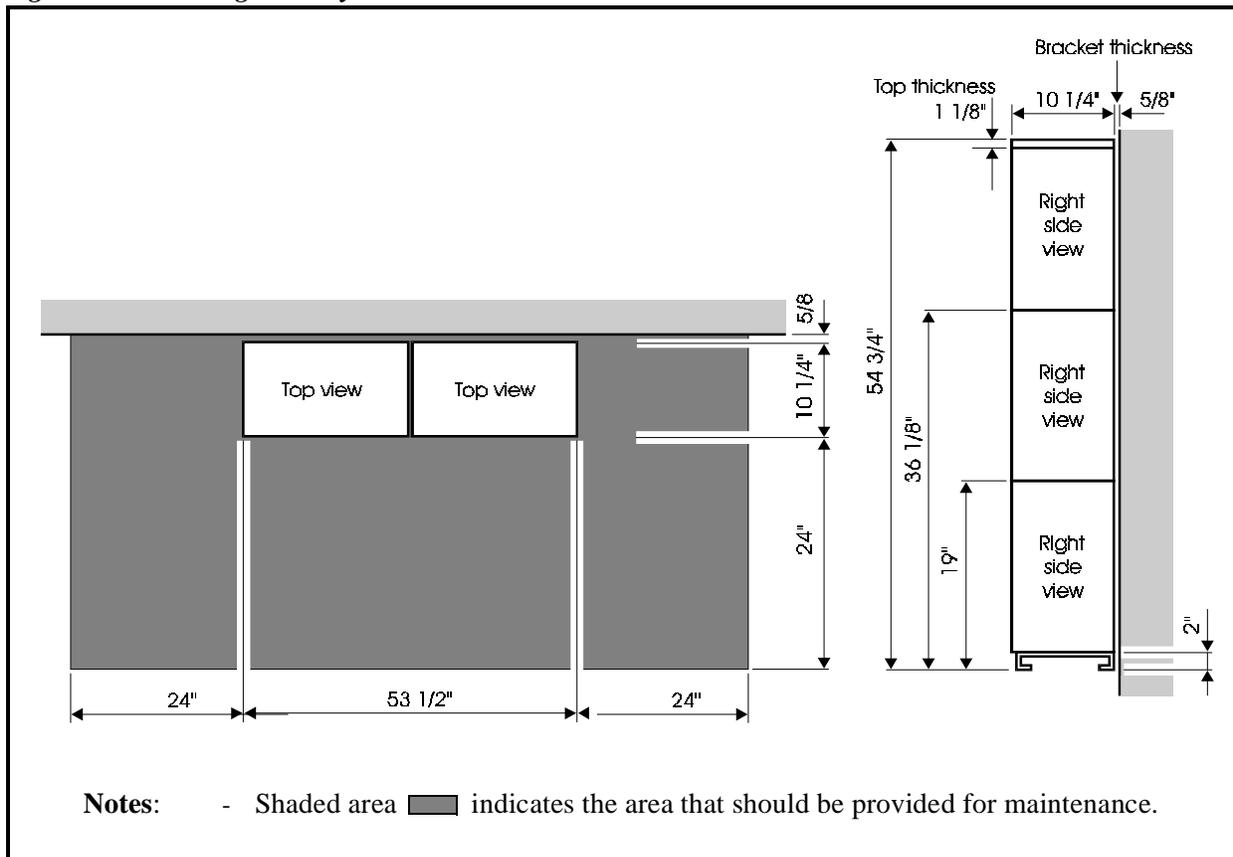
Notes: - Shaded area ▬▬ indicates the area that should be provided for maintenance.

Installation

Guidelines

⚠	**CAUTION:**

CAUTION:
- Turn the power switch OFF and make certain the AC cable is disconnected before installing.
- Handle the cabinet carefully to avoid damage.
- Do not attempt to move the cabinet without assistance.
- The cabinet is heavy and should be well secured in the event of earthquake, etc.

- Remove the cabinet covers before installing the cabinets (see "Removing and Replacing Covers" on page 3-2).

- See Figure 4-1 for example combinations of cabinets using the building block method.

- The description of how to use the building block method to set up a system is based on an example of expanding the number of ports to 576. Please use this example as a basis for setting up systems with different numbers of ports.

Figure 4-2. Example cabinet combinations using building block method
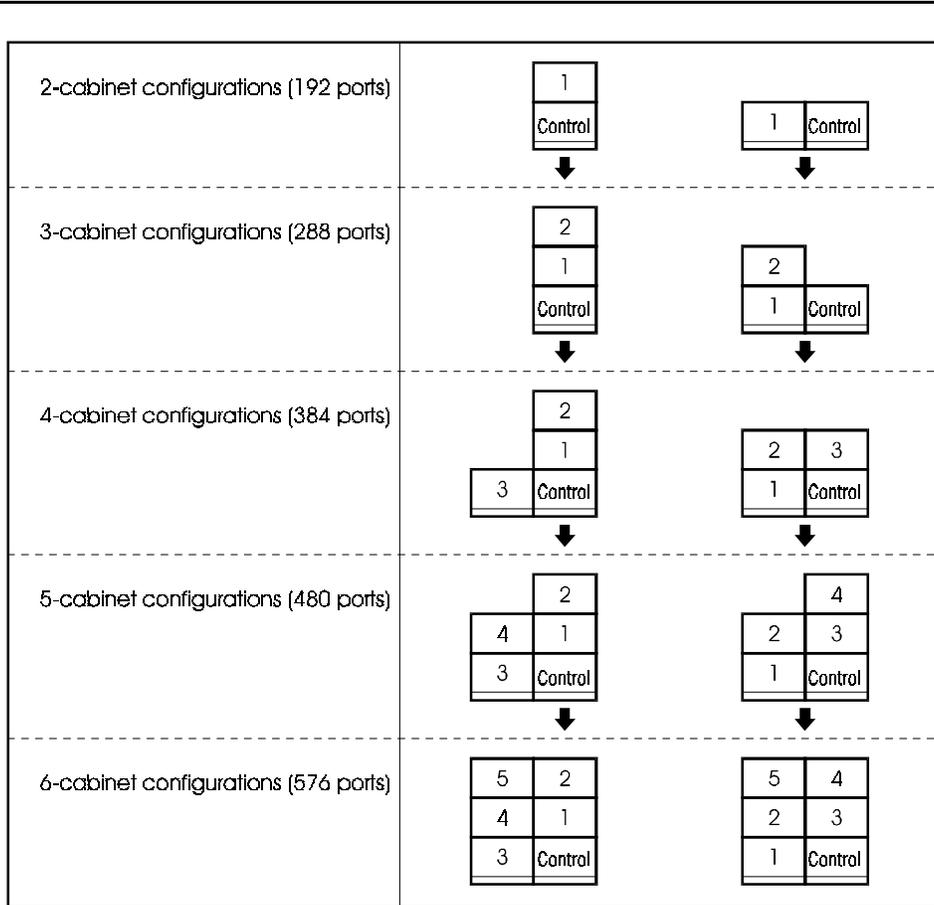
Notes: - The bottom cabinet in a column must be a base cabinet (VB-44020). These are indicated by the double lines. The other cabinets in a column should be expansion cabinets (VB-44021).

- The cabinet that contains the CPC card is called the Control cabinet since it "controls" the system.

- The 1 to 5 shown above are the ID numbers of the additional cabinets. If you are installing two or more cabinets, each added cabinet must have the designated cabinet ID No. (see page 4-27).

- If you are adding cabinets to an existing system, add them using the layouts indicated by the arrows above. If the Control cabinet is on the left, the IDs should be numbered vertically in the same order as shown below.
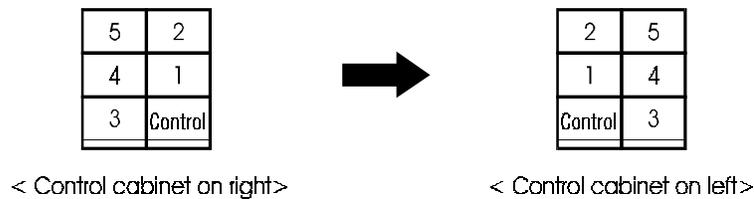
Building Block Method (floor-mounting) Installation (576-port example shown)

Installation

1. Attach wall-mounting brackets on the rear of all cabinets that are to be installed. The direction that the wall-mounting brackets are attached varies according to the position (bottom, middle or top rack) where the cabinets are installed. Attach the wall-mounting brackets according to the figures below.

Figure 4-3. Floor-Mounting Installation: Attaching the Wall-Mounting Bracket

Note: Base Cabinet   : cabinet installed on bottom rack
Expansion Cabinet-1 : cabinet installed on middle rack
Expansion Cabinet-2 : cabinet installed on top rack
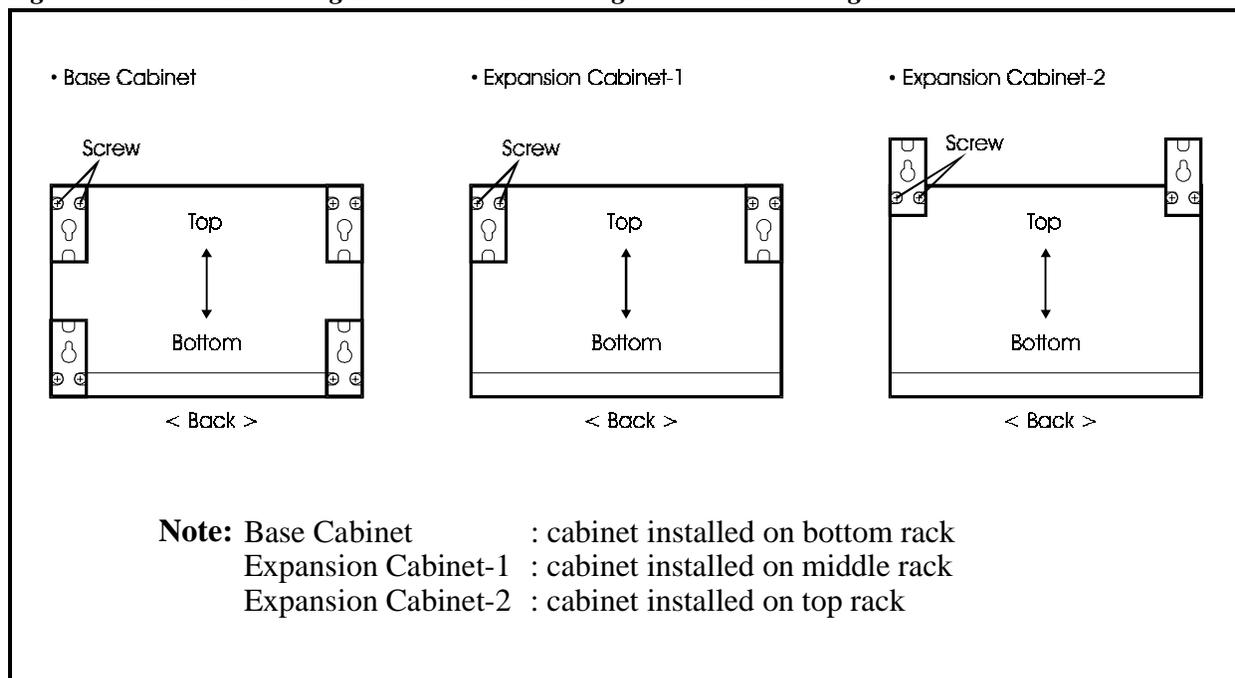
2. Place Expansion Cabinet-1 on top of the Base cabinet.

3. Attach the joining sections on the front sides of the Base Cabinet and Expansion Cabinet-1 with 2 screws.

4. Attach the 2 Side Joint Plates onto the joining sections on the sides of the Base Cabinet and Expansion Cabinet-1 with 8 screws.

5. Attach Expansion Cabinet-2 following steps 2. to 4.

Figure 4-4. Floor-mounting Installation: Vertical Joining
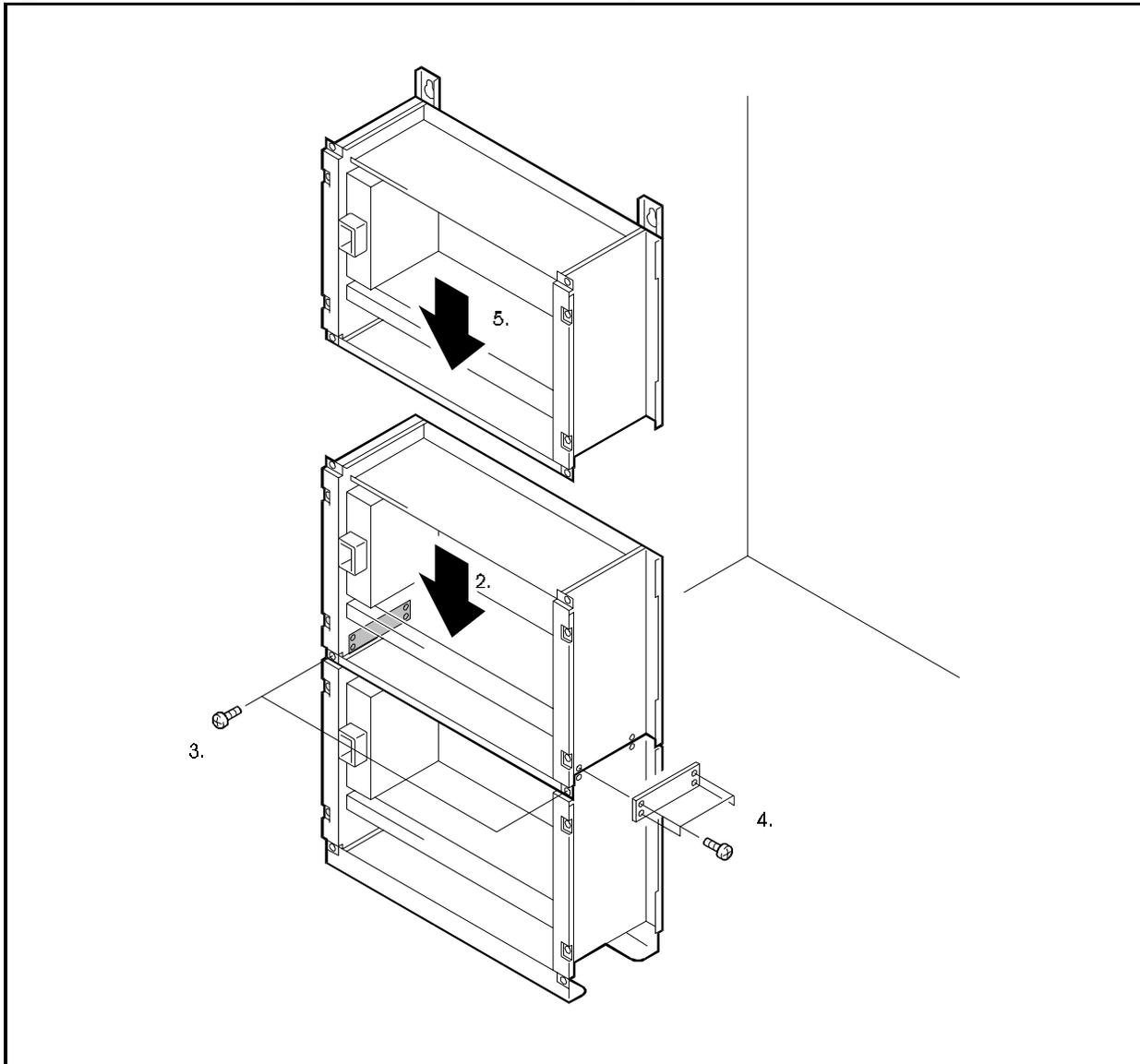
6. Attach the other Base Cabinet, Expansion Cabinet-1 and Expansion Cabinet-2 following steps 2 to 5.

7. Attach the 12 Horizontal Joint Plates (front: 6, rear: 6) onto the front and rear sides of each of the left and right cabinets with 24 screws. (The Horizontal Joint Plates are part of the VB-44024 expansion braket kit and must be separately purchased.)

8. Drill 4 four holes in the floor to attach the cabinet to the floor, and drive in hole-in-anchors.

Note: 4 holes should be drilled in the floor on both sides of the joined left and right Base Cabinets. Before drilling the holes check the drilling hole pitch referring to Figure 4-4.

9. Place the cabinet close to the wall.

10. Align the screw holes on the base plates of the joined left and right Base cabinets with the hole-in-anchors driven into the floor, and attach with bolts.

11. Attach the wall-mounting angle plates of the left and right Expansion cabinet-2 with 4 wall-mounting screws (#10 flat head screws recommended).

Figure 4-5. Floor Mounting Installation: Vertical/Horizontal Joining
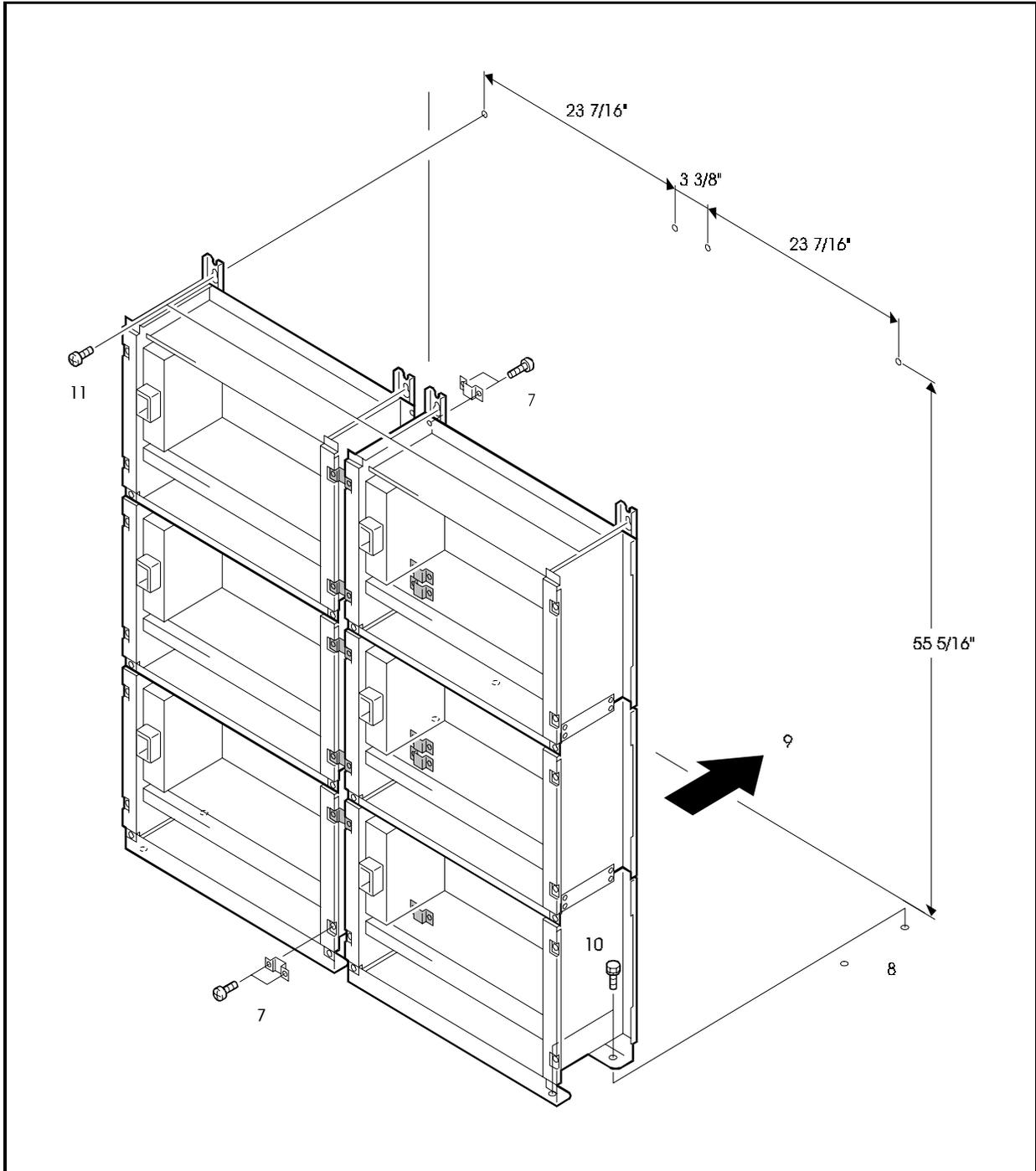
Building Block Method (wall-mounting) Installation (576-port example shown)

Guidelines

⚠ **CAUTION:**
  - When all 6 cabinets have been attached to the wall, the wall will be subjected to a load of about 90 pounds. Before attaching the cabinets to the wall, check the strength of the wall to make sure that it can withstand this load.

Installation

1. Attach wall-mounting brackets on the rear of all cabinets that are to be installed. The direction that the wall-mounting brackets are attached varies according to the position (bottom, middle or top rack) where the cabinets are installed. Attach the wall-mounting brackets according to the figures below.

Figure 4-6. Wall-mounting Installation: Attaching the Wall-mounting Bracket

• Base Cabinet   • Expansion Cabinet

Screw   Screw

Top   Top

Bottom   Bottom

< Back >   < Back >

Note: Base cabinet   : cabinet installed on bottom rack
Expansion cabinet-1 : cabinet installed on middle rack
Expansion cabinet-2 : cabinet installed on top rack
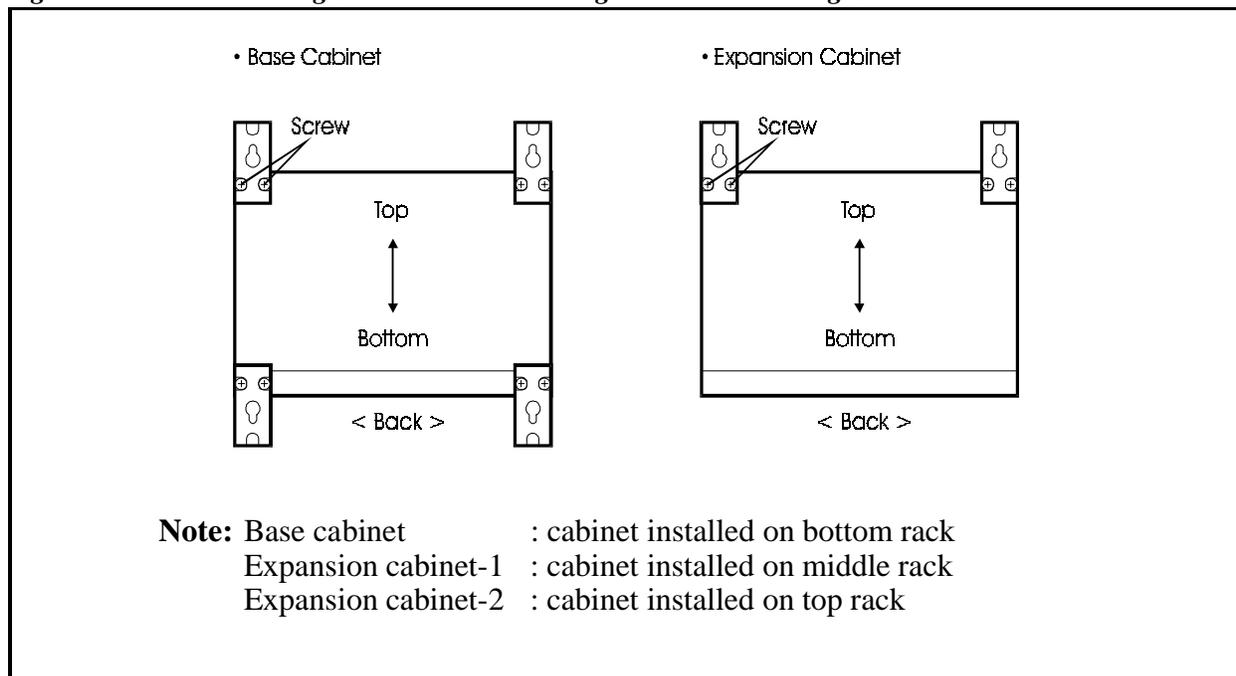
2. Temporarily fasten the 4 wall-mounting screws to the wall. (#10 flat head screws recommended.)

3. Lift up the left Base cabinet, and hook it onto the 8 screws that are temporarily fastening the wall-mounting angle.bracket.

4.   Completely tighten the temporarily fastened screws.

5.   Attach the right Base cabinet following steps 3. and 4.

Figure 4-7. Wall-mounting Installation: Attaching the Wall-mounting of cabinet-1
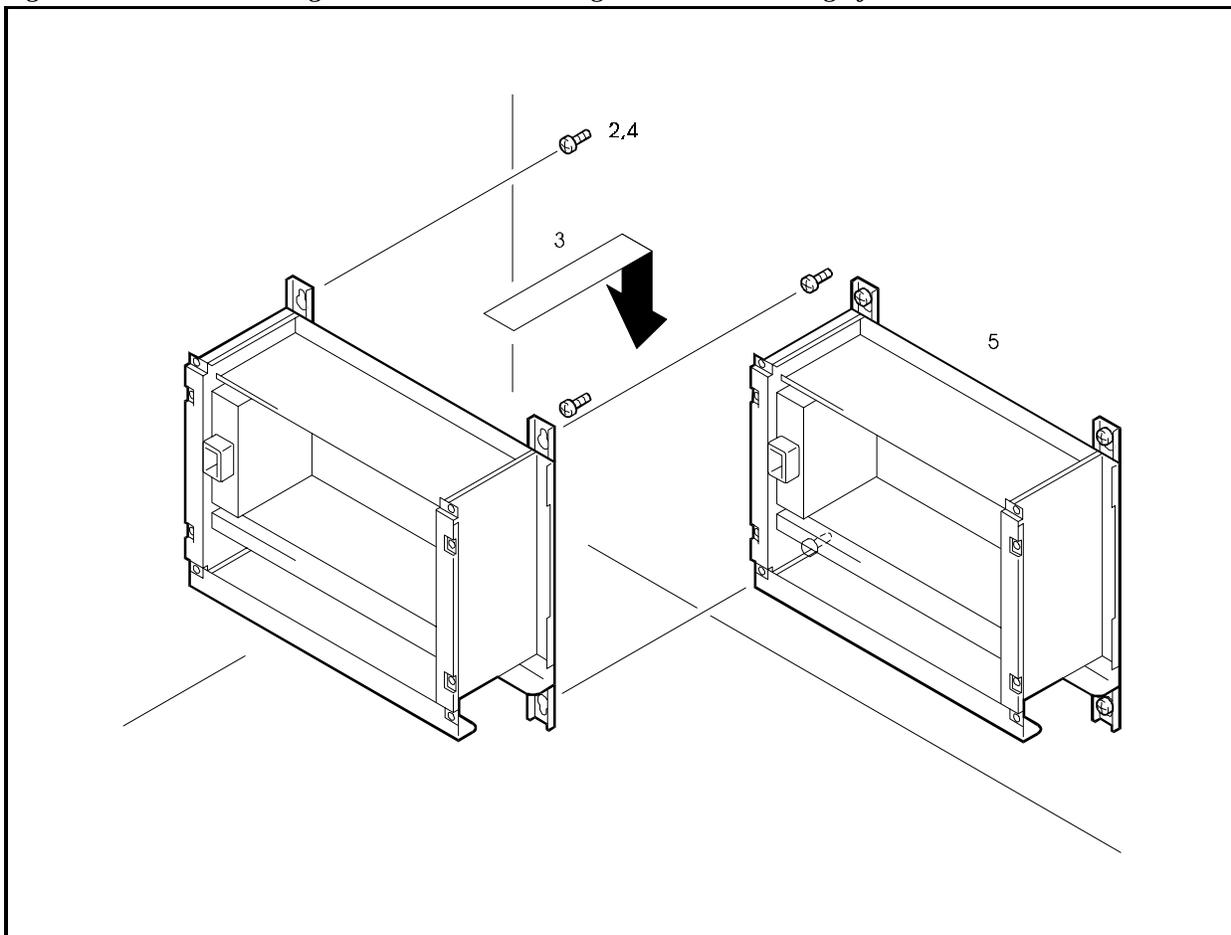
6.   Attach the 2 Horizontal Joint Plates onto the joining sections on the front of the
     left and right Base cabinets with 4 screws. (The Horizontal Joint Plates are part
     of the VB-44024 expansion braket kit and must be separately purchased.)

7.   Attach the left and right Expansion cabinet-1 onto the wall following steps 2 to
     6.

8.   Attach the joining sections on the front of the left and right Base cabinet and
     Expansion cabinet-1 with 4 screws.

Figure 4-8. Wall-mounting Installation: Attaching the Wall-mounting of cabinet-2
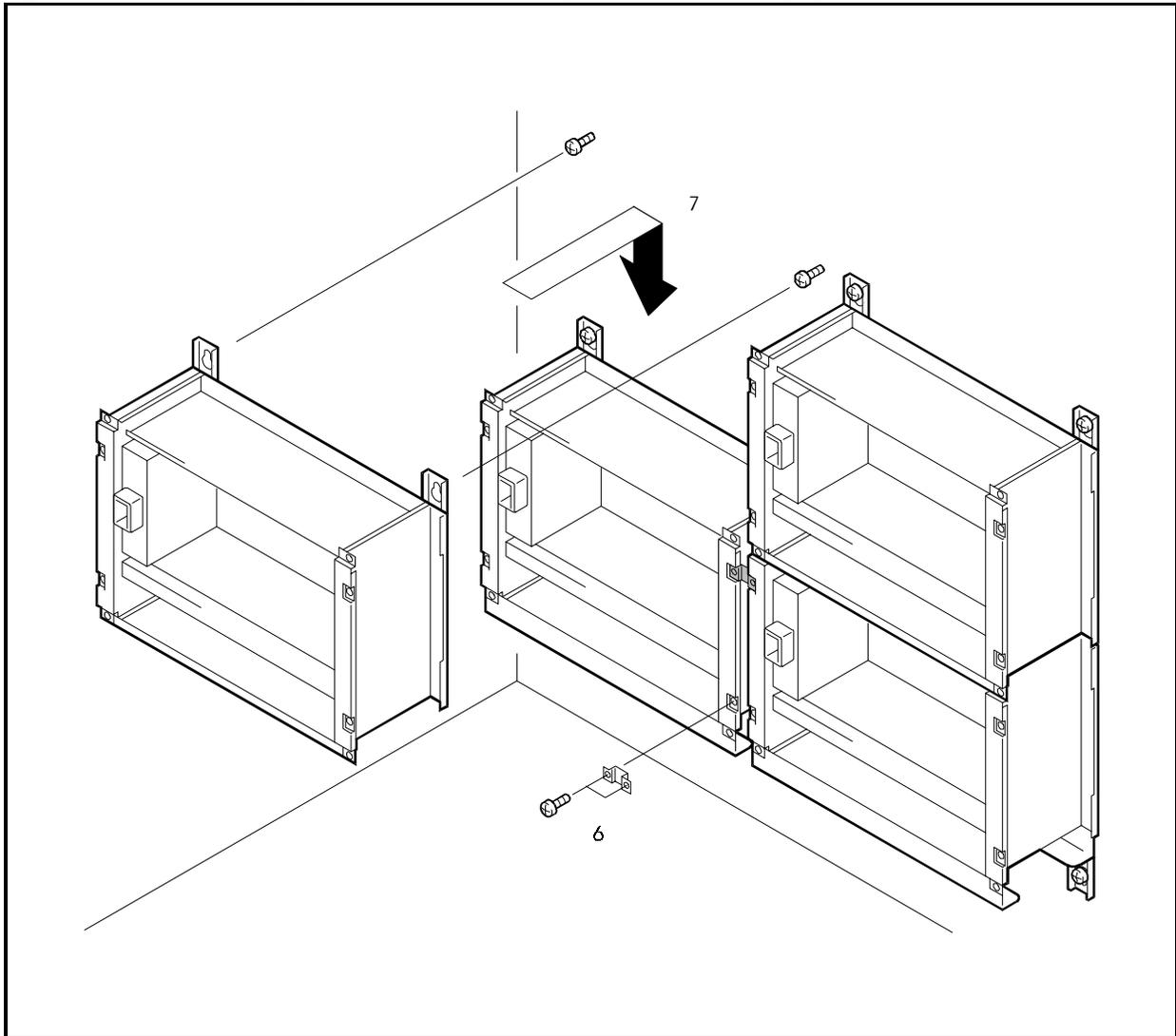
9. Attach the 2 Side Joint Plates onto the joining sections on the sides of the left and right Base cabinet and Expansion cabinet-1 with 8 screws.

10. Attach the left and right Expansion cabinet-2 onto the wall following steps 2. to 3.

11. Attach the joining section on the fronts of the left and right Expansion cabinet-1 and Expansion cabinet-2 with 4 screws.

12. Attach the 2 Side Joint Plates onto the joining sections on the sides of the left and right Expansion cabinet-1 and Expansion cabinet-2 with 8 screws.

Figure 4-11. Wall-mounting Installation: Attaching the Wall-mounting of cabinet-3
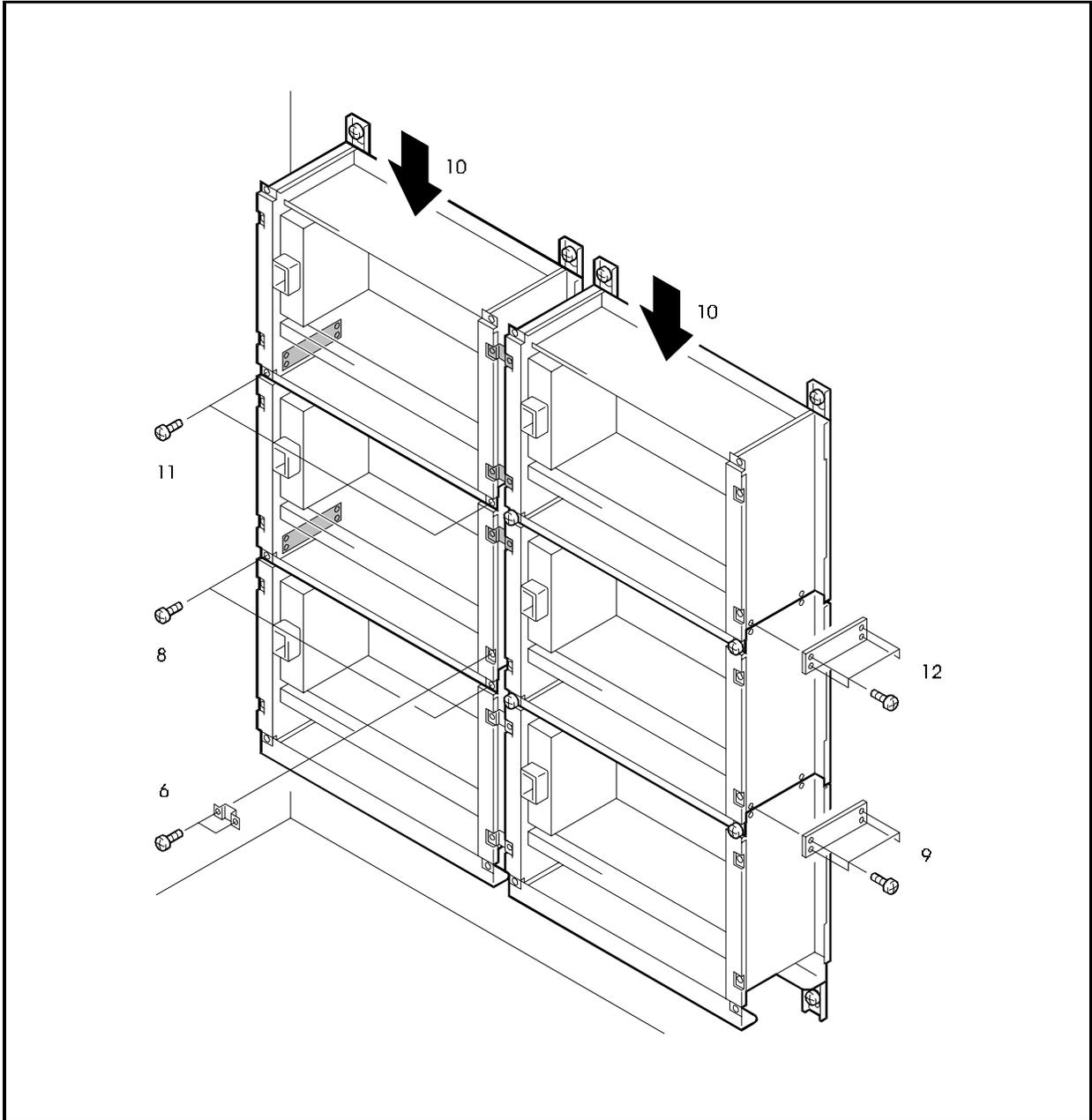
Installing Switch Boxes (VB-44023)

Guidelines

⚠

WARNING:
- **THE SWITCH BOX POWER WILL NOT BE CUT OFF EVEN IF THE POWER SWITCH ON THE BASE CABINET IS TURNED OFF. MAKE CERTAIN THAT ALL AC CABLES ARE DISCONNECTED FROM THE POWER OUTLETS TO AVOID THE POSSIBILITY OF ELECTRICAL SHOCK.**
- **TURN THE POWER SWITCH OFF BEFORE INSTALLING THE SWITCH BOX.**
- **CAREFULLY NOTE THE POLARITY WHEN WIRING TO PREVENT SHORTING.**

⚠

Caution:
- To suppress noise, be sure to install an EMI filter on the AC cable.

- The following describes how to install the AC cables for the optional VB-44023 switch box.

- The switch box allows you to turn the power on and off to one base cabinet and up to two expansion cabinets from one switch.

- If one or more expansion cabinets are attached to a base cabinet, a switch box must be installed in the base cabinet. For instance, a fully expanded system requires two switch boxes.

- The power to each of the cabinets is controlled by switching the power supply for the base cabinet. After completing installation and before replacing the covers of the cabinets, turn <u>ON</u> the power switches of each expansion cabinet.

Installation

Removing AC cables

1. Disconnect the AC cables from the power units and remove the ground wires.

2. Remove AC cable from the cord bracket and cable clamp and discard AC cable.

Figure 4-12. Removing AC cable
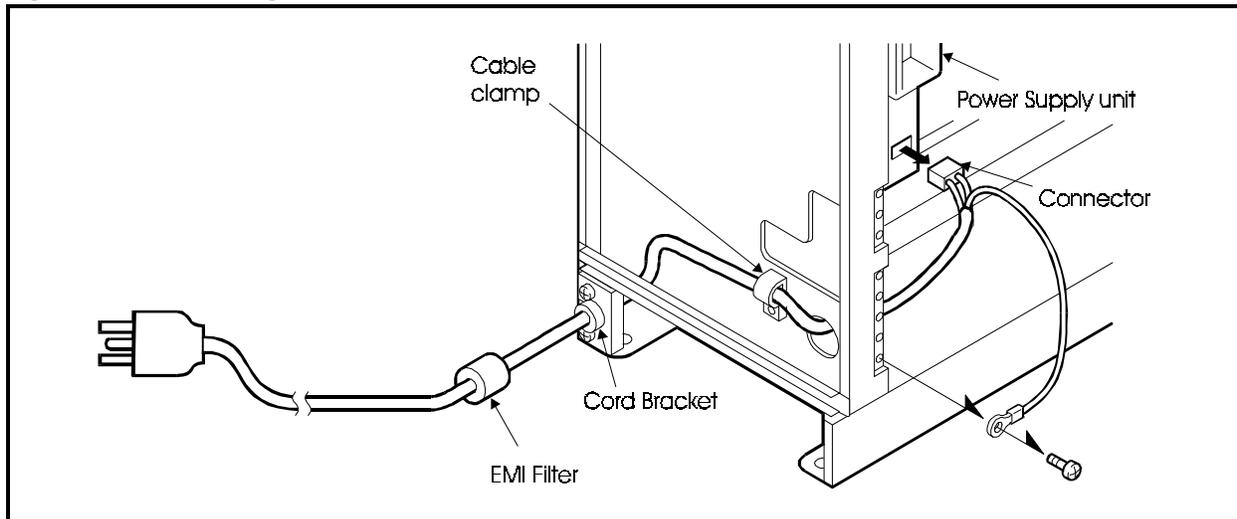
Installing Switch Box

1. Position the switch box on the guide lugs in the base cabinet.

2. Secure the switch box with the screw.

Figure 4-13. Installing the Switch Box
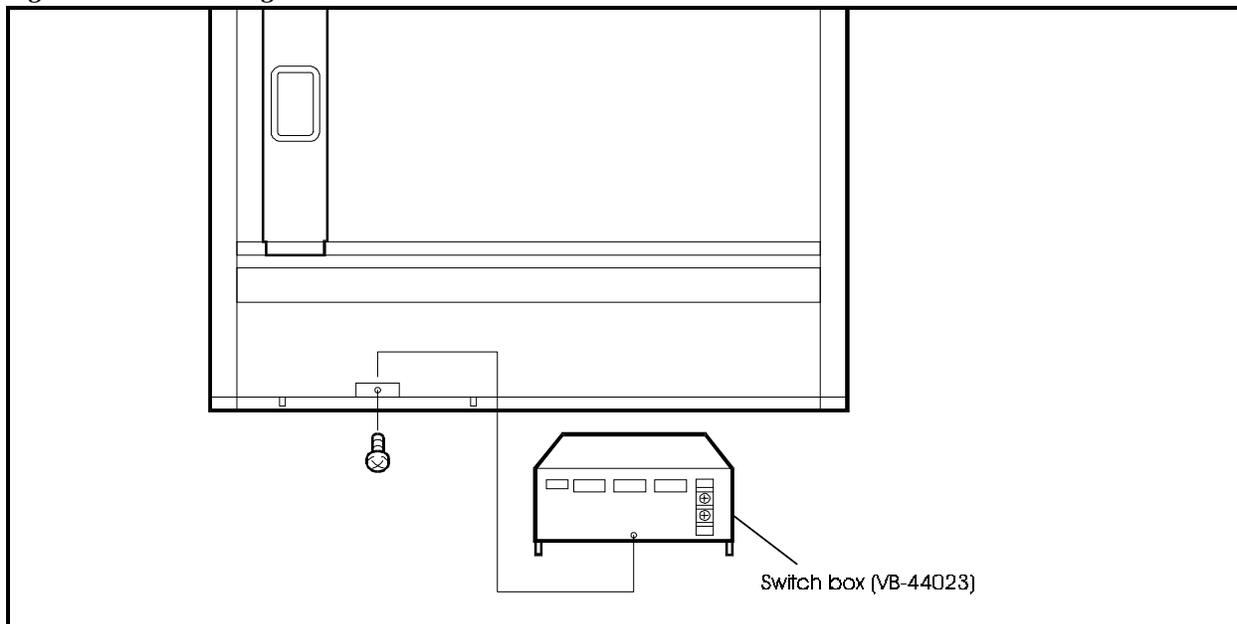
3. Attached the AC input power cable bushing (strain relief) to the side of the cabinet.

Figure 4-14. Attaching AC cable to cabinet
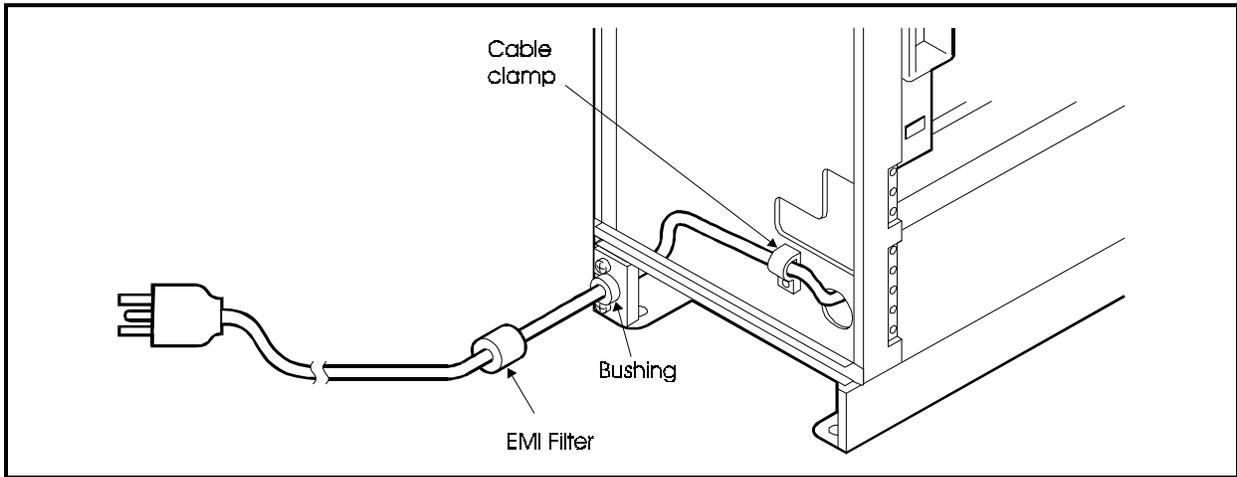
4. Secure the AC input power cable to the cabinet using the cable clamp.

5. Attach power leads to the Switch Box.

6. Attach the power cable frame ground.

Figure 4-15. AC Power Cable Connection to Switch Box/Frame Ground
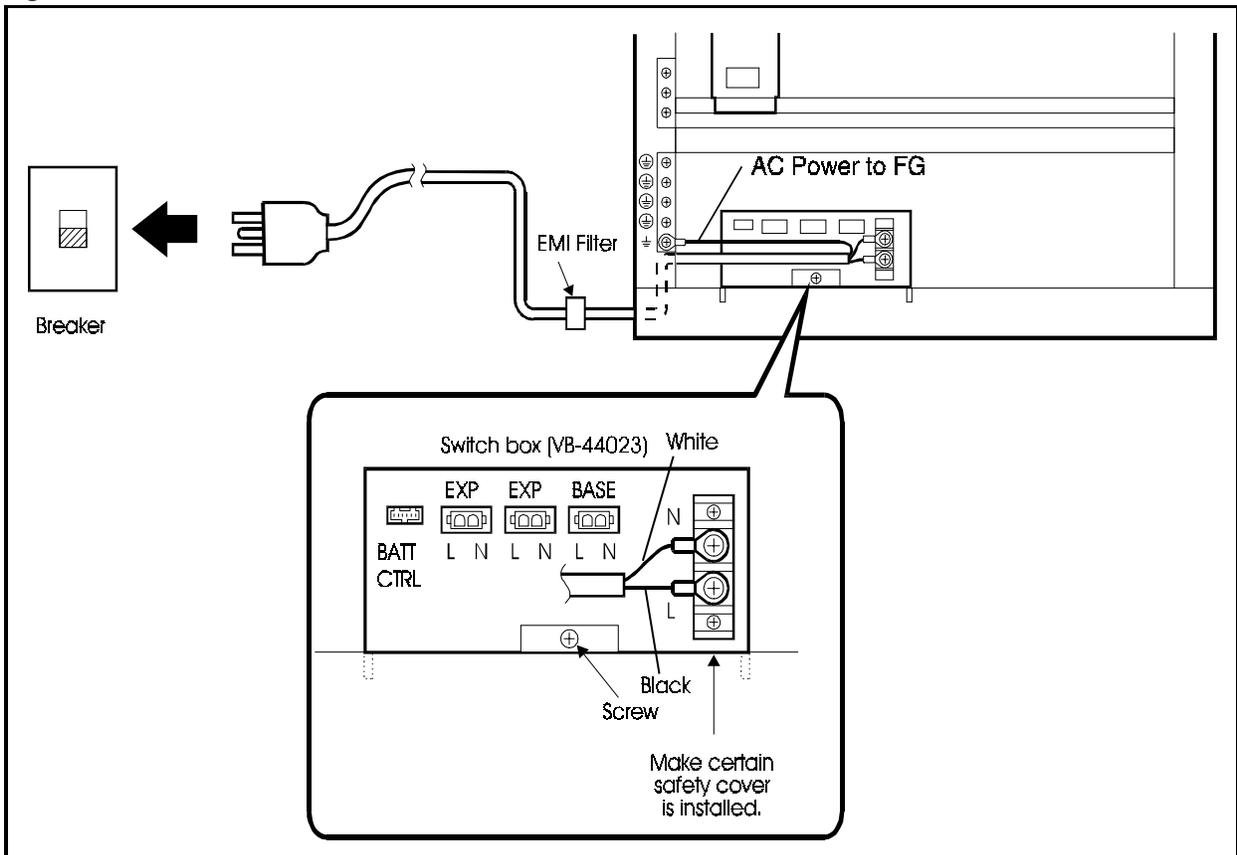
7. Plug the power supply to the switch box AC cables into the connectors on the switch box. The AC cable of top and middle cabinet must be connected to EXP connector of the switch box, and AC cable of base cabinet must be connected to BASE connector of the switch box.

Figure 4-16. Switch Box to Power Supply AC Cable Connections
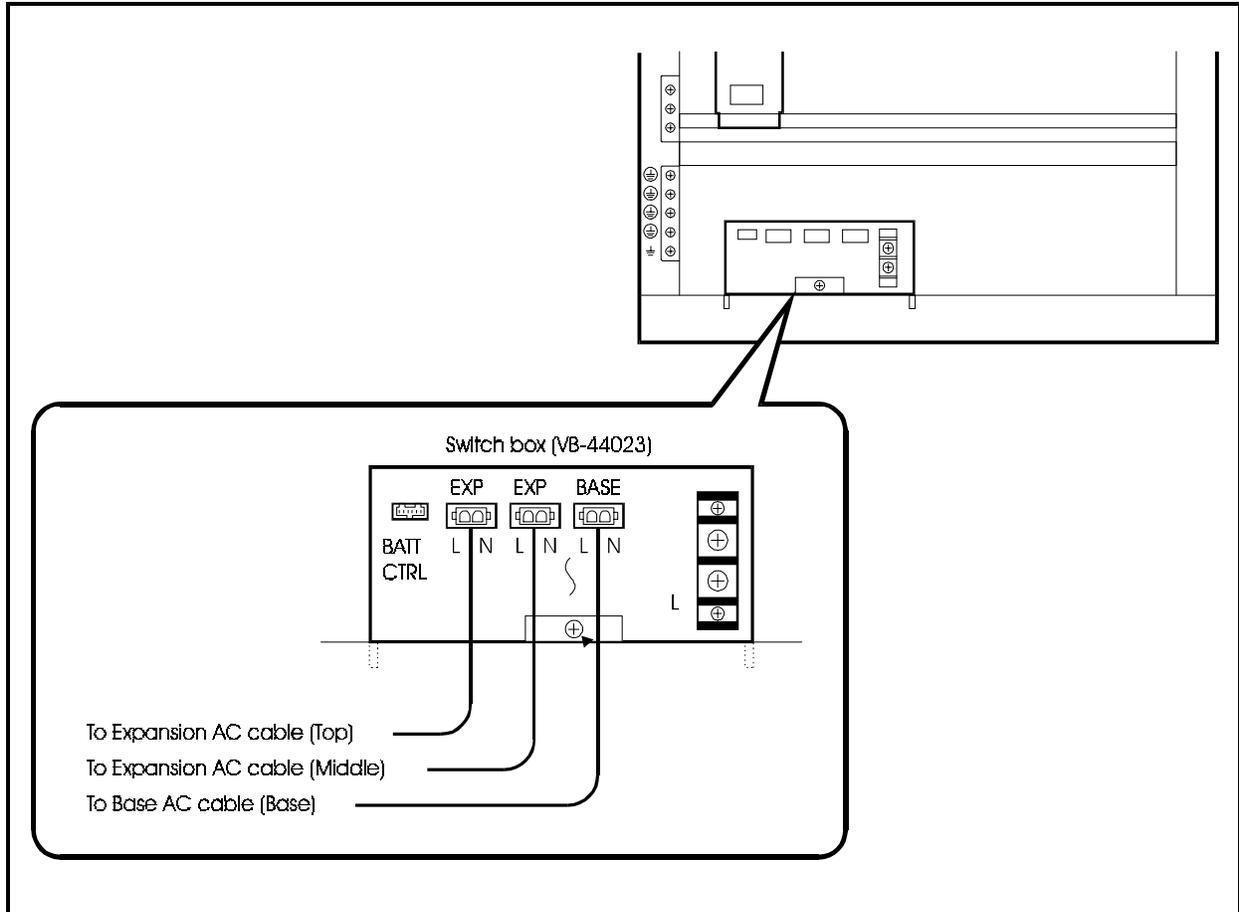
8. Connect the ground wires of the power cables connected at the switch box to the frame ground. One cable is supplied with switch box and one cable is supplied with the expansion cabinets.

Figure 4-17. Switch Box AC Cables to Frame Ground Connections
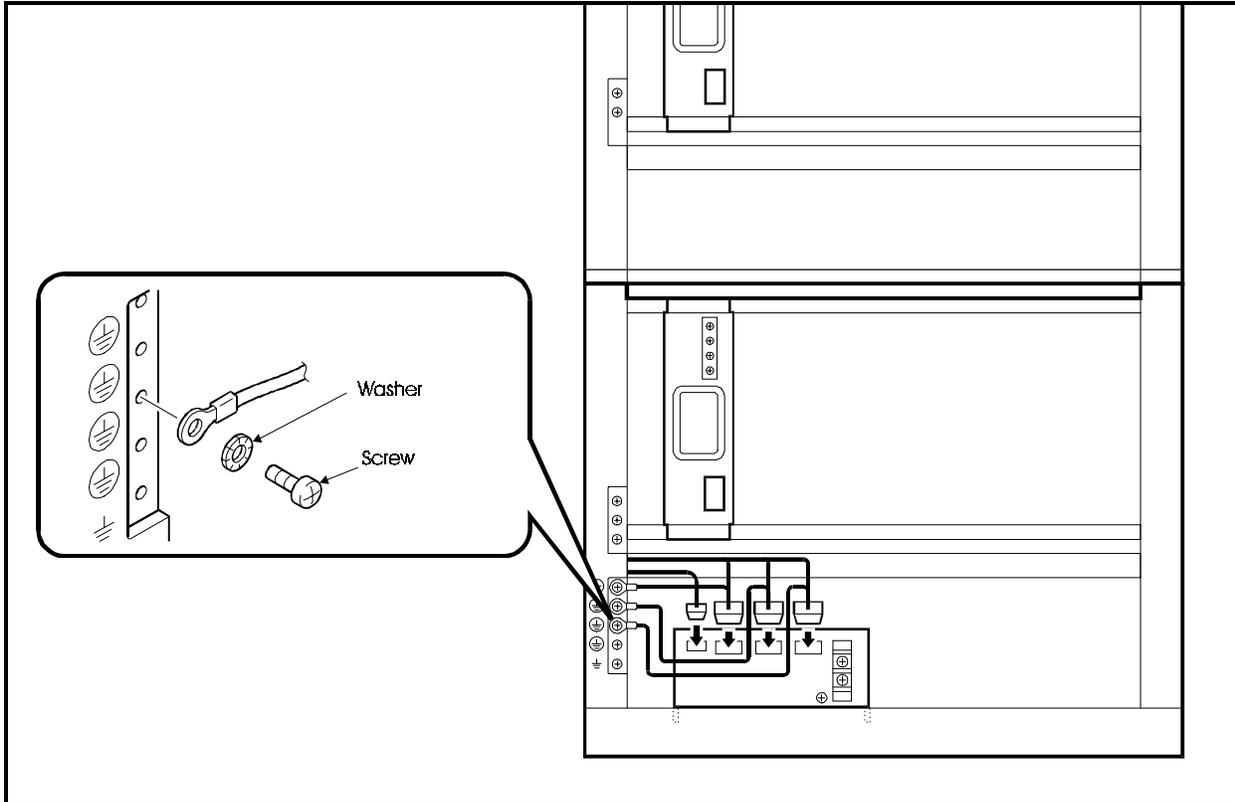
9. Connect the power supply to switch box AC cables to the power supply units of the top, middle and bottom cabinets.

10. Connect the ground wires of the expansion AC cables connected to the power units to the chassis.

Figure 4-18. Power Supply AC Cable to Frame Ground Connections
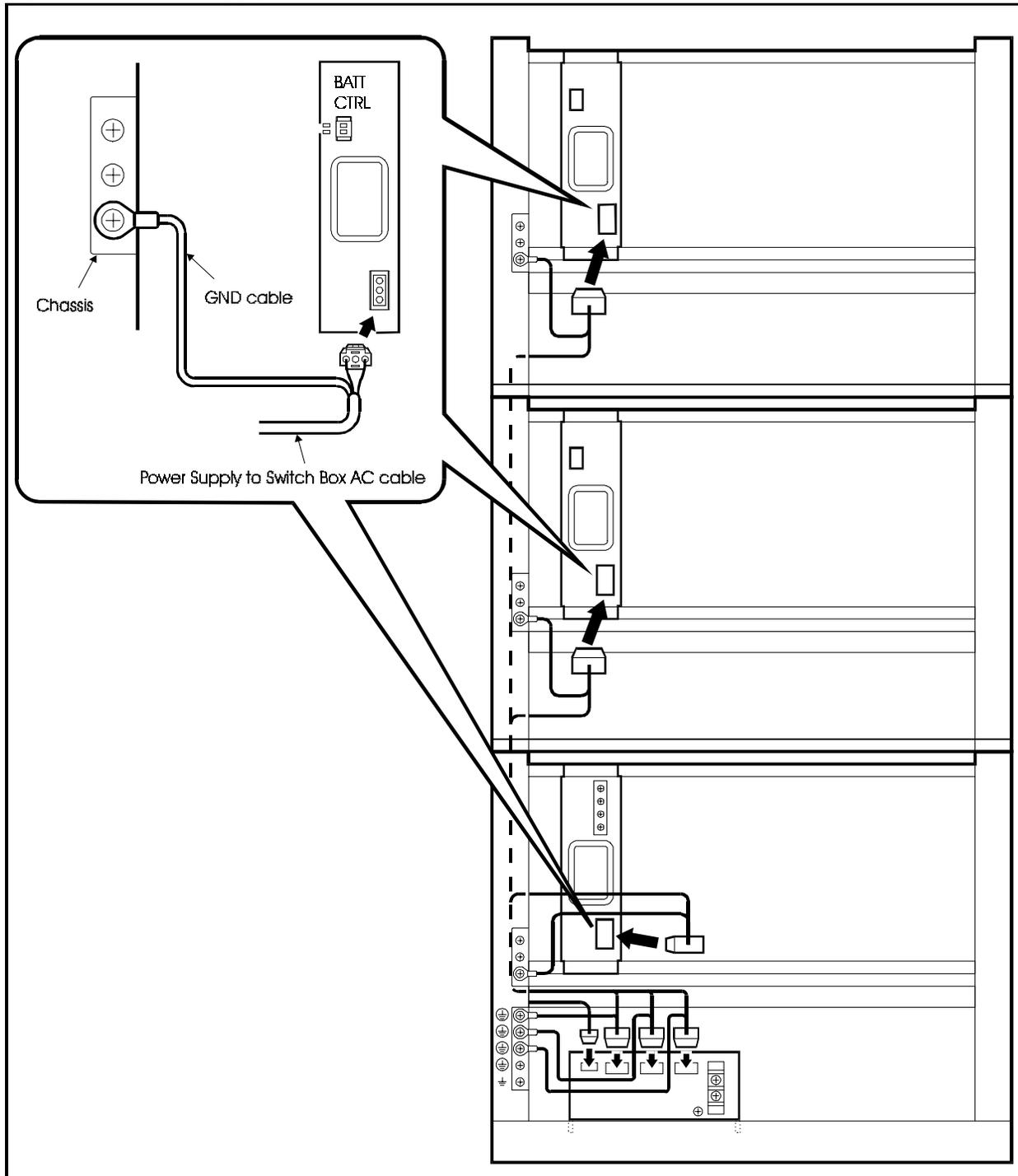
11. Connect the BATT-CTRL connector on the switch box using the supplied BATT-CTRL cable harness.

12. Connect the BATT-CTRL cable harness to the connectors of the top, and middle power supply units. Use the longest cable for the top power supply and the shortest cable to the middle power supply.

Figure 4-19. Battery Control Connections to Expansion Cabinet Power Supplies
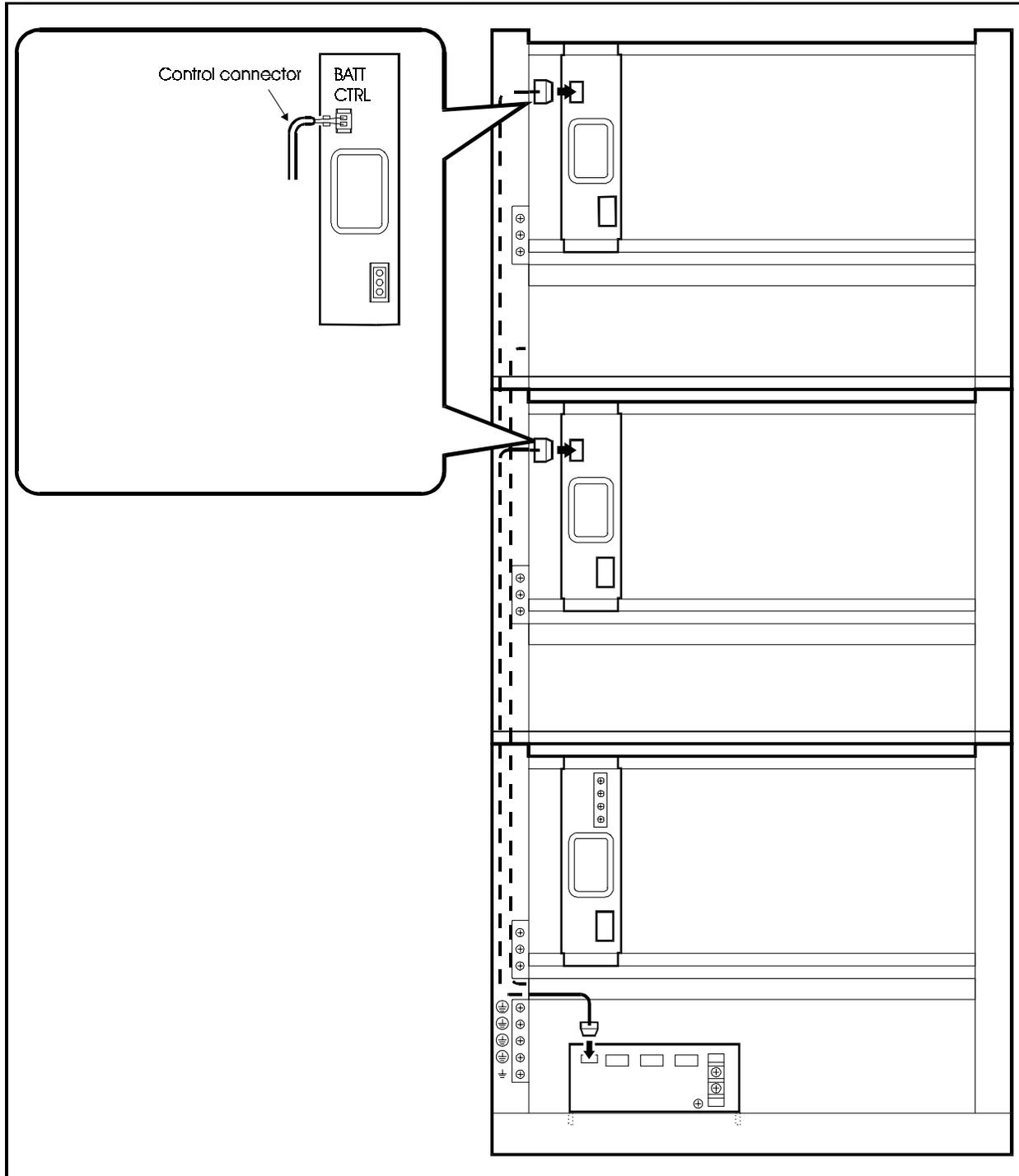
13. Screw the +24V (white) and GND (black) cables of the BATT-CTRL harness to the bottom power supply unit in base cabinet.

Figure 4-20. Battery Control Connection to Base Cabinet Power Supply
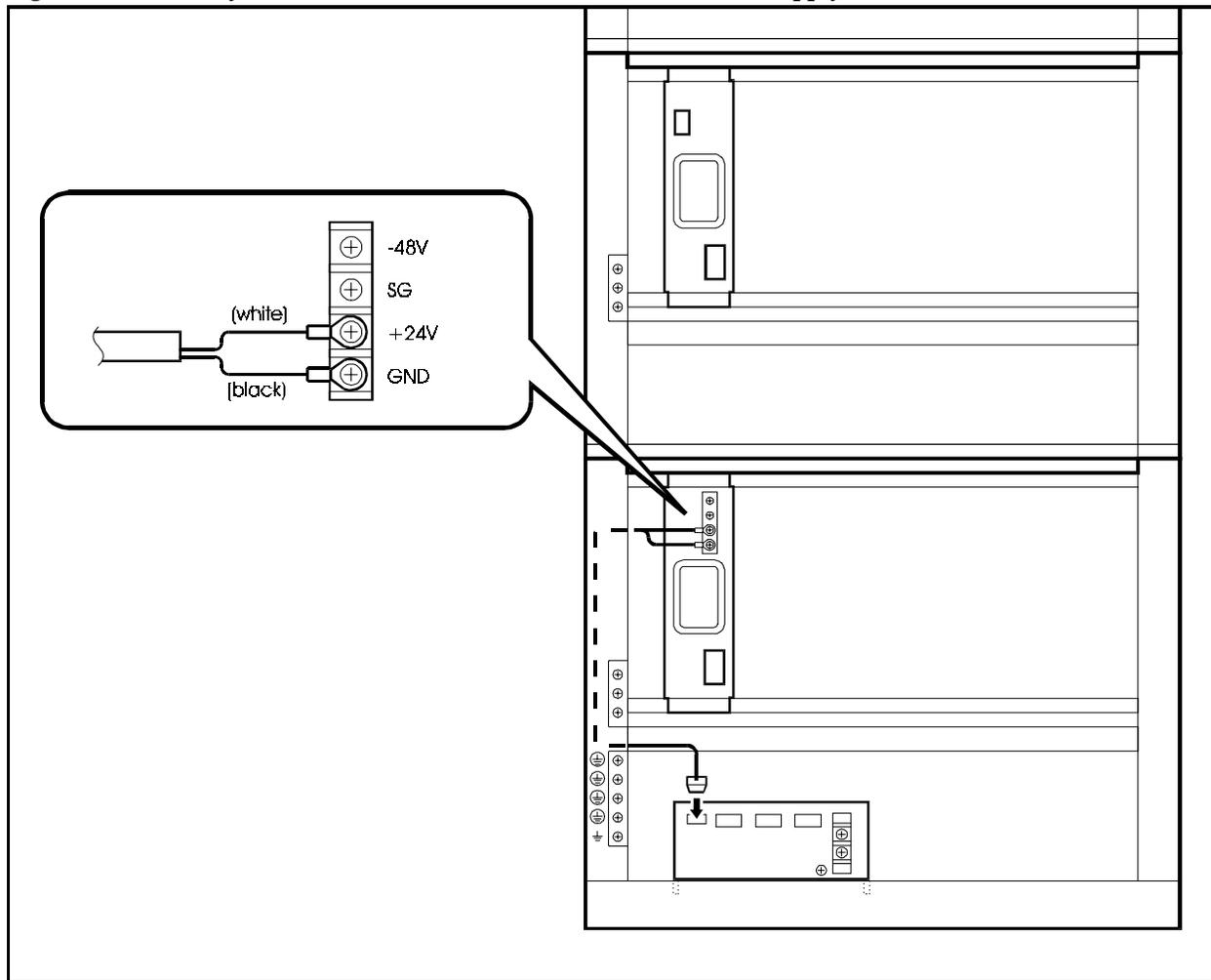
14. Make certain the base cabinet power supply is OFF.

15. Plug the AC cable into an outlet with a dedicated breaker.

Note: An dedicated external circuit breaker must be used.

16. The power switch of upper and middle cabinets should be kept ON so that the power switch of base cabinet controls power for all cabinets.

Battery Backup (VB-44025)

Guidelines

⚠️ **CAUTION:**
  - Turn the power switch and the external breaker OFF, and disconnect the AC cable before installing the backup battery.
  - Carefully note the polarity of the batteries to prevent shorting.

- When installing batteries for battery backup, **each cabinet** must have a separate set of batteries.

- The battery cable must be at least 18 AWG.

- With normal condition, the backup batteries last for about 20 minutes.

- The backup batteries should be replaced about every 3 years.

LEAD RETURN RECYCLE	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.

Installation

1. Connect the red +24V cable to the **+** terminal of battery B.

2. Connect the blue GND cable to the **-** terminal of battery A.

3. Using the supplied 8-inch black battery cable to the **+** terminal of battery A and to the **-** terminal of battery B.

4. Slide the batteries into the guides in the cabinet.

Figure 4-21. Installation of cabinet backup batteries (VB-44025)
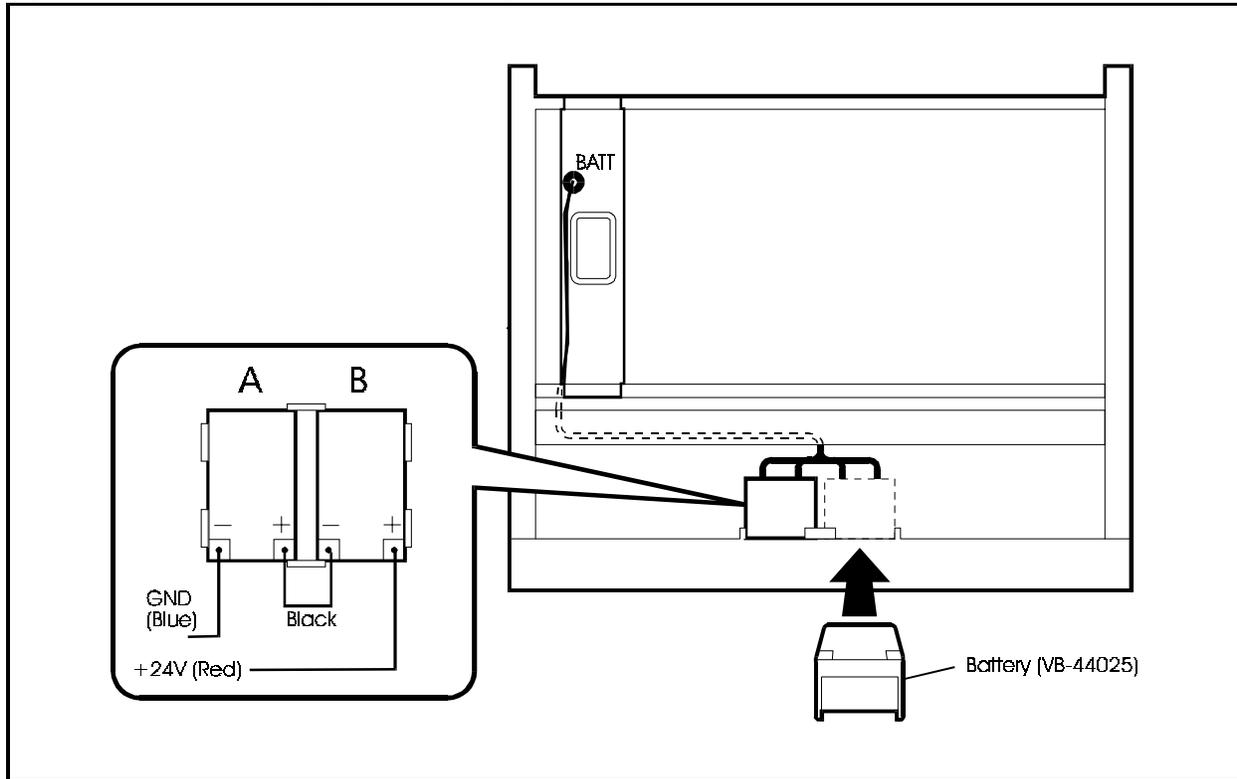
-48 Volt Power Supply (VB-44022)

Guidelines

⚠️   **CAUTION:**
   • Turn the power switch and the external breaker OFF, and disconnect the
     AC cable before installing the -48V power supply.

• Any cabinet that contains an E&M Tieline Card, Ground Start/Loop Start Card or
  DID Card must have a -48 Volt Power Supply.

• Each cabinet must have a separate -48 Volt Power Supply.

Installation

1. Turn the power switch and the external breaker OFF, and disconnect the AC
   cable.

2. Insert the -48 Volt Power Supply into the -48 volt power supply slot.

3. Secure the -48 Volt Power Supply into place by inserting the supplied lock
   washer and screw into the front tab.

4. Connect the provided 5-conductor power cable to the power connector on the front of the -48volt power supply.

5. Connect the green lead to the cabinet ground terminal as shown.

6. Connect the black lead to the **- 48** Volt terminal of the power supply.

7. Connect the orange lead to the SG terminal of the power supply.

8. Connect the red lead to the **24** Volt terminal of the power supply.

9. Connect the blue lead to the **GND** terminal of the power supply.

10. Connect the supplied green wire from the **SG** terminal of the power supply to the upper Power Supply ground screw.

11. Reconnect the AC cable, turn the external breaker to ON and turn the power switch to ON.

Figure 4-22. Installation of -48 Volt Power Supply (VB-44022)
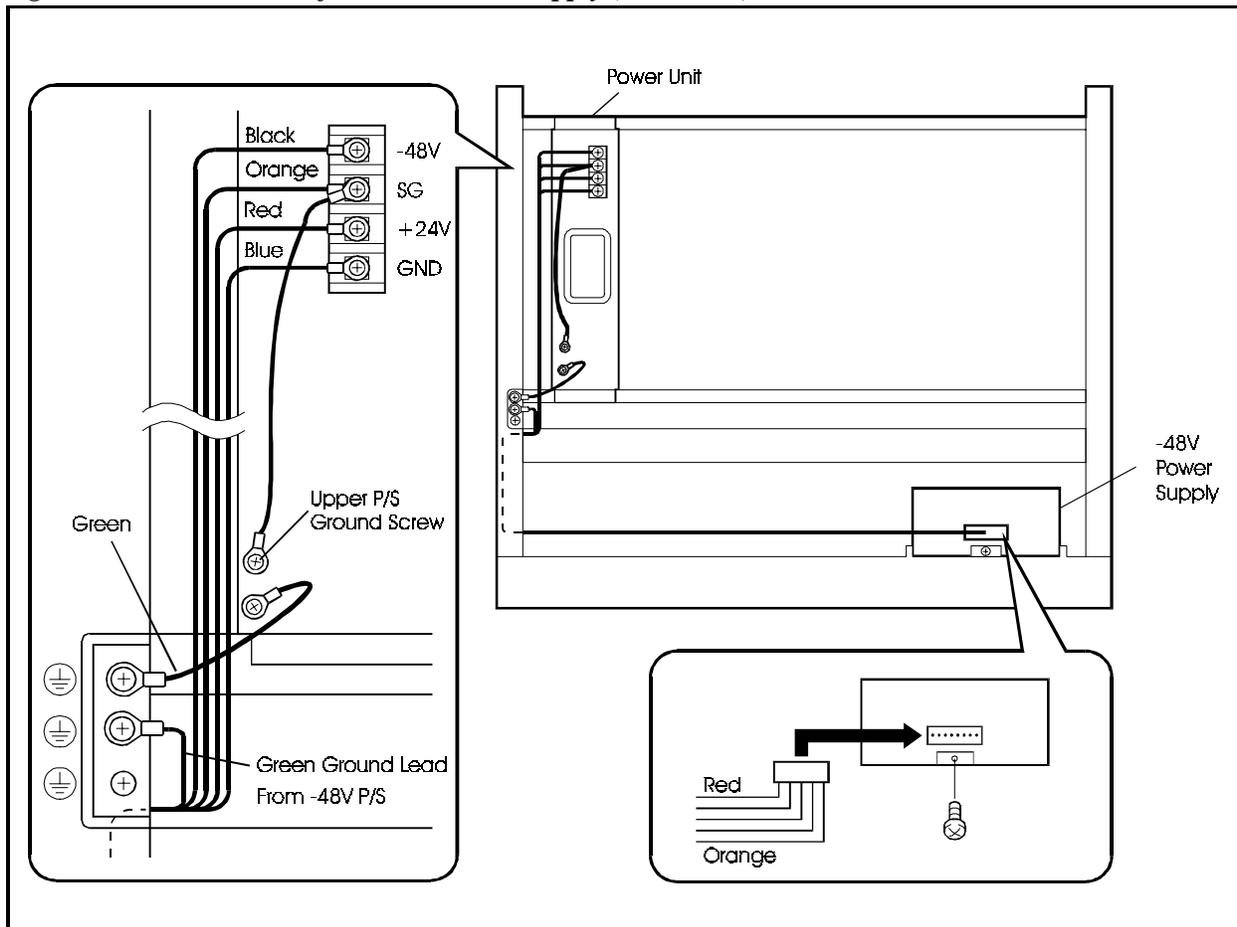
Connecting the Systems

Guidelines

⚠

> **CAUTION:**
> - Turn the power switch and the external breaker OFF and disconnect the AC cable before connecting the system.
> - To prevent EMI interference to TVs, radios, etc., install EMI filters.

- When expanding a system using the building block method, use the supplied cables to connect the TSW288/TSW576 card to the CBL card.

- Use the TSW288 card when the system has 288 or fewer ports. Use the TSW576 card when there are more than 288 ports.

- The description of how to connect systems when the building block method is based on an example of expanding the number of ports to 576. Please use Figure 4-23 to Figure 4-27 to connect systems with different numbers of ports.

- After the CBL interconnecting cables are installed, the Cabinet ID rotary switch on the CBL card must be set to determine the cabinet ID. The ID settings are shown in Figure 4-23 through Figure 4-27. See "Setting ID No. of Additional Cabinets" on page 4-27 for more information.

Important Note: Cabinets with ID rotary switch settings 1 and 2 must be cabled together in series as shown in the following figures. Cabinets with ID rotary switch settings of 3, 4 and 5 must be cabled together in series. Do not intermix these groups when cabling or the system may fail to operate.

Installation

1. Use the supplied cable to connect the connector at the bottom left of the TSW576 card installed in the OP1 slot in the 1st cabinet to the connector at the bottom left of the CBL card installed in the CPC slot of the 2nd cabinet.

2. Use the supplied cable to connect the connector at the top left of the TSW576 card installed in the OP1 slot in the 1st cabinet on the right side to the connector at the top left of the CBL card installed in the CPC slot of the 2nd cabinet.

3. Use the supplied cable to connect the connector at the bottom right of the CBL card installed in the CPC slot of the 2nd cabinet to the connector at the bottom left of the CBL card installed in the CPC slot of the 3rd cabinet.

4. Use the supplied cable to connect the connector at the top right of the CBL card installed in the CPC slot of the 2nd cabinet to the connector at the top left of the CBL card installed in the CPC slot of the 3rd cabinet.

5. Use the supplied cable to connect the connector at the bottom right of the TSW576 card installed in the OP1 slot in the 1st cabinet to the connector at the bottom left of the CBL card installed in the CPC slot of the 4rd cabinet.

6. Use the supplied cable to connect the connector at the top right of the TSW576 card installed in the OP1 slot in the 1st cabinet to the connector at the top left of the CBL card installed in the CPC slot of the 4th cabinet.

7. Use the supplied cable to connect the connector at the bottom right of the CBL card installed in the CPC slot in the 4th cabinet to the connector at the bottom left of the CBL card installed in the CPC slot of the 5th cabinet.

8. Use the supplied cable to connect the connector at the top right of the CBL card installed in the CPC slot in the 4th cabinet to the connector at the top left of the CBL card installed in the CPC slot of the 5th cabinet.

9. Use the supplied cable to connect the connector at the bottom right of the CBL card installed in the CPC slot of the 5th cabinet to the connector at the bottom left of the CBL card installed in the CPC slot of the 6th cabinet.

10. Use the supplied cable to connect the connector at the top right of the CBL card installed in the CPC slot of the 5th cabinet to the connector at the top left of the CBL card installed in the CPC slot of the 6th cabinet.

11. After the CBL interconnecting cables are installed, the Cabinet ID rotary switch on the CBL card must be set to determine the cabinet ID. The ID settings are shown in Figure 4-23 through Figure 4-27. See "Setting ID No. of Additional Cabinets" on page 4-27 for more information.

Figure 4-23. System connection using building block method (576 port example)

Notes: The CBL cables must be routed through the greyed cable trough.
The circled numbers above refer to the installation procedure step numbers.
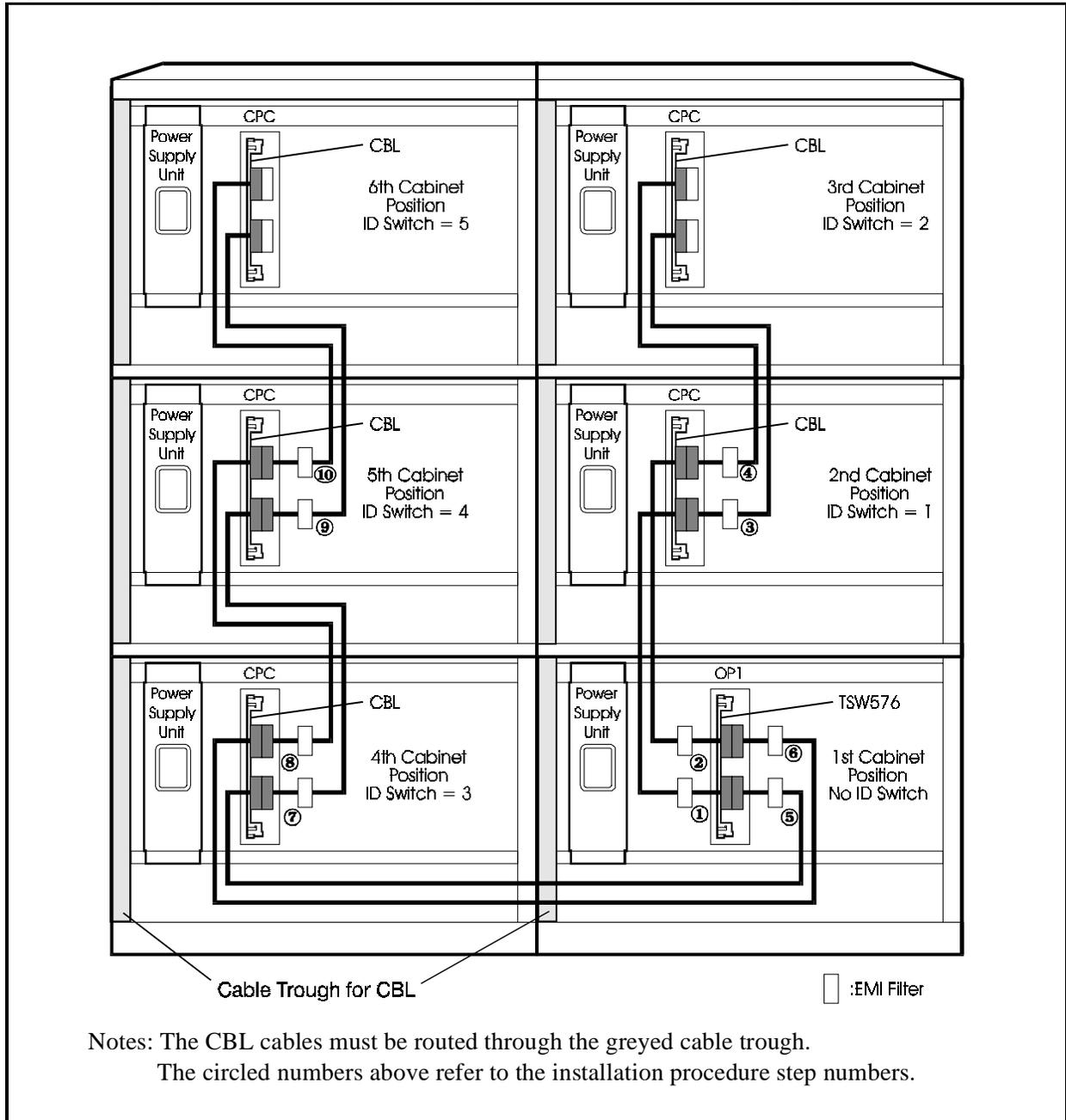
Figure 4-24. System connection using building block method (192 port example)
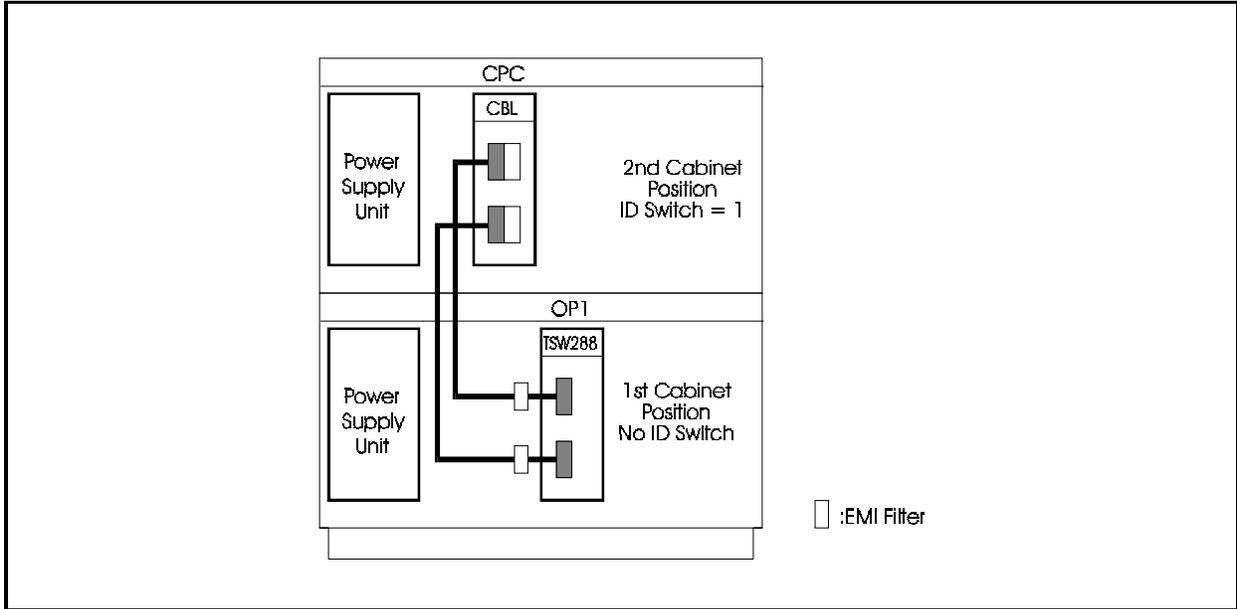
Figure 4-25. System connection using building block method (288 port example)
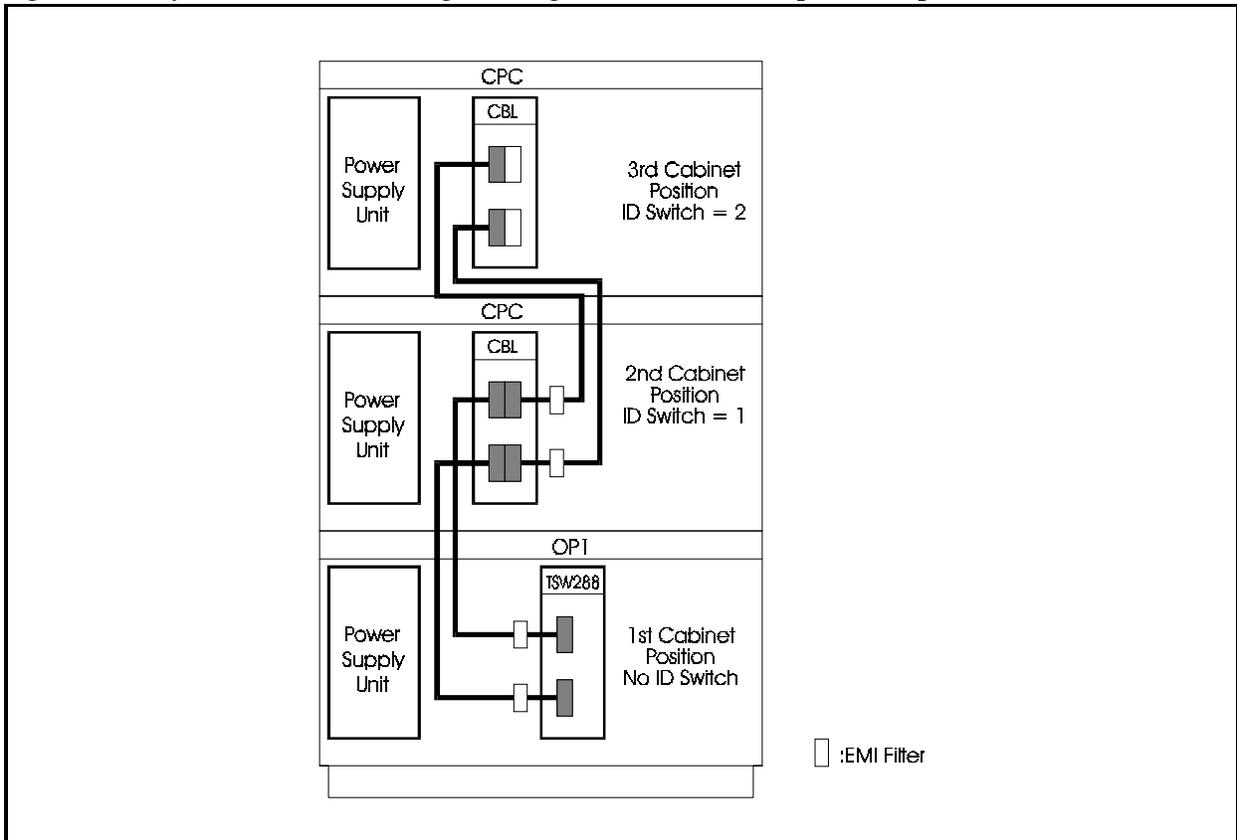
Figure 4-26. System connection using building block method (384 port example)
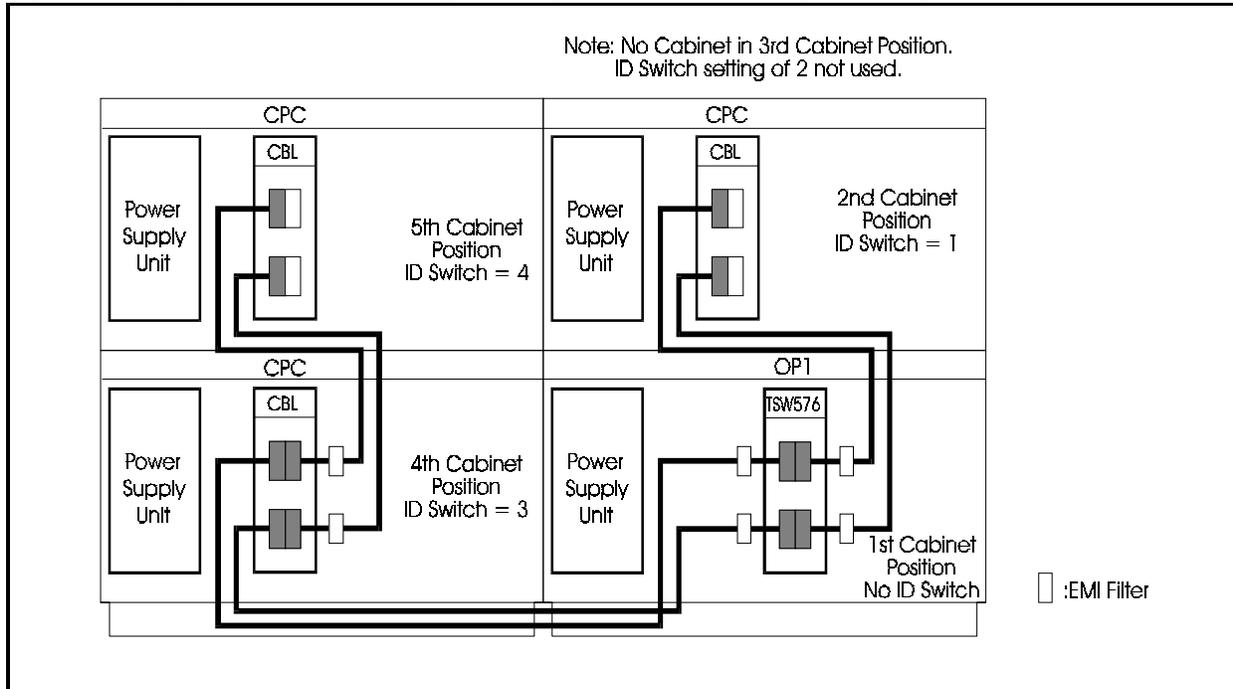
Figure 4-27. System connection using building block method (480 port example)
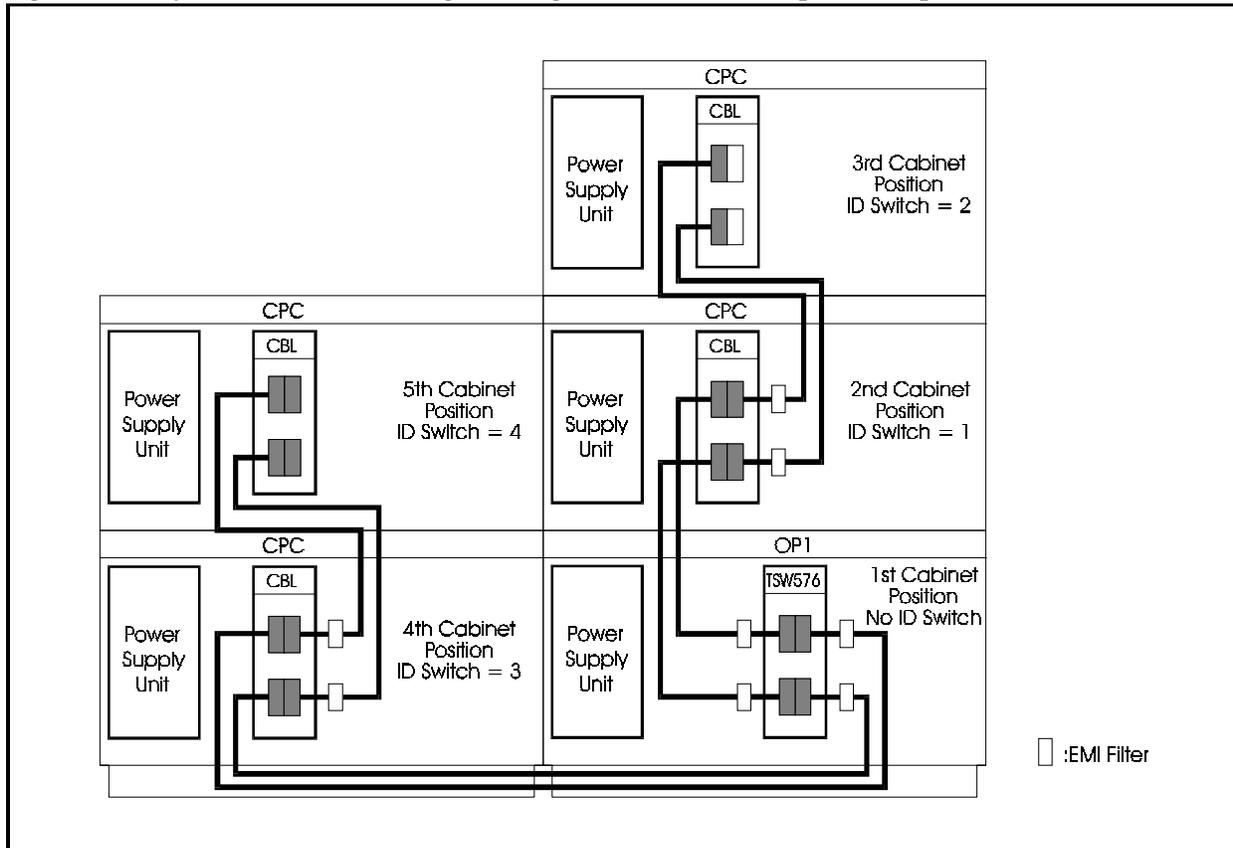
Setting ID No. of Additional Cabinets

Guidelines

- When you add a cabinet to the system, it must be given a cabinet ID number. Each cabinet ID number setting is based upon its cabinet position. See Figure 4-23 through Figure 4-27 for the cabinet positions.

  Check that the cabinet ID numbers match the size of the system you are setting up.

- Set each cabinet ID number using the ID Rotary Switch as shown in Figure 4-28. Refer to the following table for the relationship between rotary switch position and Cabinet ID number when setting the ID number.

Important Note: **Cabinets with ID rotary switch settings 1 and 2 must be cabled together in series. Cabinets with ID rotary switch settings of 3, 4 and 5 must be cabled together in series. Do not intermix these groups when cabling or the system may fail to operate.**

Figure 4-28. Relationship of rotary switch position/ID number and cabinet

Rotary switch position/ID Number	Cabinet Position (See Figure 4-23 through Figure 4-27 for Cabinet Positions)
1	2
2	3
3	4
4	5
5	6
0, 6 to 9	Not available
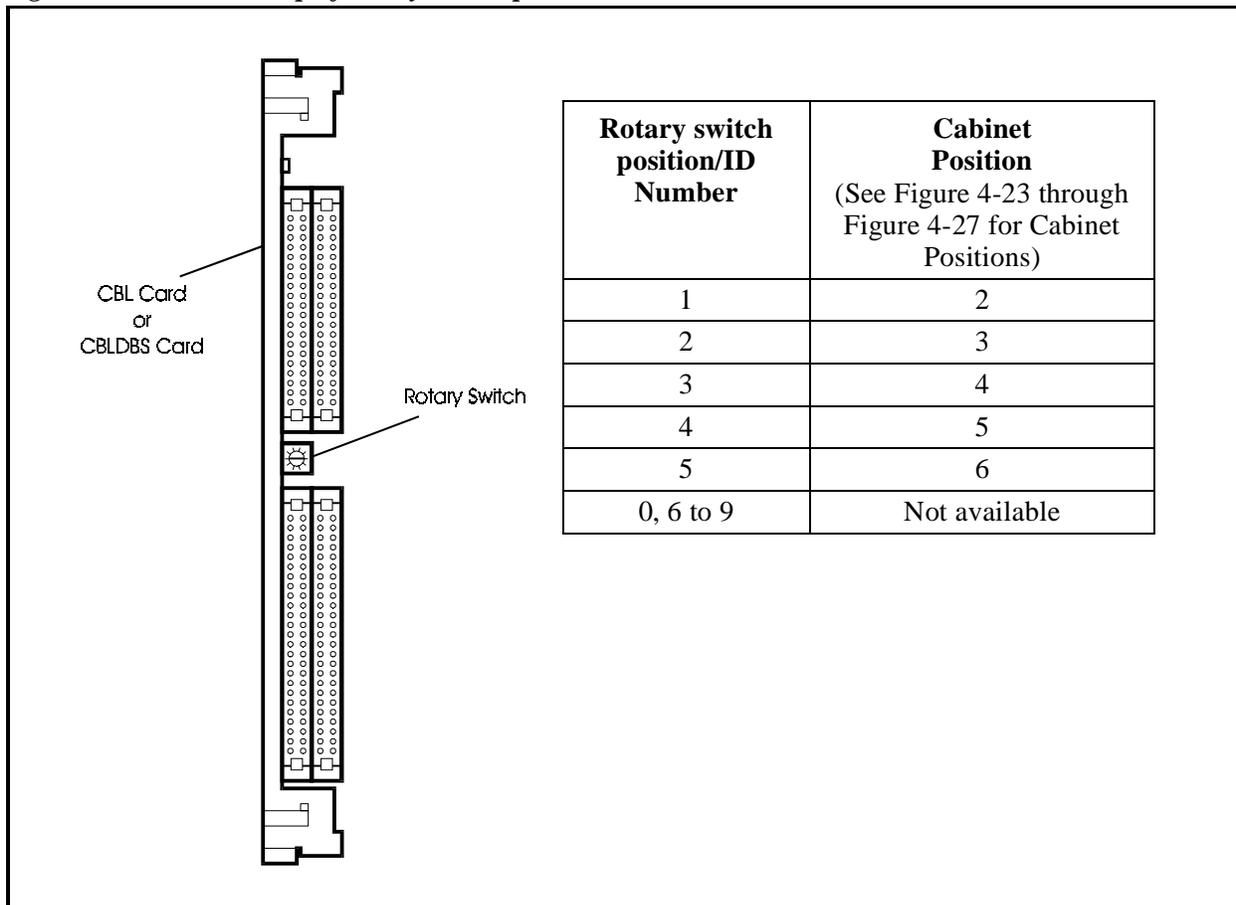
Connecting DBS 576 and DBS 96 Systems

Installation

Guidelines

⚠️ **CAUTION:**
- Turn the power switch and the external breaker OFF, and disconnect the AC cable before connecting the systems.
- Handle the DBS 576 base cabinet and DBS 96 carefully to avoid damage.
- Do not attempt to move the base cabinet or DBS 96 without assistance.
- Do not attempt to connect the base cabinet and DBS 96 system using the building block method.

- Before deciding where to install the base cabinet and DBS 96, check the external dimensions shown for the base cabinet (page 4-1) and the DBS 96 (DBS Installation and Programming Manual) and the areas required for maintenance.

- See Chapter 3 for details of how to install the base cabinet. See the DBS Installation and Programming Manual for details of how to install the DBS 96.

- Remove the covers from the base cabinet and DBS 96 (see page 3-2) to connect the systems. See the DBS Installation Manual for how to remove the covers from the DBS 96.

- Figure 4-29 shows examples of combining base cabinet and DBS 96 systems.

- Only connect to DBS 96 cabinets. The CBLDBS MDF will not fit in a DBS 40 cabinet. Some DEC ports will not be available in the DBS 72 cabinets.

Figure 4-29. Example combinations of base cabinet and DBS 96

	Cabinet Configurations		Use Cards
One additional DBS cabinet		1	CPC-288 TSW288 CBLDBS (DBS 96)
Two additional DBS cabinets	4 3	2 1	CPC-576 TWS-576 CBLDBS (DBS 96)

☐ Base Cabinet   ☐ Expansion Cabinet   ☐ DBS 96 Cabinet

Note: The numbers 1 to 5 are the cabinet ID numbers of the additional cabinets. If you are adding two or more cabinets, each added cabinet must have a cabinet ID number (see page 4-27).

Card Installation

Guidelines

- Install the cards in the base cabinet and DBS 96 in the slots indicated under "Card Installation Position" in Chapter 4 (page 4-33).

- In the DBS 96, you can only install DEC cards. You cannot increase the number of Trunk Line ports.

- Each additional DBS 96 cabinet increases the number of extension ports by up to 72.

Installation

See "Card Installation" in Chapter 3 (page 3-13) for how to install cards in the base cabinet.

See the DBS Installation and Programming Manual for details of how to install cards in the DBS 96.

Connecting the Systems

Guidelines

⚠️

CAUTION:
- Turn the power switch and the external broker OFF, and disconnect the AC cable before installing the backup battery.
- To prevent EMI interference to TVs, radios, etc., install an EMI filter.

- When expanding a system, use the supplied cables to connect the TSW288/ TSW576 card to the CBLDBS card.

- Use the TSW288 card when the CPC-288 is used. Use the TSW576 card when the CPC-576 is used.

Installation

1. Remove the one or two interface boards from the top of the DBS cabinet and retain the screws.

2. Attach the MDF Interface Circuit card supplied with the CBLDBS as shown.

Figure 4-30. Connecting the CBLDBS
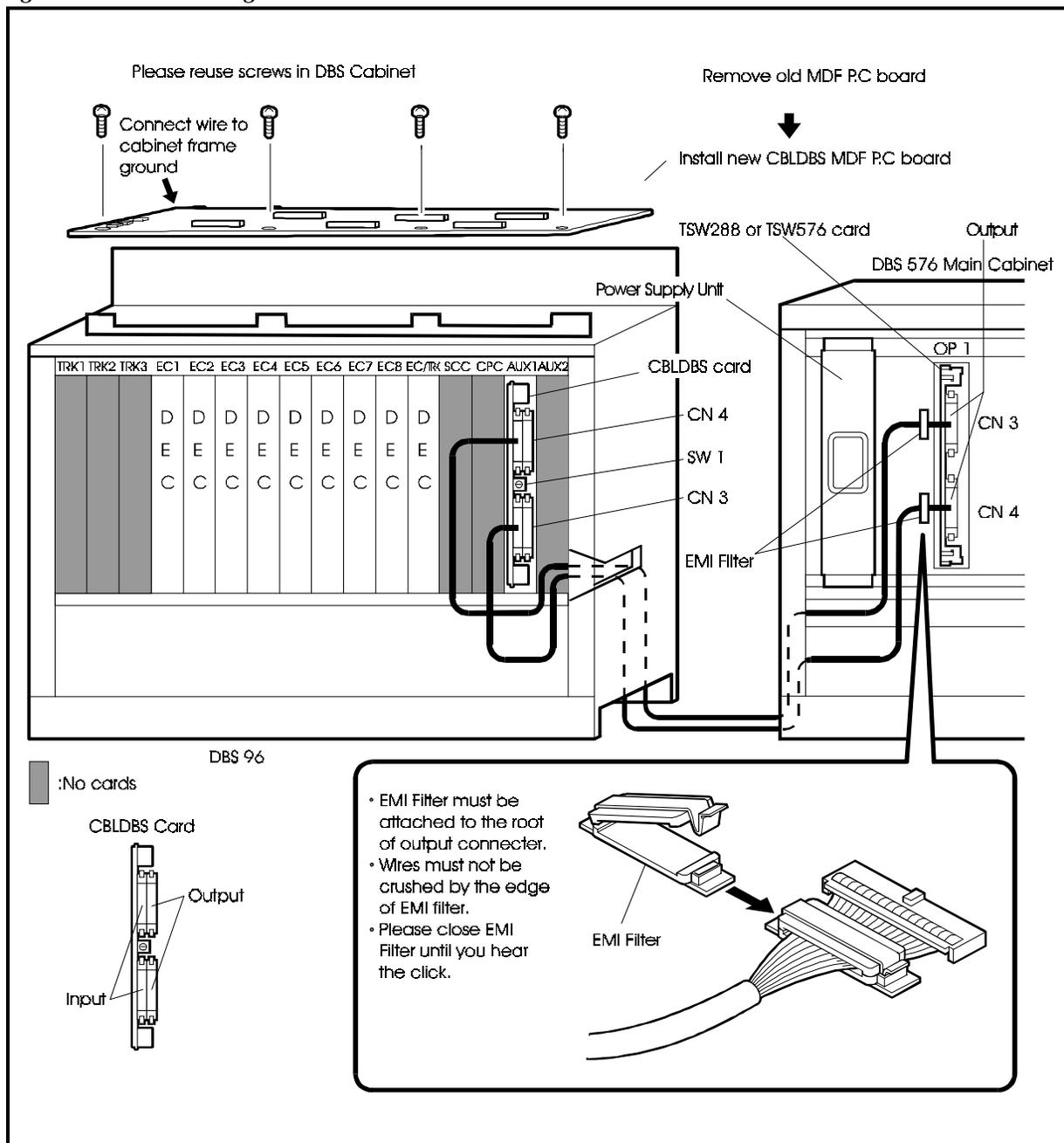
3. Connect the CBLDBS MDF Ground Cable to a screw on the cabinet frame.

4. Use the supplied cable to connect the bottom connector of the TSW288/ TSW576 card installed in the OP1 slot of the base cabinet to the connector at the bottom of the CBLDBS card installed in the AUX1 slot of the DBS 96.

5. Use the supplied cable to connect the top connector of the TSW288/TSW576 card installed in the OP1 slot in the base cabinet to the top connector of the CBLDBS card installed in the AUX1 slot of the DBS 96.

Setting CBLDBS ID Numbers

- When you add a cabinet to the system, it must be given an cabinet ID No. These cabinet ID numbers are allocated as shown in Figure 4-23.

  Check that the cabinet numbers match the size of system you are setting up.

- Use the rotary switch (SW1) on the CBL card and CBLDBS card to set the cabinet ID number.

  For details on how to set cabinet ID numbers, see "Setting ID No. of Additional Cabinets" on page 4-27.

Considerations

- The DBS 96 cabinet will only accept DEC cards. No other line or trunk card may be used with connected to a DBS 576.

- Up to two DBS cabinets may be connected to the DBS 576.

Figure 4-31. Addition of two DBS 96 cabinets
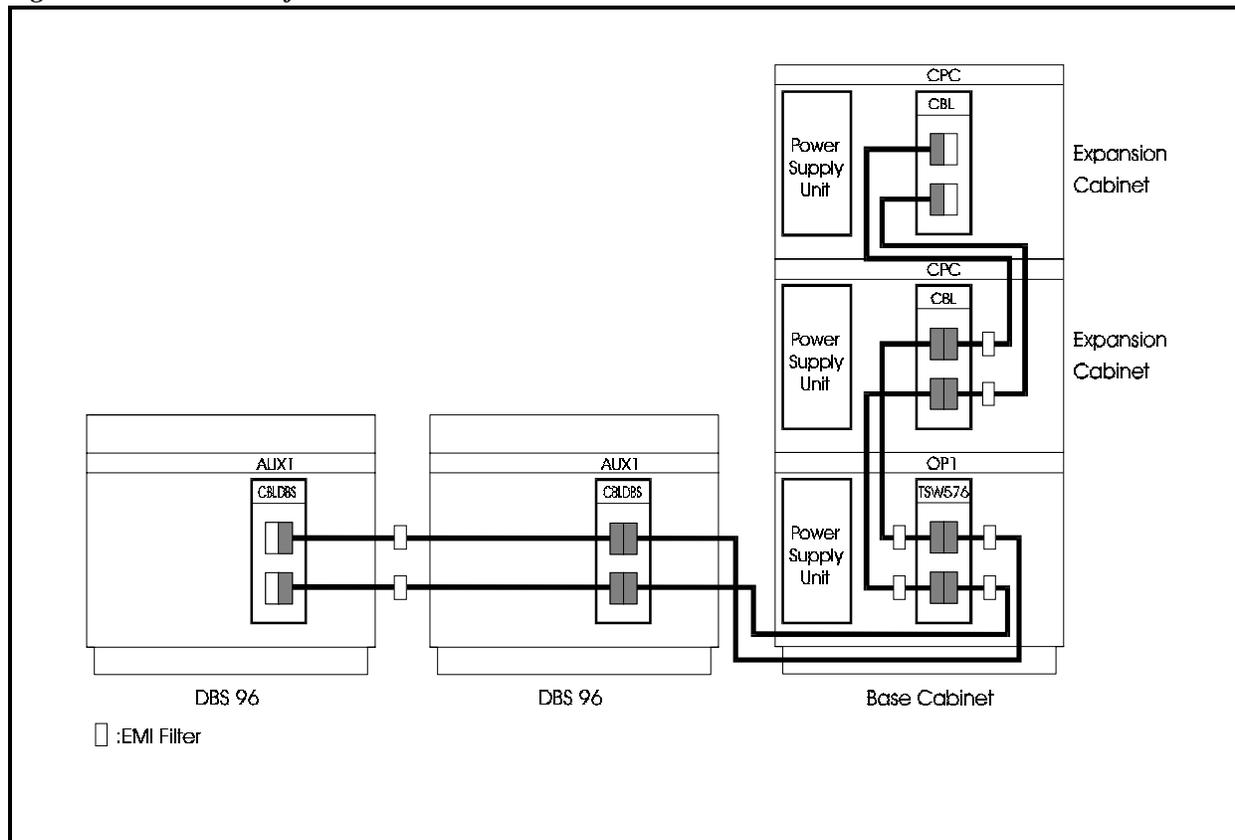
- Even though the DBS 96 cabinet logically occupies 96 port addresses, only 72 physical ports are available; 24 ports are not available. The programming address to the DBS Card slot positions are as follows:

Table 4-1.   Relationship of Programming Address to DBS Card Postion

Programming Address Card Slot (SS)	DBS DEC Card Position
Slot 1	Not Available
Slot 2	EC1
Slot 3	EC2
Slot 4	EC3
Slot 5	Not Available
Slot 6	EC4
Slot 7	EC5
Slot 8	EC6
Slot 9	Not Available
Slot 10	EC7
Slot 11	EC8
Slot 12	EC/TK

Card Installation Position

The unit cards are installed in the card slots in the DBS 576 main cabinet. Figure 4-32 shows the positions in which the cards are installed when the system comprises only one main cabinet. Figure 4-33 shows the positions when the main cabinets are combined in building-block fashion. Figure 4-34 shows the positions when a DBS 576 base cabinet is connected to a DBS 96.

Figure 4-32. Card installation positions in single cabinet system

Slot			Card		
CPC			CPC96/CPC288/CPC576		
OP1 to OP2			SCC, MFR/8, TSW288/TSW576		
FS1 to FS12	Trunks	Digital	T1^{*1}, TBRI/4, PRI/23^{*1*2}		
		Analog	LTRK/8, LGTRK/8, TR8, DIDTR/8, E&M/4		
	Extensions	Digital	DEC/8, SBRI/4, PRI/23^{*1*2}		
		Analog	AEC/8		
	Options/Audio applications		MFR/8, CONF^{*1}		
FS9					VPU/4, VPU/8
FS10					VPU/4, VPU/8
FS11				ACD	VSSC
FS12				VPU/4	^{*3}

^{*1} : Certain limitations apply (see page 4-36).

^{*2} : By setting the switch and reprogramming, the PRI/23 card can be set for T-point (trunks) or S-point (extensions) (see page 5-22, 5-45).

^{*3} : VSSC card must be installed into FS11. FS12 must be free due to the size of of the Hard Disk Drive and to allow for heat dissipation.

Figure 4-33. Card installation positions in building-block system

< Base >   < Expand >

Slot			Card		
			Base	**Expand-1**	**Expand-2 to 6**
CPC			CPC288, CPC-576[*1]	CBL[*2]	CBL[*2]
OP1			TSW288[*6], TSW576[*6]	No cards	
OP2			SCC, MFR		
FS1 to FS12	Trunks	Digital	T1[*3], TBRI/4, PRI/23[*3][*5]		
		Analog	LTRK/8, LGTRK/8, DIDTR/8, E&M/4		
	Extensions	Digital	DEC/8, SBRI/4, PRI/23[*3][*5]		
		Analog	AEC/8		
	Options/Audio applications		MFR/8, CONF[*3]		
FS10 to FS11			VPU/4[*4], VPU/8[*4], VSSC[*4][*7], ACD[*8]		
FS12			[*7] VPU/4[*8]		

[*1] : Always mount in CPC slot of master base cabinet.

[*2] : Always mount in CPC slot of expansion cabinet.

[*3] : Certain limitations apply (see page 4-36).

[*4] : Cannot be installed in top cabinet when used in two- or three-main cabinet configuration.

<2-Cabinet configuration> <3-Cabinet configuration>

[*5] : By setting the switch and reprogramming, the PRI/23 card can be set for T-point (trunks) or S-point (extensions) (see page 5-22, 5-45).

[*6] : Use the TSW288 card with the CPC-288. Use the TSW576 card with the CPC-576.

[*7] : VSSC card must be installed in FS11. FS12 free due to the size of the Hard Disk Drive and to allow for heat dissipation.

[*8] : ACD card must be installed in FS11 and VPU/4 card must be installed in FS12.

Figure 4-34. Card installation positions in system comprising DBS 576 and DBS 96

PWR	CPC	OP1	OP2	FS1	FS2	FS3	FS4	FS5	FS6	FS7	FS8	FS9	FS10	FS11	FS12

DBS 576 Cabinet(s)

TRK1	TRK2	TRK3	EC1	EC2	EC3	EC4	EC5	EC6	EC7	EC8	EC/TRK	SCC	CPC	AUX1	AUX2

< DBS 96 Cabinet(s) >

Slot				Card		
				Base	**Expand-1**	**Expand-2 to 6**
DBS 576	CPC			CPC288, CPC-576[*1]	CBL[*2]	CBL[*2]
	OP1			TSW288[*6], TSW576[*6]	No cards	
	OP2			SCC		
	FS1 to FS12	Trunks	Digital	T1[*3], TBRI/4, PRI/23[*3][*5]		
			Analog	LTRK/8, LGTRK/8, DIDTR/8, E&M/4		
		Extension lines	Digital	DEC/8, SBRI/4, PRI/23[*3][*5]		
			Analog	AEC/8		
		Options/Audio applications		MFR/8, CONF[*3]		
	FS10 to FS11			VPU/4[*4], VPU/8[*4], VSSC[*4] [*7]		No cards
	FS12			[*7]		
DBS 96	TRK1 to TRK3			Use DBS 576 Base cabinet	No cards	
	EC1 to EC8, EC/TRK	Digital extension lines			DEC	
	SCC, CPC, AUX1				No cards	
	AUX2				CBLDBS	

[*1] : Always mount in CPC slot of Base main cabinet.

[*2] : Always mount in CPC slot of Expansion main cabinet.

[*3] : Certain limitations apply (see page 4-36)

[*4] : Cannot be installed in top main cabinet when used in two- or three-main cabinet configuration.
Example:.

<2-Cabinet Configuration> <3-Cabinet Configuration>

[*5] : By setting the switch and reprogramming, the PRI/23 card can be set for S-point (extension lines) or T-point (trunks) (see page 5-22,5-45)

[*6] : Use the TSW288 card with the CPC-288. Use the TSW576 card with the CPC-576.

[*7] : VSSC card must be installed into FS11. FS12 must be kept free due to the width of the HDD and to allow for heat dissipation.

Restriction on Number of Cards

Note that only a limited number of PRI/23, T1, and CONF cards can be installed in the flexible slots (FS). Do not attempt to install more than the prescribed maximums.

PRI/23/T1 Card

The switches on the PRI/23 card (see page 2-31), the T1 card (see page 2-33) and the settings described in the Programming Manual (Section 400) allow you to select 8, 16 or 24 communication channels.

Because each flexible slot can handle a maximum of 8 channels, two or more flexible slots are effectively occupied per card if you set 16 or more channels. In this case, certain slots must be left vacant.

The following table shows which slots cannot be used according to the number of set channels. Do not attempt to install any cards in the unusable slots.

Table 4-2.   PRI/23 and T1 card limitations

Channels	Card installation position	Unusable slots		
		FS1 installed	**FS5 installed**	**FS9 installed**
8ch	FS1 to FS12	No limit		
16ch	FS1, FS5 or FS9	FS2	FS6	FS10
24ch		FS2 to FS3	FS6 to FS7	FS10 to FS11

Note: The PRI/23 card can only be set for 8 channels or 24 channels when used for S-point (extension) connections.

Figure 4-35. Restriction on PRI/23 and T1 cards installed in flexible slots of DBS 576
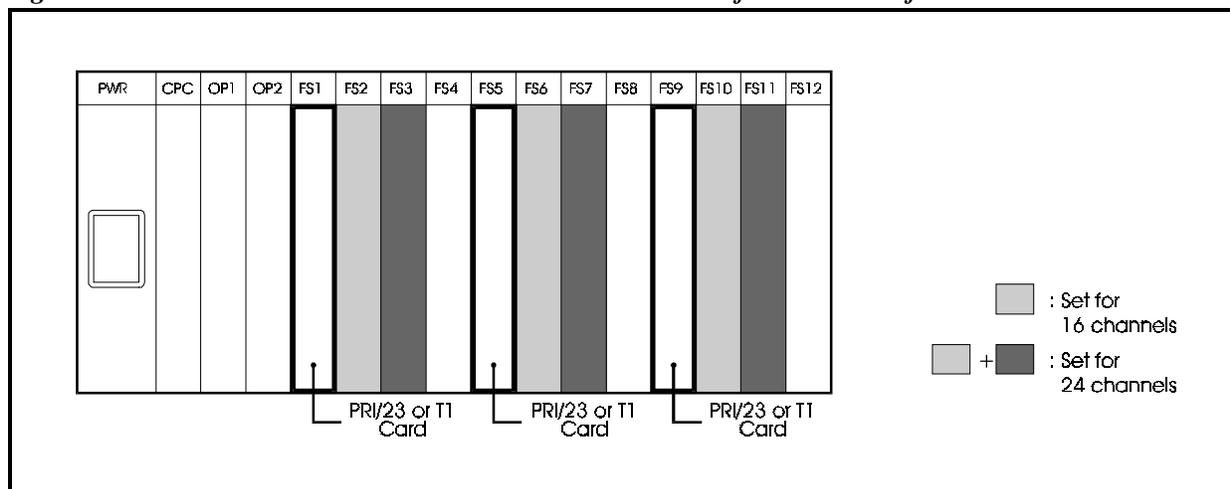
Conference Card

There is a limit to the number of eight-party conference card (CONF) that can be installed in a system cabinet as follows:

Cabinet #	1	2	3	4	5	6
Number of Conference Cards	2	2	2	2	4	4

Optimization of Card Installation

As far as possible, group the cards installed in the flexible slots as shown below.

Ensure that any vacant slots are evenly distributed.

Figure 4-36. Optimization of card installation
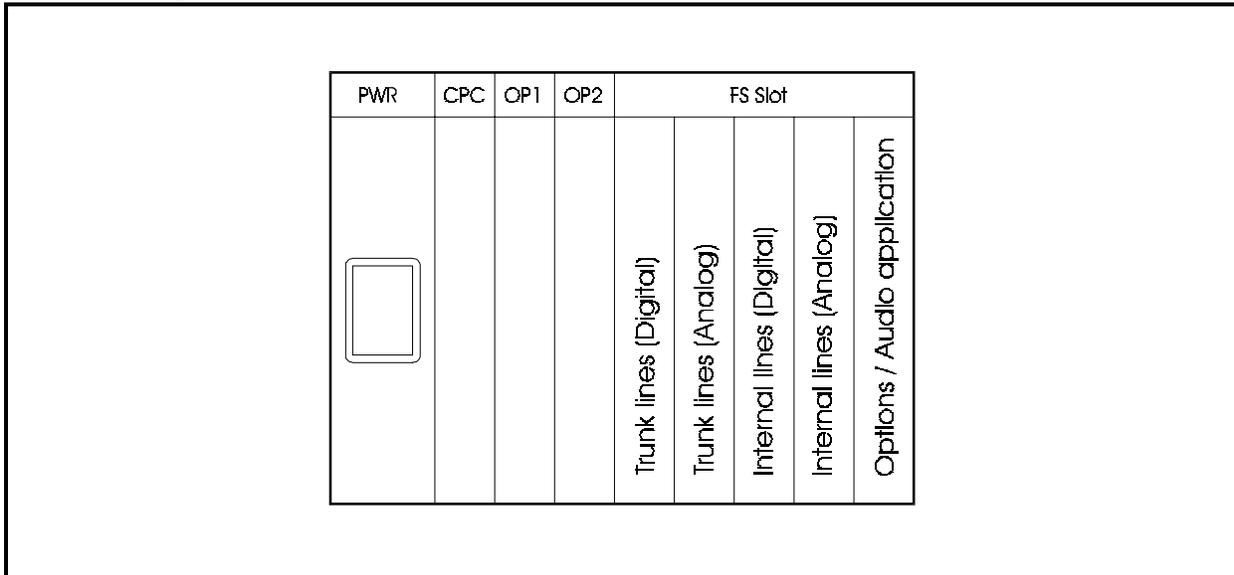
Chapter 5. Trunks and Extensions

This chapter explains how to connect trunks and dedicated lines, how to connect different types of digital and analog extensions, and how to mount telephones on the wall.

Maintenance Switches

uidelines

CAUTION:
- Check that the line busy lamp is off before removing the card. If the lamp is on, the line will be disconnected when the card is removed.
- Check that the maintenance switch is off. After replacing the card in its slot on completion of the maintenance work.
- Never attempt to remove any of the following cards while the system is operating:

• CPC96 card	• CPC288 card
• CPC576 card	• TSW288 card
• TSW576 card	• CBLDBS card
• CBL card	• SCC card
• ACD card	• VPU/8 card
• VPU/4 card	• VSSC card

- The following cards can be removed from and replaced in their slots even when the system is operating (power is on) provided the maintenance switch is set to ON (up).

  - LTRK/8 card
  - LGTRK/8 card
  - E&M/4 card
  - DIDTR8 card
  - TBRI/4 card
  - PRI/23 card
  - T1 card

When the maintenance switch is on, the cards are in the following state:

- Incoming calls are ignored;
- Outgoing calls are prevented;
- The line is disconnected on completion of any current call.

That is, further incoming calls are ignored and outgoing calls are prevented as soon as any current call is completed.

The cards can be removed as soon as all circuits on the card are idle and the busy lamps are off.

Figure 5-1. Maintenance switch positions (LTRK/8 card shown)

< Loop Start Trunk Card shown >
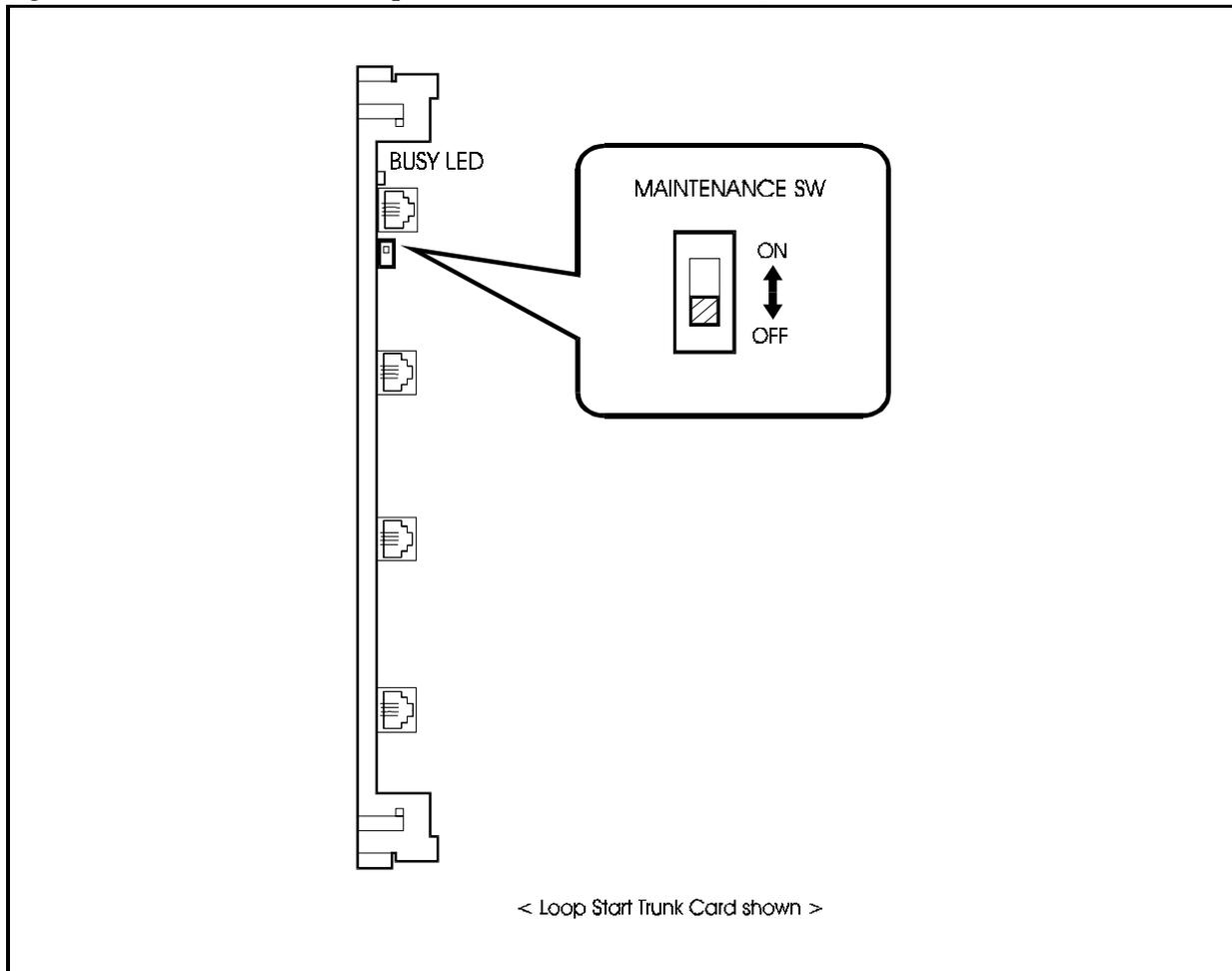
- Cards for the following extension lines can be removed and replaced while the system is operating.

  - DEC/8 card
  - AEC/8 card
  - SBRI/4 card
  - MFR/8 card
  - CONF card

Note: Because there are no busy lamps for calls on extension lines, you cannot check the status of these lines. We recommend using paging, etc., before removing the cards, to warn users that the lines will be disconnected.

Trunks

The following cards are used with trunks:

- LTRK/8: Loop start trunk interface card (8 ports)

- LGTRK/8: Loop Start/Ground Start trunk interface card (8 ports)

- DIDTR/8: Direct Inward Dial trunk interface card (8 ports)

- E&M Tie Line trunk interface card (4 ports)

- TBRI/4: T-point ISDN basic interface card (4 ports)

- PRI/23: T-point and S-point ISDN primary rate interface card (1 port)

- T1: T1 trunk interface card (1 port)

In addition to the trunk cards, if installing using any combination of LTRK/8, LGTRK/8 or DIDTR/8 cards, an appropriate number of Trunk MDF Cards must be installed for each cabinet as described in "Trunk MDF Interface Card" on page 5-4.

Install the correct type of cards in the cabinet for the trunks that are to be connected, then connect the trunks.

The following describes how to connect the respective types of trunks.

Trunk MDF Interface Card

MDF-CO card

Guidelines

- Loop-Start trunks (LTRK/8), Loop-start/Ground-start trunks (LGTRK/8), and DID trunks (DIDTR/8) trunks connect to the Main Distribution Frame through the Trunk MDF Interface (MDF-CO) card. Each Trunk MDF Interface supports any combination of up to three of these trunk cards.

- Each trunk circuit card contains four (4) four-wire modular connectors. Each four-wire connector provides connection to two (2) trunk circuits.

- The Trunk MDF Interface may be mounted on either side of the cabinet. If the system may expand to include cabinets installed side by side, install the MDF Interface on the side of the cabinet that will remain on the outside.

- The Trunk MDF Interface contains three (3) sets of four (4) modular connectors. Each set of four modular connectors supports one LTRK/8, LGTRK/8, or DIDTR/8 trunk card.

- A second type of MDF Interface is used with the DBS 576. The Extension MDF Interface is also installed in the MDF Interface positions on the side of the cabinet. Make certain that you use the correct MDF Interface.

Installation

1. From Table 5-1 determine the total number of Trunk Interface Cards required per cabinet.

Table 5-1.   Number of Trunk Interface Cards Required per Cabinet

Total Number of Trunk Cards in Cabinet (LTRK/8, LGTRK/8, and DIDTR/8)	Required Number of Trunk MDF Interface Cards
1 to 3	1
4 to 6	2
7 to 9	3
10 to 12	4

2. From Figure 5-2, determine the Trunk MDF Interface Card position(s).

Figure 5-2. Trunk MDF Interface Installation
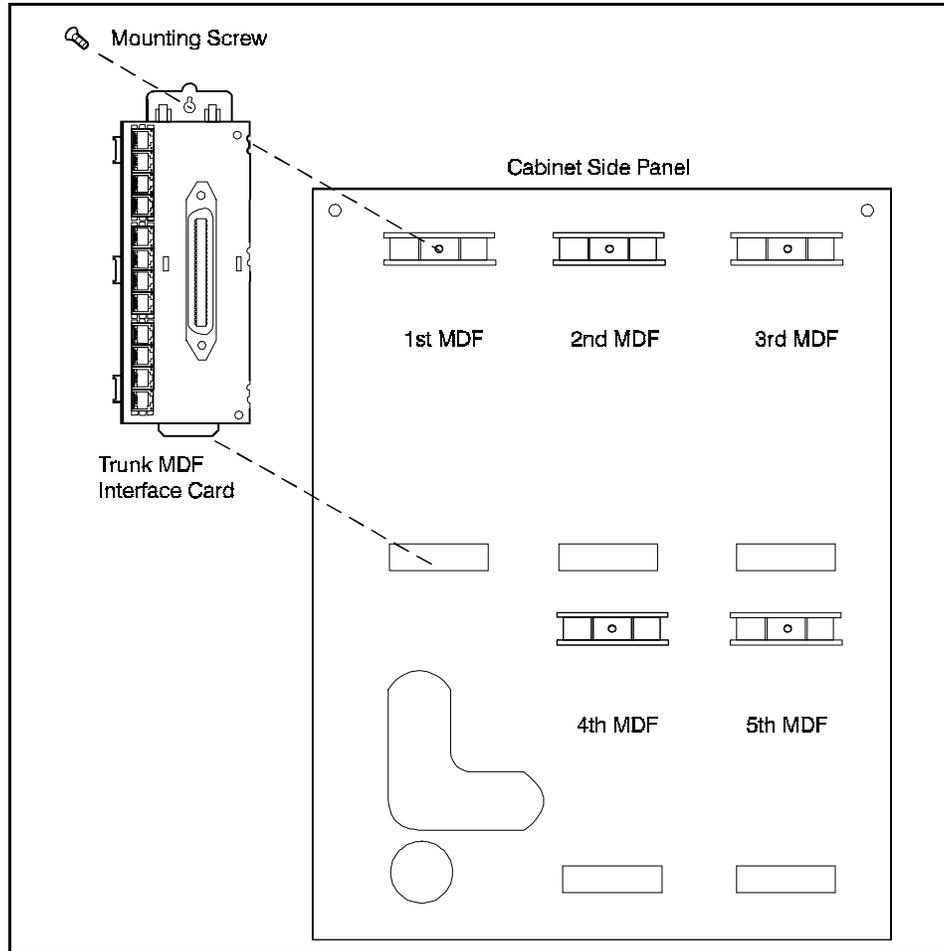
3. Holding the Trunk MDF Interface Card in place, insert the bottom tab of the Trunk MDF Interface Card into the slot opening at the bottom of the MDF Interface Card position.

4. Use the supplied screw to fasten the Trunk MDF Interface Card into place.

5. Repeat steps 3 and 4 for any additional Trunk MDF Interface Cards to be installed.

Loop-Start Trunks

<div style="border:1px solid black">

LTRK/8 card

</div>

Guidelines

- Loop-start trunks are connected to a LTRK/8 card (VB-44510) installed in a flexible slot of the cabinet. A maximum of 8 trunks can be connected to each LTRK/8 card.

- One or more Trunk MDF Cards (VB-44512) must be installed to support connection of trunks from the Main Distribution Frame (MDF) to the LTRK/8 card. Each Trunk MDF supports up to three LTRK/8, LGTRK/8 or DIDTR/8 cards (up to 24 trunks). See "Trunk MDF Interface Card" on page 5-4 for information on installing the Trunk MDF Interface Card.

- Each trunk card requires a modular cable assembly (supplied with trunk card).

- Cabling must also be completed from the MDF interface card to the MDF (cables not supplied).

- The maintenance switch (SW1) on the LTRK/8 card can be set so that the card can be removed and installed while the system is operating. See page 5-1 for details on the maintenance switch.

- A Caller ID Card (VB-44513) may be installed on the LTRK/8 to provide caller ID numbers.

- Table 5-2 shows the maximum numbers of cards and trunks per system type.

Table 5-2.   Maximum loop-start trunks per system

System Type	Maximum Number of Cards	Maximum Number of Loop Start Trunks
96 ports (CAB9651)	12	1-96
192 ports (CAB96 + CAB96B)	24	1-192
288 ports (CAB96 + CAB96B52)	36	1-288
384 ports (CAB9652 + CAB96B52)	48	1-384
480 ports (CAB9652 + CAB96B53)	60	1-480
576 ports (CAB9652 + CAB96B54)	72	1-576

Installation

Note: Prior to installing the Loop Start Trunk Card, make certain you can connect to a Trunk MDF Interface Card (VB44512) mounted on the side of the cabinet. See "Trunk MDF Interface Card" on page 5-4 for more information on installing a Trunk MDF Interface Card.

1. If installing a Caller ID (CID, VB-44513) piggyback card, install the card as shown in Figure 5-3.

Figure 5-3. Caller ID Card Installation:
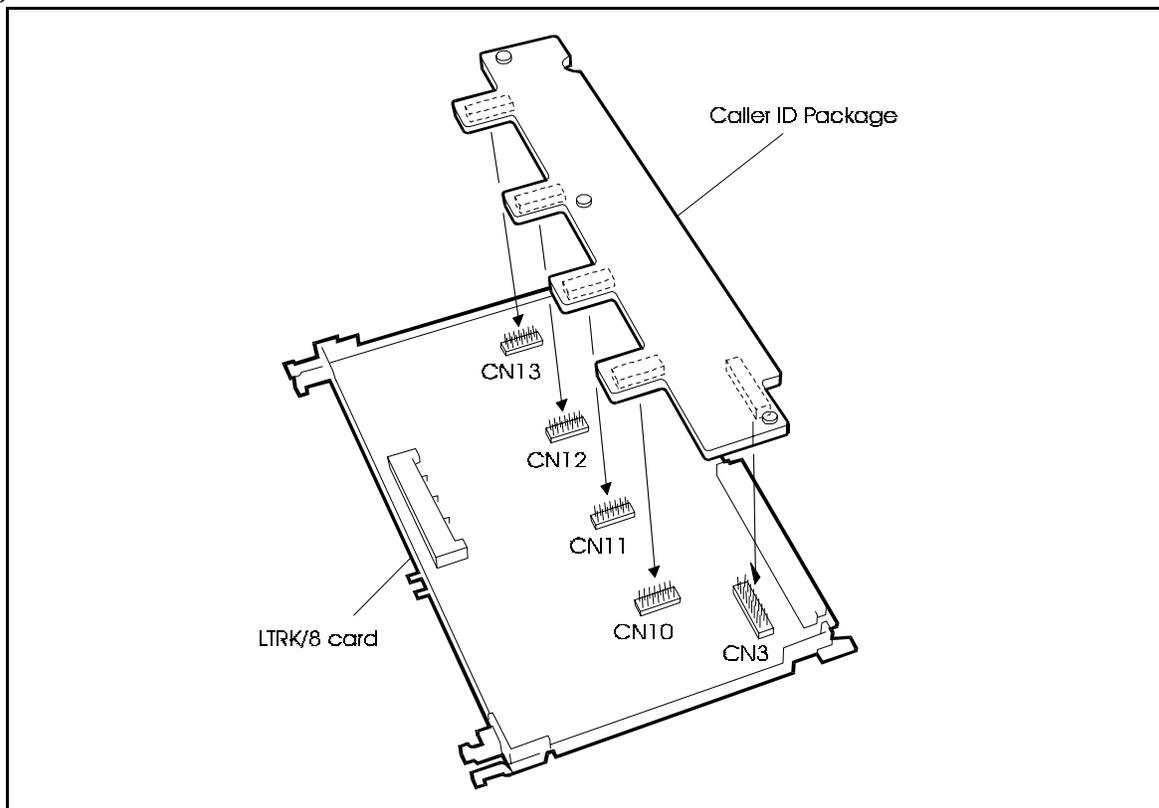
2. For every CID circuit to be used, set the DIP switch to OFF (CID). Otherwise set the switch to ON (LS).

Table 5-3.   Caller ID switch (SW10-17) settings of LTRK/8 card

Switch	Setting	Description
SW10	ON	Circuit 1 is in loop start mode and does not receive caller ID information.
	OFF	Circuit 1 is set to receive Caller ID information (requires CID card).
SW11	ON	Circuit 2 is in loop start mode and does not receive caller ID information.
	OFF	Circuit 2 is set to receive Caller ID information (requires CID card).
SW12	ON	Circuit 3 is in loop start mode and does not receive caller ID information.
	OFF	Circuit 3 is set to receive Caller ID information (requires CID card).
SW13	ON	Circuit 4 is in loop start mode and does not receive caller ID information.
	OFF	Circuit 4 is set to receive Caller ID information (requires CID card).
SW14	ON	Circuit 5 is in loop start mode and does not receive caller ID information.
	OFF	Circuit 5 is set to receive Caller ID information (requires CID card).
SW15	ON	Circuit 6 is in loop start mode and does not receive caller ID information.
	OFF	Circuit 6 is set to receive Caller ID information (requires CID card).
SW16	ON	Circuit 7 is in loop start mode and does not receive caller ID information.
	OFF	Circuit 7 is set to receive Caller ID information (requires CID card).
SW17	ON	Circuit 8 is in loop start mode and does not receive caller ID information.
	OFF	Circuit 8 is set to receive Caller ID information (requires CID card).

3. Install the LTRK/8 card in any available flexible slot.

4. Referring to Figure 5-4 and Table 5-4 on page 5-9, connect the trunks to the MDF Interface Card using the supplied modular cable.

    Note: Labels are supplied with the MDF Interface Card to identify the Flexible Slot cable connection. Make certain to attach a label on both ends of the cable and at the MDF Interface Card connector.

Figure 5-4. Connecting loop-start trunks

Table 5-4.   Loop Start Trunk Connections and Pinouts.

Trunk Circuit Card(s)				MDF Interface Card (Trunk)		
B *(Cabinet)*	SS *(Slot)*	C *(Circuit)*	*Modular Connector*	*Modular Connector*	*CN1 Color Code*	*CN1 Pin No.*
_____	_____	1	CN2 (Bottom)	CN2 - 1 (Top)	WH-BL BL-WH	26 1
		2			WH-OR OR-WH	27 2
		3	CN3	CN2-2	WH-GN GN-WH	28 3
		4			WH-BR BR-WH	29 4
		5	CN4	CN2-3	WH-SL SL-WH	30 5
		6			RD-BL BL-RD	31 6
		7	CN5	CN2-4	RD-OR OR-RD	32 7
		8			RD-GN GN-RD	33 8
	_____	1	CN2 (Bottom)	CN3-1 (Top)	RD-BR BR-RD	34 9
		2			RD-SL SL-RD	35 10
		3	CN3	CN3-2	BK-BL BL-BK	36 11
		4			BK-OR OR-BK	37 12
		5	CN4	CN3-3	BK-GN GN-BK	38 13
		6			BK-BR BR-BK	39 14
		7	CN5	CN3-4	BK-SL SL-BK	40 15
		8			YL-BL BL-YL	41 16
	_____	1	CN2 (Bottom)	CN4-1 (Top)	YL-OR OR-YL	42 17
		2			YL-GN GN-YL	43 18
		3	CN3	CN4-2	YL-BR BR-YL	44 19
		4			YL-SL SL-YL	45 20
		5	CN4	CN4-3	VI-BL BL-VI	46 21
		6			VI-OR OR-VI	47 22
		7	CN5	CN4-4	VI-GN GN-VI	48 23
		8			VI-BR BR-VI	49 24
	No Connection			No Connection	VI-SL SL-VI	50 25

Loop-Start/Ground Start Trunks

LGTRK/8 card

Guidelines

- Loop-start and or ground-start trunks are connected to a LGTRK/8 card (VB-44511) installed in a flexible slot of the cabinet. A maximum of 8 trunks can be connected to each LGTRK/8 card.

- Both jumpers settings and system programming determines if the circuit is used as a loop-start trunk or a ground start trunk. After the card in installed, the circuit must also be properly programmed. See *Programming Section 400 - Analog Trunk Programming - Trunk Signal Type*.

- A -48V Power Supply must be installed in the same cabinet as the LGTRK/8 card for ground start trunks to operate.

- One or more Trunk MDF Cards (VB-44512) must be installed to support connection of trunks from the Main Distribution Frame (MDF) to the LGTRK/8 card. Each Trunk MDF supports up to three LTRK/8, LGTRK/8 or DIDTR/8 cards (up to 24 trunks). See "Trunk MDF Interface Card" on page 5-4 for information on installing the Trunk MDF Interface Card.

- Each trunk card requires a four (4) RJ-11 modular cable assembly (supplied).

- Cabling must also be completed from the MDF interface card to the MDF (cables not supplied).

- The maintenance switch (SW1) on the LGTRK/8 card can be set so that the card can be removed and installed while the system is operating. See page 5-1 for details on the maintenance switch.

- Table 5-5 shows the maximum numbers of cards and trunks per system type.

Table 5-5.   Maximum Loop-Start/Ground-Start Trunks Per System

System Type	Maximum Number of Cards	Maximum Number of Ground Start/Loop Start Trunks
96 ports (CAB9651)	12	1-96
192 ports (CAB96 + CAB96B)	24	1-192
288 ports (CAB96 + CAB96B52)	36	1-288
384 ports (CAB9652 + CAB96B52)	48	1-384
480 ports (CAB9652 + CAB96B53)	60	1-480
576 ports (CAB9652 + CAB96B54)	72	1-576

Installation

Note: Prior to installing the Loop Start/Ground Start Trunk Card, make certain you can connect to a Trunk MDF Interface Card (VB44512) mounted on the side of the cabinet. See "Trunk MDF Interface Card" on page 5-4 for more information on installing a Trunk MDF Interface Card.

Note: Make certain that there is a -48V power supply installed in every cabinet containing a LGTRK/8 card.

1. Set the jumpers for each of the circuits on the LGTRK/8 card for either ground start or loop start operation as per the following table:

Table 5-6.   Ground Start/Loop Start jumper settings of LGTRK/8 card

Jumper Connector	Jumpers	Description
CN101 & CN102	ON	Circuit 1 is in ground start mode
	OFF	Circuit 1 is in loop start mode
CN201 & CN202	ON	Circuit 2 is in ground start mode
	OFF	Circuit 2 is in loop start mode
CN301 & CN302	ON	Circuit 3 is in ground start mode
	OFF	Circuit 3 is in loop start mode
CN401 & CN402	ON	Circuit 4 is in ground start mode
	OFF	Circuit 4 is in loop start mode
CN501 & CN502	ON	Circuit 5 is in ground start mode
	OFF	Circuit 5 is in loop start mode
CN601 & CN602	ON	Circuit 6 is in ground start mode
	OFF	Circuit 6 is in loop start mode
CN701 & CN702	ON	Circuit 7 is in ground start mode
	OFF	Circuit 7 is in loop start mode
CN801 & CN802	ON	Circuit 8 is in ground start mode
	OFF	Circuit 8 is in loop start mode

2. Install the LGTRK/8 card in any available flexible slot.

3. Referring to Figure 5-5 and Table 5-7 on page 5-13, connect the trunks to the MDF Interface Card using the supplied modular cable assembly.

Note: Labels are supplied with the MDF Interface Card to identify the Flexible Slot cable connection. Make certain to attach a label on both ends of the cable and at the MDF Interface Card connector.

Note: After the card in installed, the circuit must also be programmed to match. See *Programming Section 400 - Analog Trunk Programming - Trunk Signal Type*.

Figure 5-5. Connecting Loop-Start/Ground Start Trunks
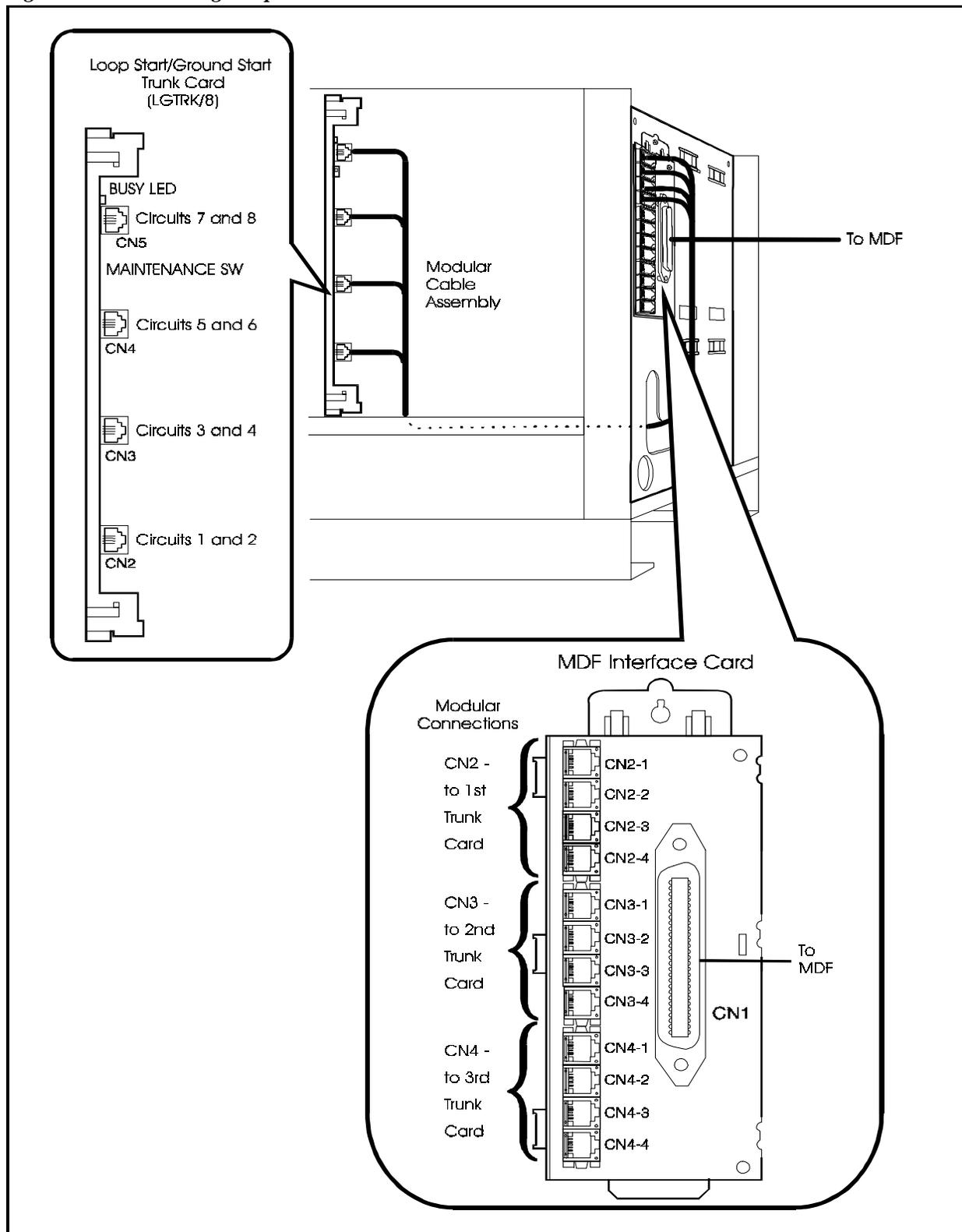
Table 5-7. Loop Start/Ground Trunk Connections and Pinouts.

Trunk Circuit Card(s)				MDF Interface Card (Trunk)		
B (Cabinet)	SS (Slot)	C (Circuit)	Modular Connector	Modular Connector	CN1 Color Code	CN1 Pin No.
_____	_____	1	CN2 (Bottom)	CN2 - 1 (Top)	WH-BL / BL-WH	26 / 1
		2			WH-OR / OR-WH	27 / 2
		3	CN3	CN2-2	WH-GN / GN-WH	28 / 3
		4			WH-BR / BR-WH	29 / 4
		5	CN4	CN2-3	WH-SL / SL-WH	30 / 5
		6			RD-BL / BL-RD	31 / 6
		7	CN5	CN2-4	RD-OR / OR-RD	32 / 7
		8			RD-GN / GN-RD	33 / 8
	_____	1	CN2 (Bottom)	CN3-1 (Top)	RD-BR / BR-RD	34 / 9
		2			RD-SL / SL-RD	35 / 10
		3	CN3	CN3-2	BK-BL / BL-BK	36 / 11
		4			BK-OR / OR-BK	37 / 12
		5	CN4	CN3-3	BK-GN / GN-BK	38 / 13
		6			BK-BR / BR-BK	39 / 14
		7	CN5	CN3-4	BK-SL / SL-BK	40 / 15
		8			YL-BL / BL-YL	41 / 16
	_____	1	CN2 (Bottom)	CN4-1 (Top)	YL-OR / OR-YL	42 / 17
		2			YL-GN / GN-YL	43 / 18
		3	CN3	CN4-2	YL-BR / BR-YL	44 / 19
		4			YL-SL / SL-YL	45 / 20
		5	CN4	CN4-3	VI-BL / BL-VI	46 / 21
		6			VI-OR / OR-VI	47 / 22
		7	CN5	CN4-4	VI-GN / GN-VI	48 / 23
		8			VI-BR / BR-VI	49 / 24
	No Connection			No Connection	VI-SL / SL-VI	50 / 25

DID Trunks

> ## DIDTR/8 card

Guidelines

- Direct Inward Dial (DID) trunks are connected to a DIDTR/8 card (VB-44520) installed in a flexible slot of the cabinet. A maximum of 8 trunks can be connected to each DIDTR/8 card.

- A -48V Power Supply must be installed in the same cabinet as the DIDTR/8 card for DID trunks to operate.

- One or more Trunk MDF Cards (VB-44512) must be installed to support connection of trunks from the Main Distribution Frame (MDF) to the DIDTR/8 card. Each Trunk MDF supports up to three LTRK/8, LGTRK/8 or DIDTR/8 cards (up to 24 trunks). See "Trunk MDF Interface Card" on page 5-4 for information on installing the Trunk MDF Interface Card.

- Each trunk card requires a modular cable asswmbly (supplied).

- Cabling must also be completed from the MDF interface card to the MDF (cables not supplied).

- The maintenance switch (SW1) on the DIDTR/8 card can be set so that the card can be removed and installed while the system is operating. See page 5-1 for details on the maintenance switch.

- Table 5-8 shows the maximum numbers of cards and trunks per system type.

Table 5-8.   Maximum DID Trunks Per System

System Type	Maximum Number of Cards	Maximum Number of DID Trunks
96 ports (CAB9651)	12	1-96
192 ports (CAB96 + CAB96B)	24	1-192
288 ports (CAB96 + CAB96B52)	36	1-288
384 ports (CAB9652 + CAB96B52)	48	1-384
480 ports (CAB9652 + CAB96B53)	60	1-480
576 ports (CAB9652 + CAB96B54)	72	1-576

Installation

Note: Prior to installing the DID Trunk Card, make certain you can connect to a Trunk MDF Interface Card (VB44512) mounted on the side of the cabinet. See "Trunk MDF Interface Card" on page 5-4 for more information on installing a Trunk MDF Interface Card.

1. Install the DIDTR/8 card in any available flexible slot.

2. Referring to Figure 5-6 and Table 5-9 on page 5-16, connect the trunks to the MDF Interface Card using the supplied modular cable.

Note: Labels are supplied with the MDF Interface Card to identify the Flexible Slot cable connection. Make certain to attach a label on both ends of the cable and at the MDF Interface Card connector.
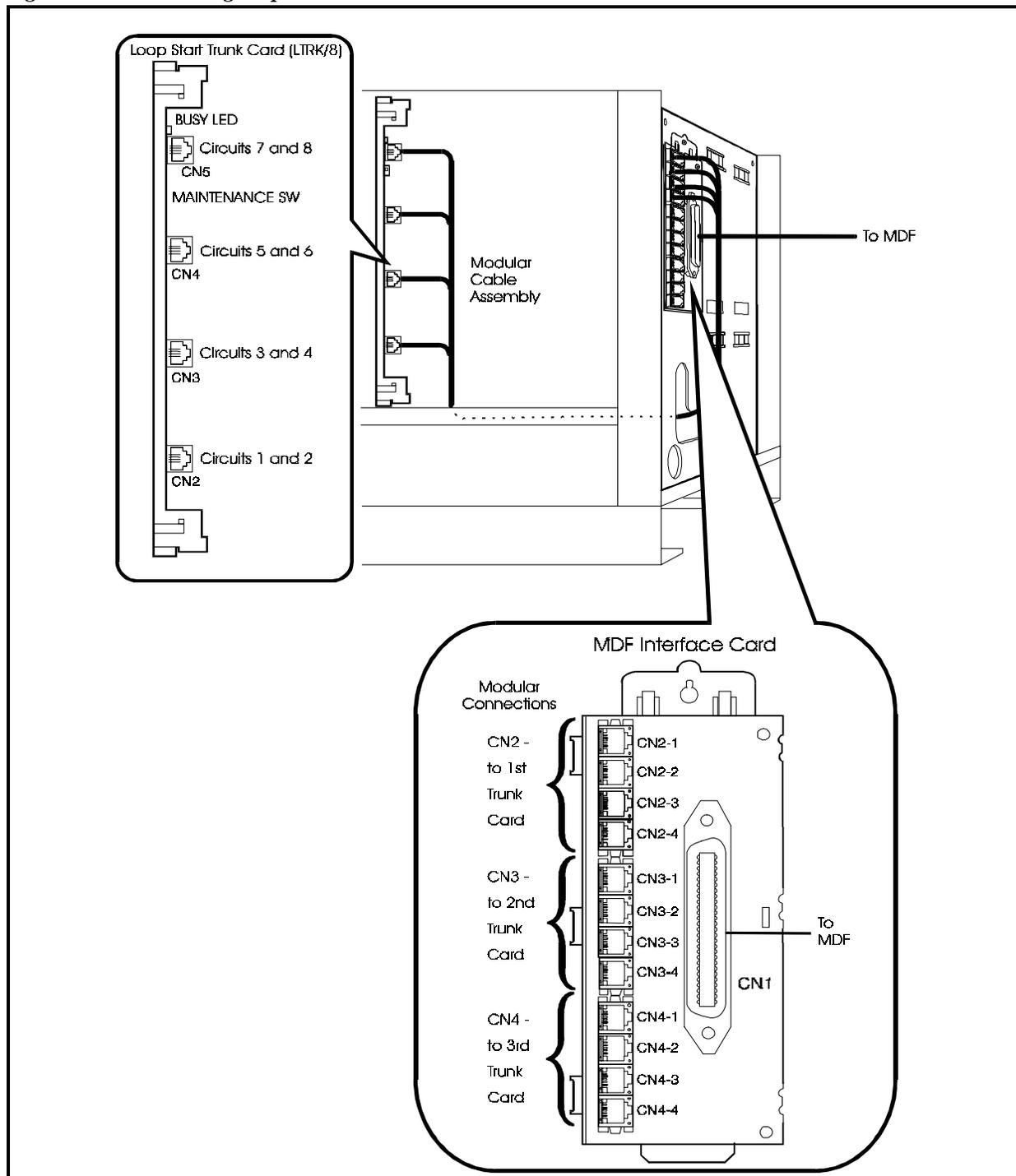
Figure 5-6. Connecting DID Trunks
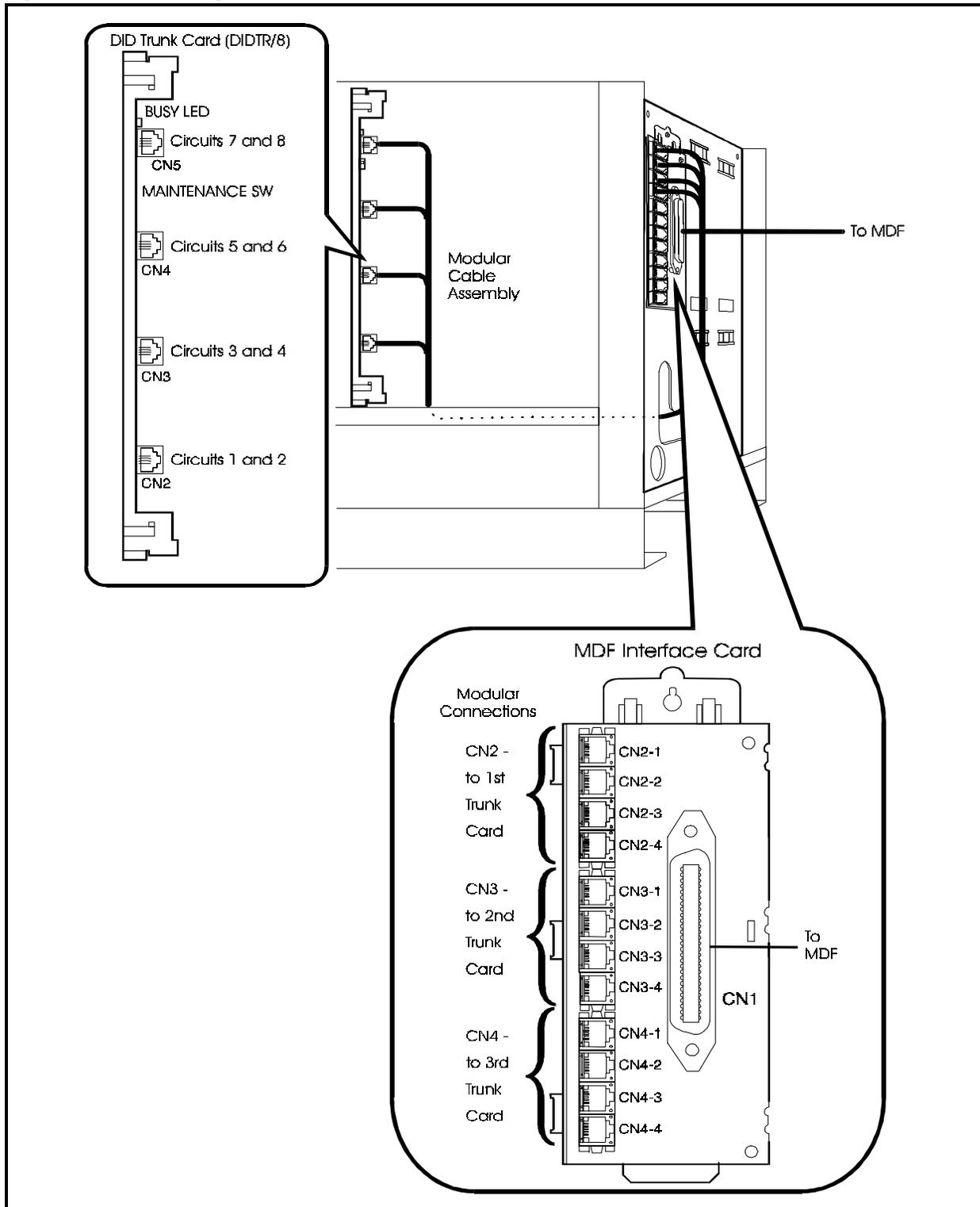
Table 5-9.   DID Trunk Connections and Pinouts.

Trunk Circuit Card(s)				MDF Interface Card (Trunk)		
B (Cabinet)	SS (Slot)	C (Circuit)	Modular Connector	Modular Connector	CN1 Color Code	CN1 Pin No.
_____	_____	1	CN2 (Bottom)	CN2 - 1 (Top)	WH-BL BL-WH	26 1
		2			WH-OR OR-WH	27 2
		3	CN3	CN2-2	WH-GN GN-WH	28 3
		4			WH-BR BR-WH	29 4
		5	CN4	CN2-3	WH-SL SL-WH	30 5
		6			RD-BL BL-RD	31 6
		7	CN5	CN2-4	RD-OR OR-RD	32 7
		8			RD-GN GN-RD	33 8
	_____	1	CN2 (Bottom)	CN3-1 (Top)	RD-BR BR-RD	34 9
		2			RD-SL SL-RD	35 10
		3	CN3	CN3-2	BK-BL BL-BK	36 11
		4			BK-OR OR-BK	37 12
		5	CN4	CN3-3	BK-GN GN-BK	38 13
		6			BK-BR BR-BK	39 14
		7	CN5	CN3-4	BK-SL SL-BK	40 15
		8			YL-BL BL-YL	41 16
	_____	1	CN2 (Bottom)	CN4-1 (Top)	YL-OR OR-YL	42 17
		2			YL-GN GN-YL	43 18
		3	CN3	CN4-2	YL-BR BR-YL	44 19
		4			YL-SL SL-YL	45 20
		5	CN4	CN4-3	VI-BL BL-VI	46 21
		6			VI-OR OR-VI	47 22
		7	CN5	CN4-4	VI-GN GN-VI	48 23
		8			VI-BR BR-VI	49 24
	No Connection			No Connection	VI-SL SL-VI	50 25

E&M Tie Line Trunks

E&M/4 card

Guidelines

- E&M Tie Line Trunks are connected to a E&M Tie Line card (VB-44560) installed in a flexible slot of the cabinet. A maximum of 4 trunks can be connected to each E&M Tie Line card.

- A -48V Power Supply must be installed in the same cabinet as the E&M/4 card for E&M trunks to operate.

- E&M Tie Lines can be directly wired to the network jack (USOC: RJ1CX).

- Each trunk used requires an 8-pin modular cable to connect to the Network Jack (not supplied).

- The maintenance switch (SW1) on the E&M Tie Line card can be set so that the card can be removed and installed while the system is operating. See page 5-1 for details on the maintenance switch.

- Table 5-10 shows the maximum numbers of cards and trunks per system type.

Table 5-10. Maximum E&M Tie Line Trunks Per System

System Type	Maximum Number of Cards	Maximum Number of E&M Tie Line Trunks
96 ports (CAB9651)	12	1-48
192 ports (CAB96 + CAB96B)	24	1-96
288 ports (CAB96 + CAB96B52)	36	1-144
384 ports (CAB9652 + CAB96B52)	48	1-192
480 ports (CAB9652 + CAB96B53)	60	1-240
576 ports (CAB9652 + CAB96B54)	72	1-288

Installation

1. Referring to Figure 2-20 on page 2-27, set the switch settings on the E&M Tie Line circuit card.

2. Install the E&M Tie Line card in any available flexible slot.

3. Referring to Figure 5-7, connect the trunks to the Network Jack using four (4) RJ-1CX 8-conductor modular cables (not supplied).

Figure 5-7. Connecting E&M Tie Line Trunks
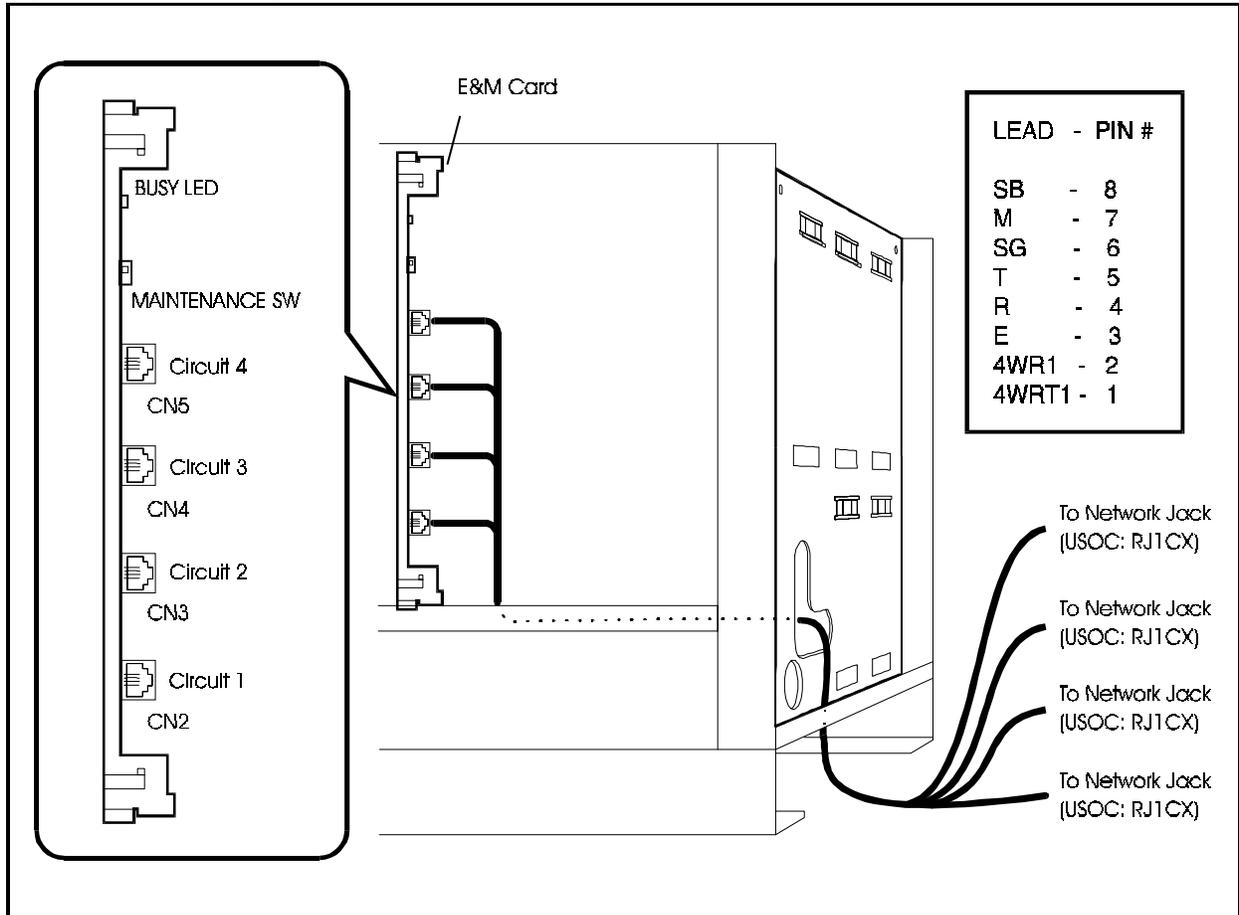
T-Point ISDN Interface (TBRI)

TBRI/4 card

Guidelines

- T-point ISDN is accommodated by the TBRI/4 card which is installed in the flexible slot. Four T-point ISDN lines can be connected to each TBRI/4 card.

- T-point ISDN is connected via NT1 (Network Termination Unit (NT1)).

- T-point ISDN is connected to the TBRI/4 card using 8-conductor modular connectors. See Figure 5-9 for the pin configuration of the 8-conductor modular connectors.

- The TBRI/4 card can be attached or detached when the power is turned ON by setting the maintenance switch (SW4). See page 5-1 for details.

- When using T-point ISDN, you must install the synchronization package (VB-44460) on a CPC96, TSW288 or TSW576 card.

- The CPC96, TSW288 or TSW576 card cannot be attached or detached when the power is turned ON . Always turn the power OFF when attaching or detaching.

- Table 5-11 shows the maximum number of cards that can be installed in each system size.

Table 5-11. Maximum Number of T-Point ISDN Interfaces Per System

System Type	Maximum Cards	Maximum Lines (No. of channels)
96 ports (CAB9651)	12	48/(96ch)
192 ports (CAB96 + CAB96B)	24	96/(192ch)
288 ports (CAB96 + CAB96B$_x$2)	36	144/(288ch)
384 ports (CAB96x2 + CAB96Bx2)	48	192/(384ch)
480 ports (CAB96$_x$2 + CAB96Bx3)	60	240/(480ch)
576 ports (CAB96x2 + CAB96Bx4)	72	288/(576ch)

- Setting the rotary switch SW1 of the TBRI/4 enables you to display the status of the each interface condition using LAYER1 LED (lights in red when synchronisation is completed) or LAYER2 LED (lights in red when DL (Data Link) is completed).

  Four lines on one single card are connected to an ISDN of the same station. Therefore, the remaining synchronizations are automatically completed when synchronization has been completed in any one of the lines.

  Table 5-12 shows the settings of the line selection switch.

Table 5-12. Line Selection Switch (SW1: SELECT) on TBRI/4 Card

Switch Setting No.	Settings
0	OFF (default setting when unit is shipped)
1	1st interface condition displayed by LAYER1 LED and LAYER2 LED
2	2nd interface condition displayed by LAYER1 LED and LAYER2 LED
3	3rd interface condition displayed by LAYER1 LED and LAYER2 LED
4	4th interface condition displayed by LAYER1 LED and LAYER2 LED
5 to 9	Not available

Installation

1. Align the CN8 connector of the CPC96 card or the CN5 connector of the
    TSW288 or TSW576 card with the holes of spacers and connect the
    synchronization package (VB-44460).

Figure 5-8. Installation of Sync Package (Example: Installation on TSW288 Card)
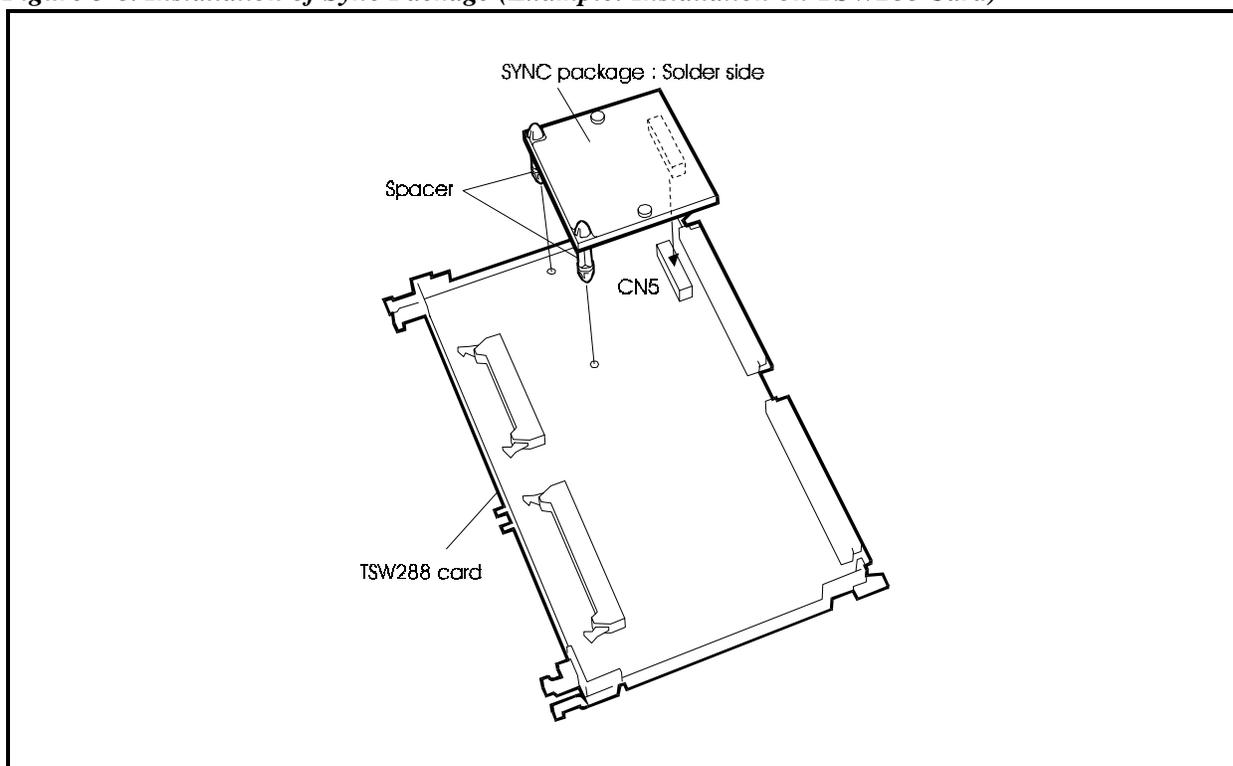
2. Insert the CPC96, TSW288, or TSW576 card in the specified slot.

3. Insert the TBRI/4 card in an available flexible slot.

4. Connect the 8-conductor modular jack via the NT1 to the T-point ISDN
    interface.

5. Pass the T-point ISDN wires with 8-conductor modular jack through the wiring aperture in the main unit and connect it to the modular connector on the TBRI/4 card.

Figure 5-9. Connection of T-Point ISDN Interface (BRI)
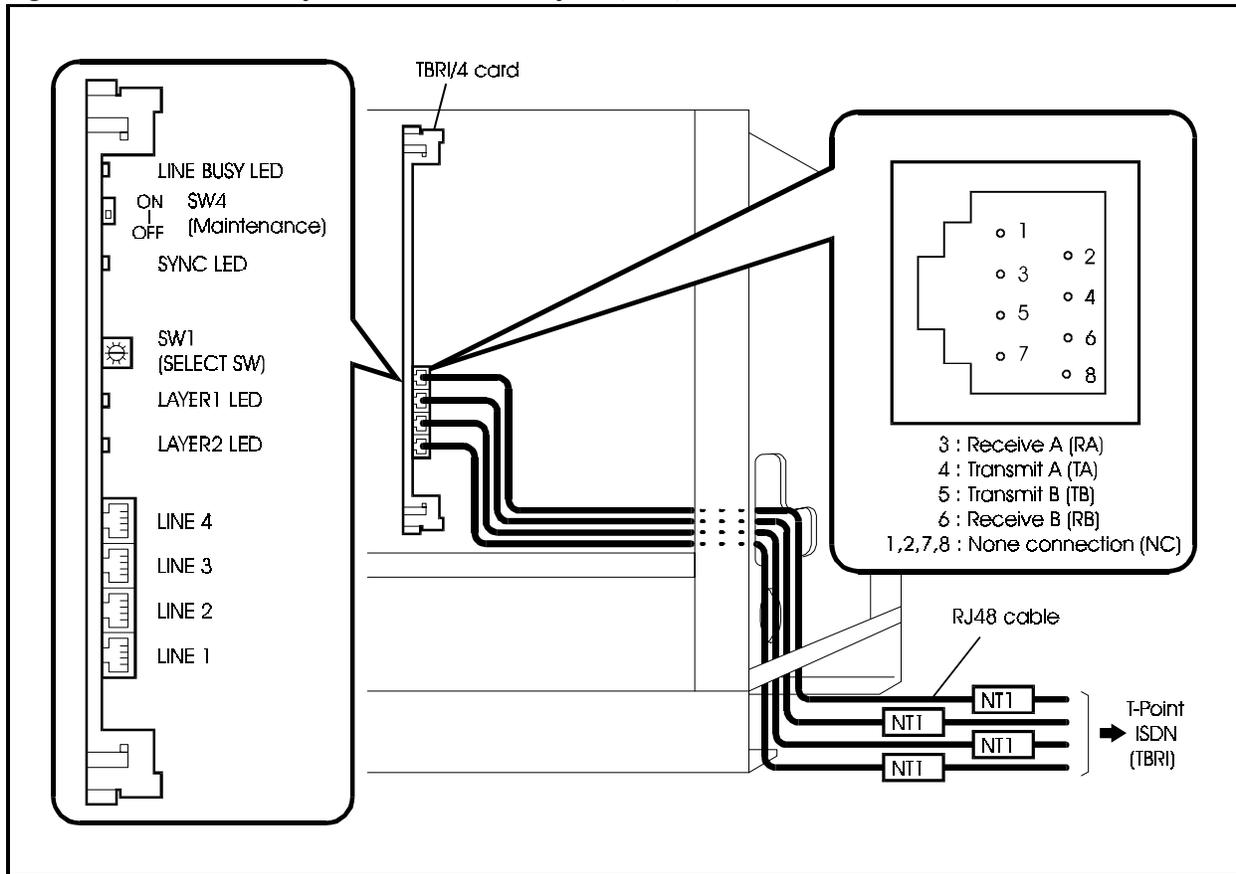
T-Point ISDN Primary Rate Interface (PRI)

PRI/23 card

Guidelines

- The T-point ISDN primary rate interface carrier line is accommodated on the PRI/23 card which is installed in the flexible slot. You can connect one T-point ISDN primary rate interface carrier to each PRI/23 card.

- By setting the switch and reprogramming, the PRI/23 card can also be set up as an S-point ISDN primary rate interface (see page 5-45).

- The T-point ISDN primary rate interface carrier line connects to the switched network via a CSU.

- Depending on Dip switch SW2-2, the PRI/23 card can be set for "8-channel mode" or "Other mode". When set for "Other mode" you can also specify three channel classifications: "1 to 16B+D" or "1 to 23B+D".

  Table 5-13 shows the mode settings of the PRI/23 card.

Table 5-13. Mode Settings of PRI/23 Card

Card Name	Switch Setting Mode	Card Assignment/ No. of Channels Used
PRI/23 card (Primary Rate Interface)	8ch mode	PRIT/8: 1 to 8B+D
	Other mode	PRIT/16: 1 to 16B+D
		PRIT/23: 1 to 23B+D

- The DBS 576 can accommodate a maximum of 8 communication channels per flexible slot. If you set the number of channels to 9 or more, there is a limit of the number of cards that can be installed in other slots (see page 4-36).

- When multiple T-Point PRI cards are installed, one PRI may be selected to provide control and all 24 channels on the remaining PRI cards may be utilized as "B" channels.

- The T-point ISDN primary rate interface carrier line uses an 8-conductor modular connector, and is connected to the PRI/23 card. See Figure 5-10 on page 5-24 for the pin configuration of the 8-conductor modular connectors.

- The PRI/23 card can be attached or detached when the power is turned ON by setting the maintenance switch (SW3). See page 5-1 for details.

- When installing a T-point ISDN primary rate interface, install the synchronisation package on the CPC96, TSW288, or TSW576 card.

- The CPC96, TSW288 or TSW576 card cannot be inserted or removed when the power is turned ON . Always turn the power OFF when inserting or removing.

- Table 5-14 on page 5-23 shows the maximum number of T-point ISDN primary rate interfaces that can be installed in each system size.

Table 5-14. Maximum Number of T-Point ISDN Primary Rate Interface Cards Per System

System Type	Maximum Cards (available flexible slot positions)	Maximum Lines (No. of channels)
96 ports (CAB96x1)	3/(1, 5, 9)	3/(72ch)
192 ports (CAB96 + CAB96B)	6/(1, 5, 9 x2)	6/(144ch)
288 ports (CAB96 + CAB96Bx2)	9/(1, 5, 9 X 3)	9/(216ch)
384 ports (CAB96x2 + CAB96Bx2)	12/(1, 5, 9 X 4)	12/(288ch)
480 ports (CAB96x2 + CAB96Bx3)	15/(1, 5, 9 X 5)	15/(360ch)
576 ports (CAB96x2 + CAB96Bx4)	18/(1, 5, 9 x 6)	18/(432ch)

Installation

1. Align the CN8 connector of the CPC96 card or the CN5 connector of the TSW288 or TSW576 card with the holes of spacers and connect the SYNC synchronization package. See Figure 5-8 on page 5-20 for how to install the SYNC synchronization package.

2. Insert the CPC96, TSW288, or TSW576 card in the specified slot.

3. Set the DIP switch (SW2-1) of the PRI/23 card ON (trunk).

4. Set the DIP switch (SW2-2) of the PRI/23 card as shown in Table 5-15.

Table 5-15. Switch Setting for SW2 on PRI/23 Card

Switch No.	Function	
SW2-1	ON	Set to "Trunk". for T-point.
	OFF	Set to "extension". for S-point.
SW2-2	ON	Set to "Other mode". Can be used with the programmed number (1 to 16B+D or 1 to 23B+D) of channels.
	OFF	Set to "8-channel mode". Can be used with 1 to 8B + D channels.

5. Set SW1 on the PRI/23 card according to the following table.

    These switch settings correspond to the distance between the DBS 576 and the CSU. To turn a switch on, set it to the "up" position.

Table 5-16. Switch Setting for SW1 on PRI/23 Card

Switch No.	Distance from the DBS 576 to the CSU		
	0 to 150 ft.	150 to 450 ft.	450 to 655 ft.
SW1-1	ON	OFF	OFF
SW1-2	OFF	ON	OFF
SW1-3	OFF	OFF	ON
SW1-4	OFF	ON	OFF
SW1-5	OFF	OFF	ON
SW1-6	OFF	ON	OFF
SW1-7	OFF	OFF	ON
SW1-8	Not used		

6. Insert the PRI/23 card into the specified flexible slot (see page 4-36)

7. Connect the 8-conductor modular jack via the CSU to the T-point ISDN primary rate carrier line.

8. Pass the T-point ISDN rate carrier wires with 8-conductor modular jack through the wiring aperture of the cabinet and connect it to the modular connector on the PRI/23 card.

Figure 5-10. Connection of T-Point ISDN Primary Rate Interface (PR1)
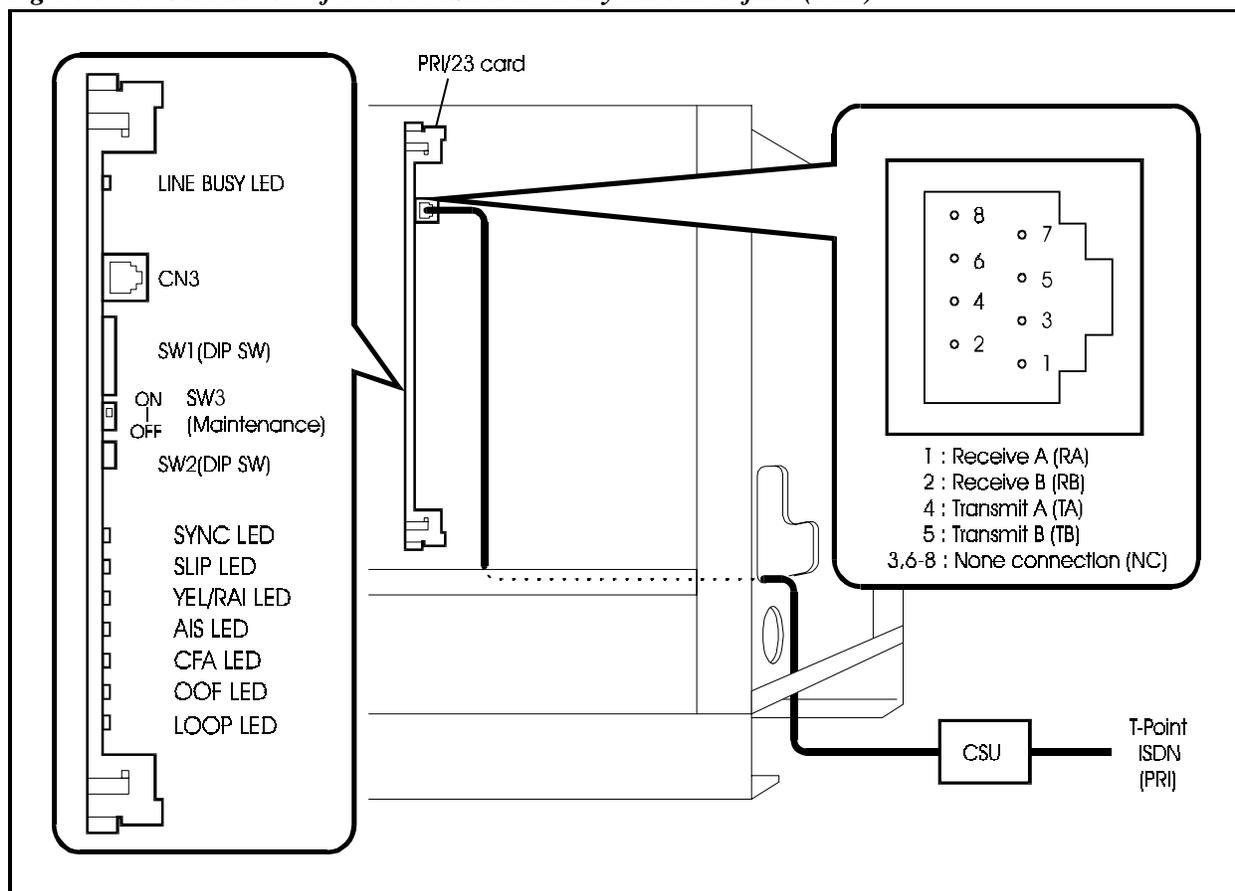
T1 Interface

T1 interface card

Guidelines

- A T1 line is connected to the T1 card which is installed in the flexible slot. You can connect one T1 line to each T1 card.

- The T1 line connects to the switched network via a CSU (Channel Service Unit).

- Depending on Dip switch SW2-2, the T1 card can be set for "8-channel mode" or "Other mode". When set for "Other mode" you can also specify two channel classifications: "1 to 16" or "1 to 24".

  Table 5-17 shows the mode settings of the T1 card.

Table 5-17. Mode Settings of T1 Card

Card Name	Switch Setting Mode	Card Assignment/ No. of Channels Used
T1 card	8ch mode	T1/8: 1 to 8 channels
		T1/16: 1 to 16 channels
	Other mode	T1/24: 1 to 24 channels

- The DBS 576 can accommodate a maximum of 8 communication channels per flexible slot. If you set the number of channels to 9 or more, there is a limit of the number of cards that can be installed in other slots (see page 4-36).

- The T1 interface carrier line uses an 8-conductor modular connector, and is connected to the T1 card. See Figure 5-11 on page 5-27 for the pin configuration of the 8-conductor modular connectors.

- The T1 card can be attached or detached when the power is turned ON by setting the maintenance switch (SW3). See page 5-1 for details.

- When installing a T1 interface, install the synchronization package on the CPC96, TSW288, or TSW576 card.

- The CPC96, TSW288 or TSW576 card cannot be inserted or removed when the power is turned ON . Always turn the power OFF when inserting or removing.

- Table 5-18 shows the maximum number of T 1 interfaces that can be installed in each system size.

Table 5-18. Maximum Number of T1 Interface Cards Per System

System Type	Maximum Cards (available flexible slot positions)	Maximum Lines (No. of channels)
96 ports (Single Cabinet)	3/(1, 5, 9)	3/(72ch)
192 ports (Two Cabinets)	6/(1, 5, 9 X 2)	6/(144ch)

System Type	Maximum Cards (available flexible slot positions)	Maximum Lines (No. of channels)
288 ports (Three Cabinets)	9/(1, 5, 9 x 3)	9/(216ch)
384 ports (Four Cabinets)	12/(1, 5, 9 x 4)	12/(288ch)
480 ports (Five Cabinets)	15/(1, 5, 9 x 5)	15/(360ch)
576 ports (Six Cabinets)	18/(1, 5, 9 x 6)	18/(432ch)

Installation

1.   Align the CN8 connector of the CPC96 card or the CN5 connector of the TSW288 or TSW576 card with the holes of spacers and connect the SYNC synchronization package. See Figure 5-8 on page 5-20 for how to install the SYNC synchronization package.

2.   Insert the CPC96, TSW288, or TSW576 card in the specified slot.

3.   Set the DIP switch (SW2-1) of the T1 card ON (trunk).

4.   Set the DIP switch (SW2-2) of the T1 card as shown in Table 5-19.

Table 5-19. Switch Setting for SW2 on T1 Card

Switch No.	Function	
SW2-1	ON	
	OFF	
SW2-2	ON	Set to "Other mode". Can be used with the programmed number (1 to 16 or 1 to 24) of channels.
	OFF	Set to "8-channel mode". Can be used with 1 to 8 channels.

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

These switch settings correspond to the distance between the DBS 576 and the CSU. To turn a switch on, set it to the "up" position.

Table 5-20. Switch Setting for SW1 on T1 Card

Switch No.	Distance from the DBS 576 to the CSU		
	0 to 150 ft.	150 to 450 ft.	450 to 655 ft.
SW1-1	ON	OFF	OFF
SW1-2	OFF	ON	OFF
SW1-3	OFF	OFF	ON
SW1-4	OFF	ON	OFF
SW1-5	OFF	OFF	ON
SW1-6	OFF	ON	OFF
SW1-7	OFF	OFF	ON
SW1-8	Not used		

6. Insert the T1 card into the specified flexible slot (see page 4-36).

7. Connect the 8-conductor modular jack via the CSU to the T1 carrier line.

8. Pass the cable with 8-conductor modular jack through the wiring aperture of the cabinet and connect it to the modular connector on the T1 card.

Figure 5-11. Connection of T1 Rate Interface
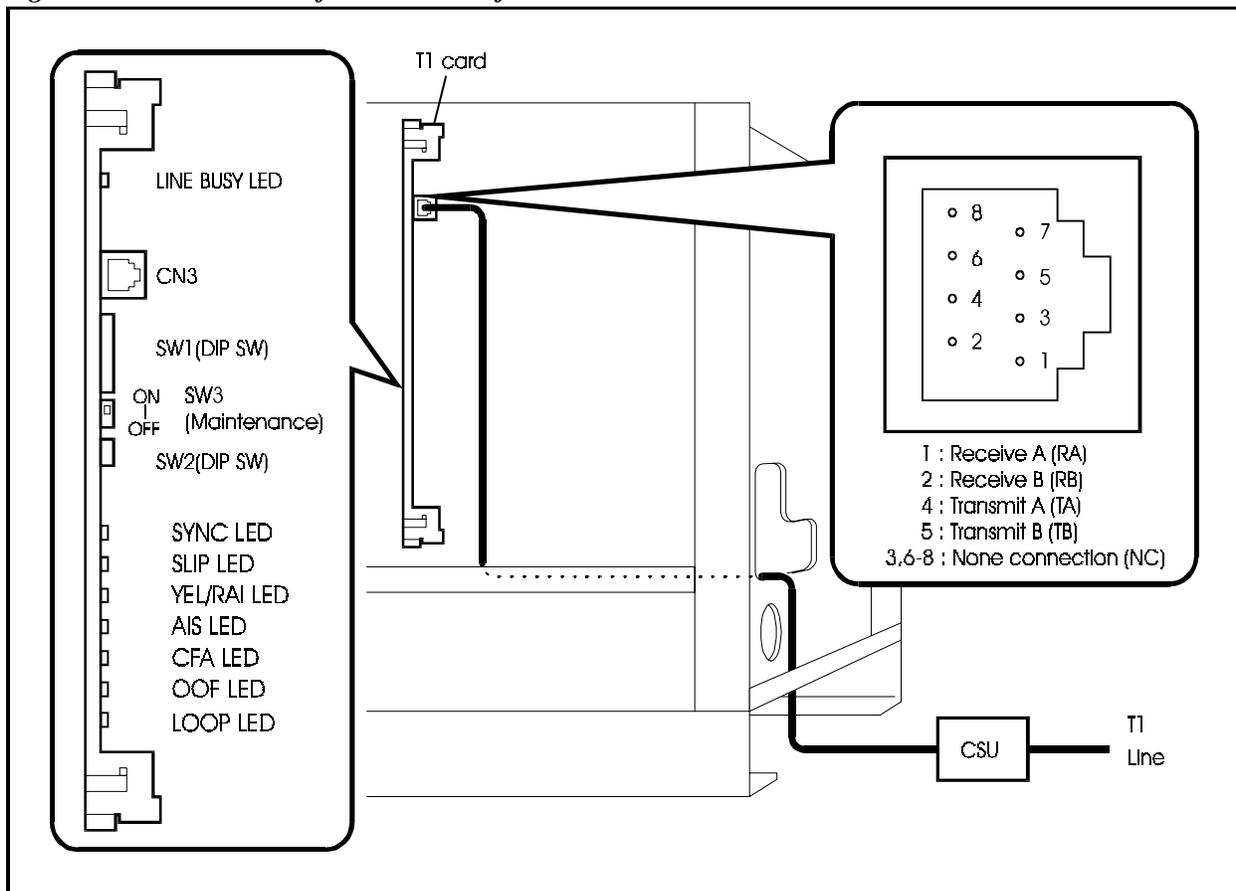
Extensions

The following cards are used with extensions:

- DEC/8: Digital key phone interface card (8 ports)

- AEC/8: Standard telephone (SLT) extension interface card (8 ports)

- SBRI/4: S-point ISDN basic interface card (4 ports)

- PRI/23: T-point and S-point ISDN primary rate interface card (1 port)

In addition to the extension cards, if installing using any combination of DEC/8 and AEC/8 cards, an appropriate number of Extension MDF Cards must be installed for each cabinet as described in "Extension MDF Interface Card" on page 5-29.

Install the correct type of cards in the cabinet for the extensions that are to be connected, then connect the extensions.

The following describes how to connect the respective types of extensions.

Extension MDF Interface Card

MDF-EXT card

Guidelines

- Digital Extension Card (DEC/8) Lines, and Analog Extension Card (AEC/8) Lines connect to the Main Distribution Frame through the Extension MDF Interface (MDF-EXT) card. Each Extension MDF Interface supports any combination of up to three of these extension cards.

- Each extension circuit card contains one sixteen-wire connector. Each sixteen-wire connector provides connection to all 8 extension circuits.

- The Extension MDF Interface may be mounted on either side of the cabinet. If the system may expand to include cabinets installed side by side, install the MDF Interface on the side of the cabinet that will remain on the outside.

- The Extension MDF Interface contains three sixteen-wire connectors. Each connector supports one extension card.

- A second type of MDF Interface is used with the DBS 576. The Trunk MDF Interface is also installed in the MDF Interface positions on the side of the cabinet. Make certain that you use the correct MDF Interface.

Installation

1. From Table 5-21 determine the total number of Extension Interface Cards required per cabinet.

Table 5-21. Number of Extension Interface Cards Required per Cabinet

Total Number of Extension Cards in Cabinet (DEC/8 and AEC/8)	Required Number of Extension MDF Interface Cards
1 to 3	1
4 to 6	2
7 to 9	3
10 to 12	4

2. From Figure 5-12, determine the Extension MDF Interface Card position(s).

Figure 5-12. Extension MDF Interface Installation
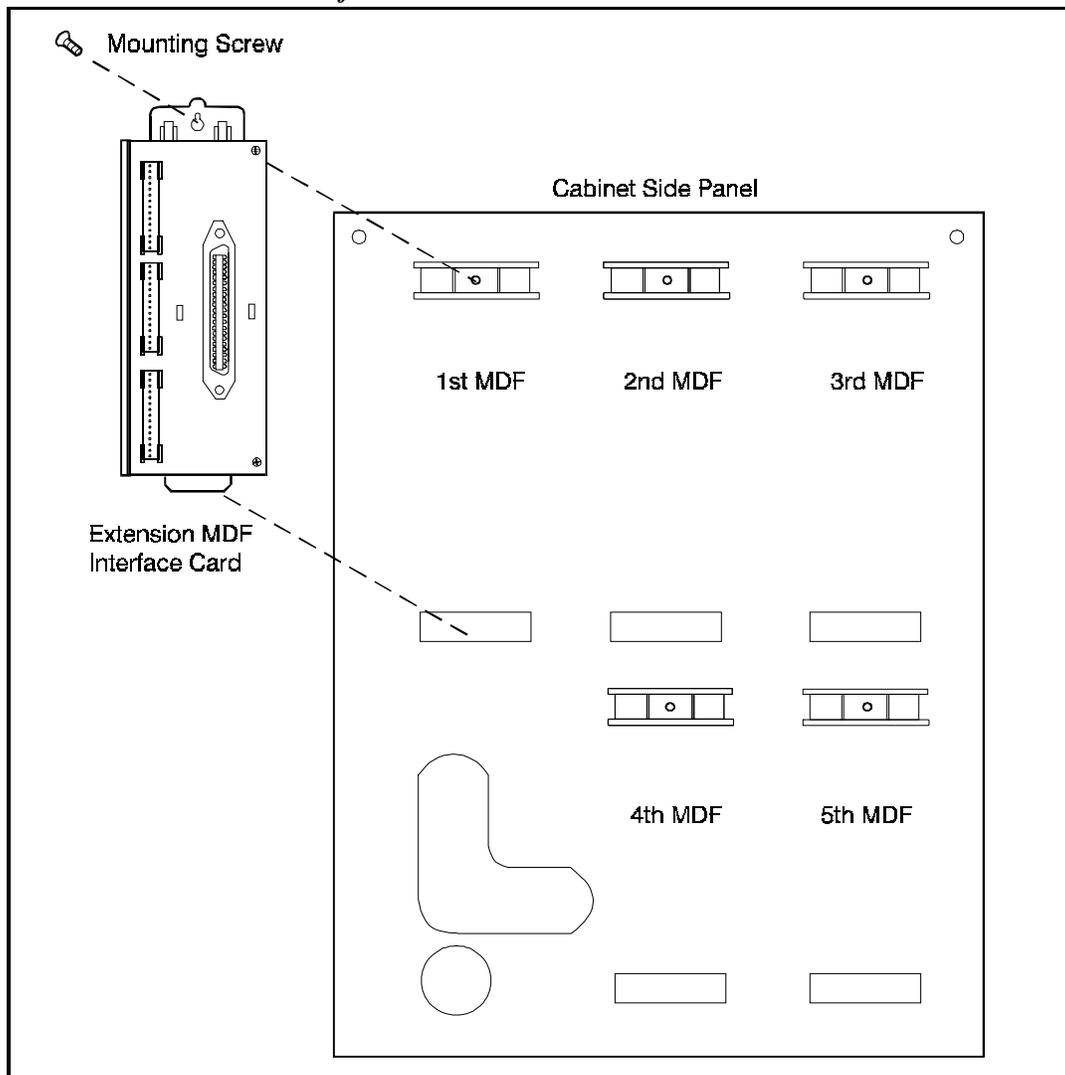
3. Holding the Extension MDF Interface Card in place, insert the bottom tab of the Extension MDF Interface Card into the slot opening at the bottom of the MDF Interface Card position.

4. Use the supplied screw to fasten the Extension MDF Interface Card into place.

5. Repeat steps 3 and 4 for any additional Extension MDF Interface Cards to be installed.

Digital Extensions   **DEC/8 card**

Guidelines

- Digital extensions are connected to a DEC/8 card installed in a flexible slot of the cabinet. A maximum of 8 extensions can be connected to each DEC/8 card.

- One or more Extension MDF Interface Cards (VB-44611) must be installed to support connection of extension lines from the Main Distribution Frame (MDF) to the DEC/8 card. Each Extension MDF Interface supports up to three DEC/8 or AEC/8 cards (up to 24 extension). See "Extension MDF Interface Card" on page 5-29 for information on installing the Extension MDF Interface Card.

- Connect digital extensions to digital key phones via normal building wiring.

- See Table 7-9 on page 7-7 for the maximum loop circuit resistance and distance.

- DEC/8 cards can be removed and replaced while the system is operating. However, because there are no busy lamps for calls on extensions, you cannot check the status of these lines. We recommend using paging, etc., before removing the cards, to warn users that the lines will be disconnected (see page 5-1 for details).

- Table 5-22 shows the maximum numbers of cards and extensions per system type.

Table 5-22. Maximum cards and digital (and analog) extensions per system

System Type	Maximum number of cards	Maximum extension Nos.
96 ports (CAB9651)	12	1-96
192 ports (CAB96 + CAB96B)	24	1-192
288 ports (CAB96 + CAB96Bx2)	36	1-288
384 ports (CAB96x2 + CAB96Bx2)	48	1-384
480 ports (CAB96x2 + CAB96Bx3)	60	1-480
576 ports (CAB96x2 + CAB96Bx4)	72	1-576

Installation

Note: Prior to installing the Extension Card, make certain you can connect to an Extension MDF Interface Card (VB44611) mounted on the side of the cabinet. See "Extension MDF Interface Card" on page 5-29 for more information on installing an Extension MDF Interface Card.

1. Install the DEC/8 card in any available flexible slot.

2. Referring to Figure 5-13 and Table 5-23 on page 5-33, connect the extension card to the MDF Interface Card using supplied sixteen-lead cable.

Note: Labels are supplied with the MDF Interface Card to identify the Flexible Slot cable connection. Make certain to attach a label on both ends of the cable and at the MDF Interface Card connector.

Figure 5-13. Connecting Digital Extension Lines
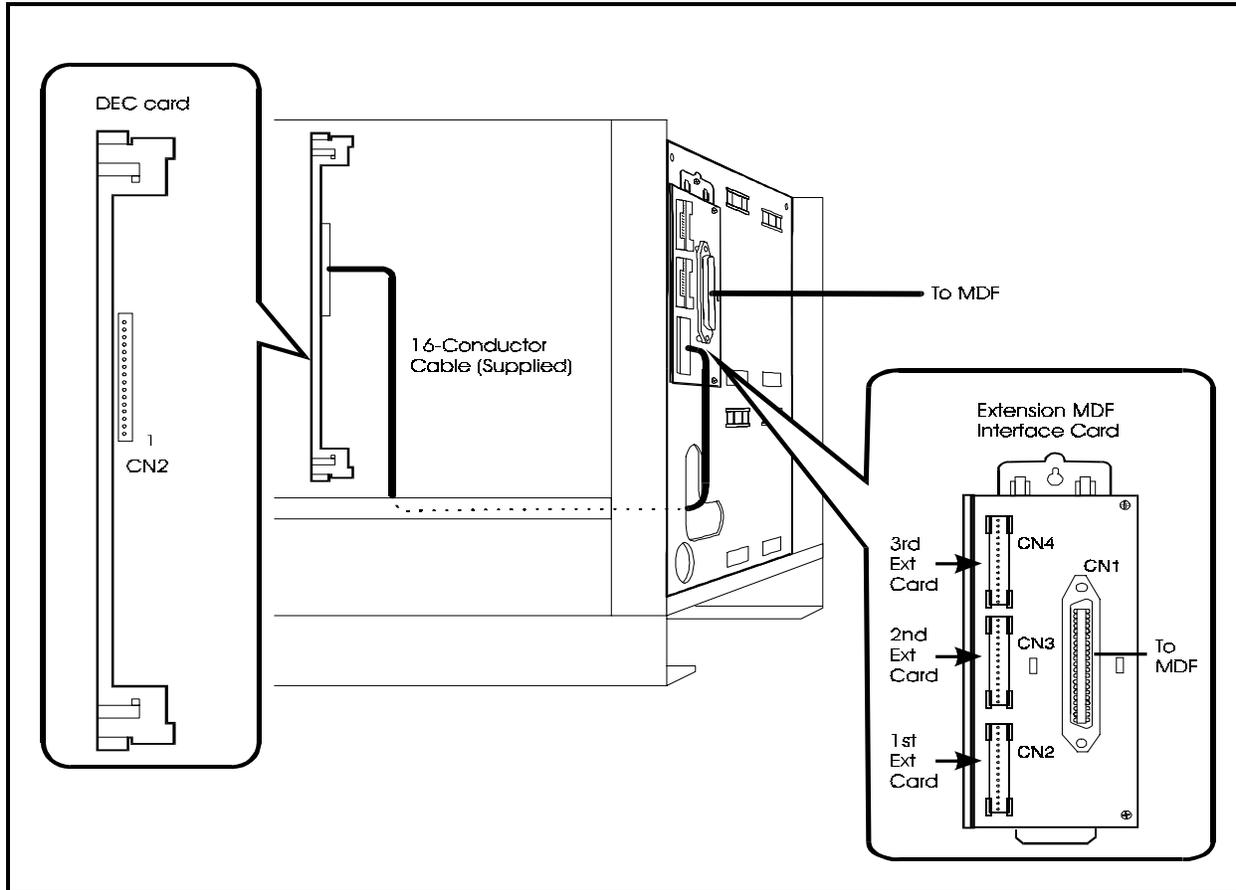
Table 5-23. Digital Extension Connections and Pinouts.

Extension Circuit Card(s)				MDF Interface (Extension)		
B (Cabinet)	SS (Slot)	C (Circuit)	Connector	Modular Connector	CN1 Color Code	CN1 Pin No.
_____	_____	1	CN2	CN2 (Bottom)	WH-BL BL-WH	26 1
		2			WH-OR OR-WH	27 2
		3			WH-GN GN-WH	28 3
		4			WH-BR BR-WH	29 4
		5			WH-SL SL-WH	30 5
		6			RD-BL BL-RD	31 6
		7			RD-OR OR-RD	32 7
		8			RD-GN GN-RD	33 8
	_____	1	CN2	CN3 (Middle)	RD-BR BR-RD	34 9
		2			RD-SL SL-RD	35 10
		3			BK-BL BL-BK	36 11
		4			BK-OR OR-BK	37 12
		5			BK-GN GN-BK	38 13
		6			BK-BR BR-BK	39 14
		7			BK-SL SL-BK	40 15
		8			YL-BL BL-YL	41 16
	_____	1	CN2 (Bottom)	CN4 (Top)	YL-OR OR-YL	42 17
		2			YL-GN GN-YL	43 18
		3			YL-BR BR-YL	44 19
		4			YL-SL SL-YL	45 20
		5			VI-BL BL-VI	46 21
		6			VI-OR OR-VI	47 22
		7			VI-GN GN-VI	48 23
		8			VI-BR BR-VI	49 24
	No Connection			No Connection	VI-SL SL-VI	50 25

DBS 96 Digital Extensions   **DBS DEC card**

Guidelines

- Digital extensions are connected to a DEC card installed in an extension slot of the DBS 96 cabinet. A maximum of 8 extensions can be connected to each DBS DEC card.

- The CBLDBS kit (VB-44452) must be installed to connect the DBS 576 to the DBS. One CBLDBS MDF Interface (part of the CBLDBS kit) must be installed to support connection of extension lines from the Main Distribution Frame (MDF) to the DBS cabinet. See "Connecting DBS 576 and DBS 96 Systems" on page 4-28 for information.

- Connect digital extensions to digital key phones via normal building wiring.

- See Table 7-9 on page 7-7 for the maximum loop circuit resistance and distance.

- The DBS 96 cabinet will only accept DBS DEC cards. No other DBS line or trunk card may be used with a DBS 576.

- The DBS 576 DEC/8 card cannot be installed in the DBS 96 cabinet.

- Up to two DBS cabinets may be connected to the DBS 576.

- Up to 9 DBS DEC cards can be installed in the DBS 96 cabinet therefore supporting up to 72 ports. However, the DBS 96 cabinet logically occupies 96 port addresses; 24 ports are not available. For each DBS 96 cabinet installed, the maximum number of ports in the overall system is reduced by 24 ports. If two DBS 96 cabinets are installed, the maximum number of overall ports is reduced by 48 ports.

- The programming address to the DBS Card slot positions are as follows:

Table 5-24. Relationship of Programming Address to DBS Card Postion

DBS 576 Programming Address Card Slot (SS)	DBS DEC Card Position	CBLDBS MDF Connector
Slot 1	Not Available	Not Applicable
Slot 2	EC1	EXT A
Slot 3	EC2	EXT A
Slot 4	EC3	EXT A
Slot 5	Not Available	Not Applicable
Slot 6	EC4	EXT B
Slot 7	EC5	EXT B
Slot 8	EC6	EXT B
Slot 9	Not Available	Not Applicable
Slot 10	EC7	EXT C
Slot 11	EC8	EXT C
Slot 12	EC/TK	EXT C

Installation

1. Install the DBS DEC card in any available DBS 96 cabinet EC slot or the EC/
    TRK slot.

2. Referring to Figure 5-14 and Table 5-25, Table 5-26, and Table 5-27, connect the
    CBLDBS MDF Interface Card to the MDF using standard 25-pair cabling (not
    supplied). Each cable must have a male connector at the CBLDBS MDF
    interface end.

Figure 5-14. Connecting DBS 96 Digital Extension Lines

Table 5-25. DBS 96 Digital Extension Connections and Pinouts - Slots EC1, EC2, and EC3.

DBS 96 Cabinet Extension Circuit Card(s)			CBLDBS MDF Interface		
B (Cabinet)	*Slot*	*C (Circuit)*	*Connector*	*Color Code*	*Pin No.*
———————	DBS 96 Cabinet Slot EC1 (DBS 576 Programming Slot 02)	1		WH-BL BL-WH	26 1
		2		WH-OR OR-WH	27 2
		3		WH-GN GN-WH	28 3
		4		WH-BR BR-WH	29 4
		5		WH-SL SL-WH	30 5
		6		RD-BL BL-RD	31 6
		7		RD-OR OR-RD	32 7
		8		RD-GN GN-RD	33 8
	DBS 96 Cabinet Slot EC2 (DBS 576 Programming Slot 03)	1		RD-BR BR-RD	34 9
		2		RD-SL SL-RD	35 10
		3		BK-BL BL-BK	36 11
		4		BK-OR OR-BK	37 12
		5	EXT A	BK-GN GN-BK	38 13
		6		BK-BR BR-BK	39 14
		7		BK-SL SL-BK	40 15
		8		YL-BL BL-YL	41 16
	DBS 96 Cabinet Slot EC3 (DBS 576 Programming Slot 04)	1		YL-OR OR-YL	42 17
		2		YL-GN GN-YL	43 18
		3		YL-BR BR-YL	44 19
		4		YL-SL SL-YL	45 20
		5		VI-BL BL-VI	46 21
		6		VI-OR OR-VI	47 22
		7		VI-GN GN-VI	48 23
		8		VI-BR BR-VI	49 24
	No Connection		No Connection	VI-SL SL-VI	50 25

Table 5-26. DBS 96 Digital Extension Connections and Pinouts - Slots EC4, EC5, and EC6.

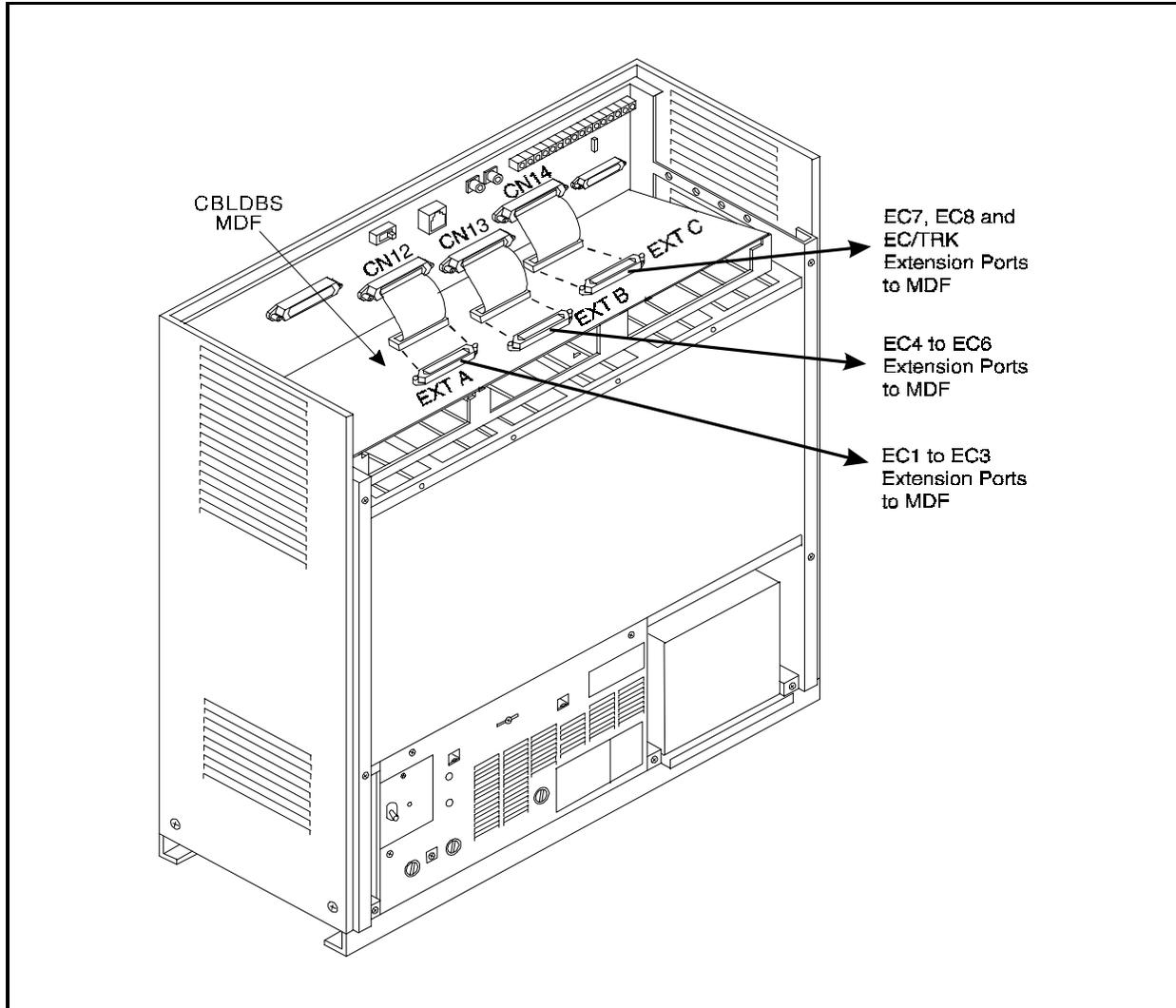| DBS 96 Cabinet Extension Circuit Card(s)			CBLDBS MDF Interface		
B (Cabinet)	*Slot*	*C (Circuit)*	*Connector*	*Color Code*	*Pin No.*
_____	DBS 96 Cabinet Slot EC4 (DBS 576 Programming Slot 06)	1		WH-BL BL-WH	26 1
		2		WH-OR OR-WH	27 2
		3		WH-GN GN-WH	28 3
		4		WH-BR BR-WH	29 4
		5		WH-SL SL-WH	30 5
		6		RD-BL BL-RD	31 6
		7		RD-OR OR-RD	32 7
		8		RD-GN GN-RD	33 8
	DBS 96 Cabinet Slot EC5 (DBS 576 Programming Slot 07)	1		RD-BR BR-RD	34 9
		2		RD-SL SL-RD	35 10
		3		BK-BL BL-BK	36 11
		4		BK-OR OR-BK	37 12
		5	EXT B	BK-GN GN-BK	38 13
		6		BK-BR BR-BK	39 14
		7		BK-SL SL-BK	40 15
		8		YL-BL BL-YL	41 16
	DBS 96 Cabinet Slot EC6 (DBS 576 Programming Slot 08)	1		YL-OR OR-YL	42 17
		2		YL-GN GN-YL	43 18
		3		YL-BR BR-YL	44 19
		4		YL-SL SL-YL	45 20
		5		VI-BL BL-VI	46 21
		6		VI-OR OR-VI	47 22
		7		VI-GN GN-VI	48 23
		8		VI-BR BR-VI	49 24
	No Connection		No Connection	VI-SL SL-VI	50 25

Table 5-27. DBS 96 Digital Extension Connections and Pinouts - Slots EC7, EC8, and EC/TRK.

DBS 96 Cabinet Extension Circuit Card(s)			CBLDBS MDF Interface		
B (Cabinet)	*Slot*	*C (Circuit)*	*Connector*	*Color Code*	*Pin No.*
_____	DBS 96 Cabinet Slot EC7 (DBS 576 Programming Slot 10)	1		WH-BL BL-WH	26 1
		2		WH-OR OR-WH	27 2
		3		WH-GN GN-WH	28 3
		4		WH-BR BR-WH	29 4
		5		WH-SL SL-WH	30 5
		6		RD-BL BL-RD	31 6
		7		RD-OR OR-RD	32 7
		8		RD-GN GN-RD	33 8
	DBS 96 Cabinet Slot EC8 (DBS 576 Programming Slot 11)	1		RD-BR BR-RD	34 9
		2		RD-SL SL-RD	35 10
		3		BK-BL BL-BK	36 11
		4		BK-OR OR-BK	37 12
		5	EXT C	BK-GN GN-BK	38 13
		6		BK-BR BR-BK	39 14
		7		BK-SL SL-BK	40 15
		8		YL-BL BL-YL	41 16
	DBS 96 Cabinet Slot EC6 (DBS 576 Programming Slot 12)	1		YL-OR OR-YL	42 17
		2		YL-GN GN-YL	43 18
		3		YL-BR BR-YL	44 19
		4		YL-SL SL-YL	45 20
		5		VI-BL BL-VI	46 21
		6		VI-OR OR-VI	47 22
		7		VI-GN GN-VI	48 23
		8		VI-BR BR-VI	49 24
	No Connection		No Connection	VI-SL SL-VI	50 25

Analog extensions   **AEC/8 card**

Guidelines

- Analog extensions are connected to an AEC/8 card installed in a flexible slot of the main unit. A maximum of 8 extensions can be connected to each AEC/8 card.

- Loop resistance not to exceed 100 ohms.

- Four DTMF signal reception circuits are mounted on the CPC96, CPC288 or CPC576 card. If more DTMF circuits are required, add the MFR/8 card to the flexible slot.

- AEC/8 cards and MFR/8 cards can be removed and replaced while the system is operating. However, because there are no busy lamps for calls on extensions, you cannot check the status of these lines. We recommend using paging, etc., before removing the cards, to warn users that the lines will be disconnected. See page 5-1 for details.

- One or more Extension MDF Interface Cards (VB-44611) must be installed to support connection of extension lines from the Main Distribution Frame (MDF) to the AEC/8 card. Each Extension MDF Interface supports up to three DEC/8 or AEC/8 cards (up to 24 extension). See "Extension MDF Interface Card" on page 5-29 for information on installing the Extension MDF Interface Card.

- Connect analog extensions to analog single line telephones (SLTs) or other devices via normal building wiring.

- Table 5-28 shows the maximum numbers of cards and extensions per system type.

Table 5-28. Maximum cards and analog (and digital) extensions per system

System Type	Maximum number of cards	Maximum extension Nos.
96 ports (CAB9651)	12	1-96
192 ports (CAB96 + CAB96B)	24	1-192
288 ports (CAB96 + CAB96Bx2)	36	1-288
384 ports (CAB96x2 + CAB96Bx2)	48	1-384
480 ports (CAB96x2 + CAB96Bx3)	60	1-480
576 ports (CAB96x2 + CAB96Bx4)	72	1-576

Installation

Note: Prior to installing the Extension Card, make certain you can connect to an Extension MDF Interface Card (VB44611) mounted on the side of the cabinet. See "Extension MDF Interface Card" on page 5-29 for more information on installing an Extension MDF Interface Card.

1. Install the AEC/8 card in any available flexible slot.

2. Referring to Figure 5-15 and Table 5-29 on page 5-41, connect the extension
    card to the MDF Interface Card using supplied sixteen-lead cable.

    Note: Labels are supplied with the MDF Interface Card to identify the Flexible
    Slot cable connection. Make certain to attach a label on both ends of the cable
    and at the MDF Interface Card connector.

Figure 5-15. Connecting Analog Extension Lines
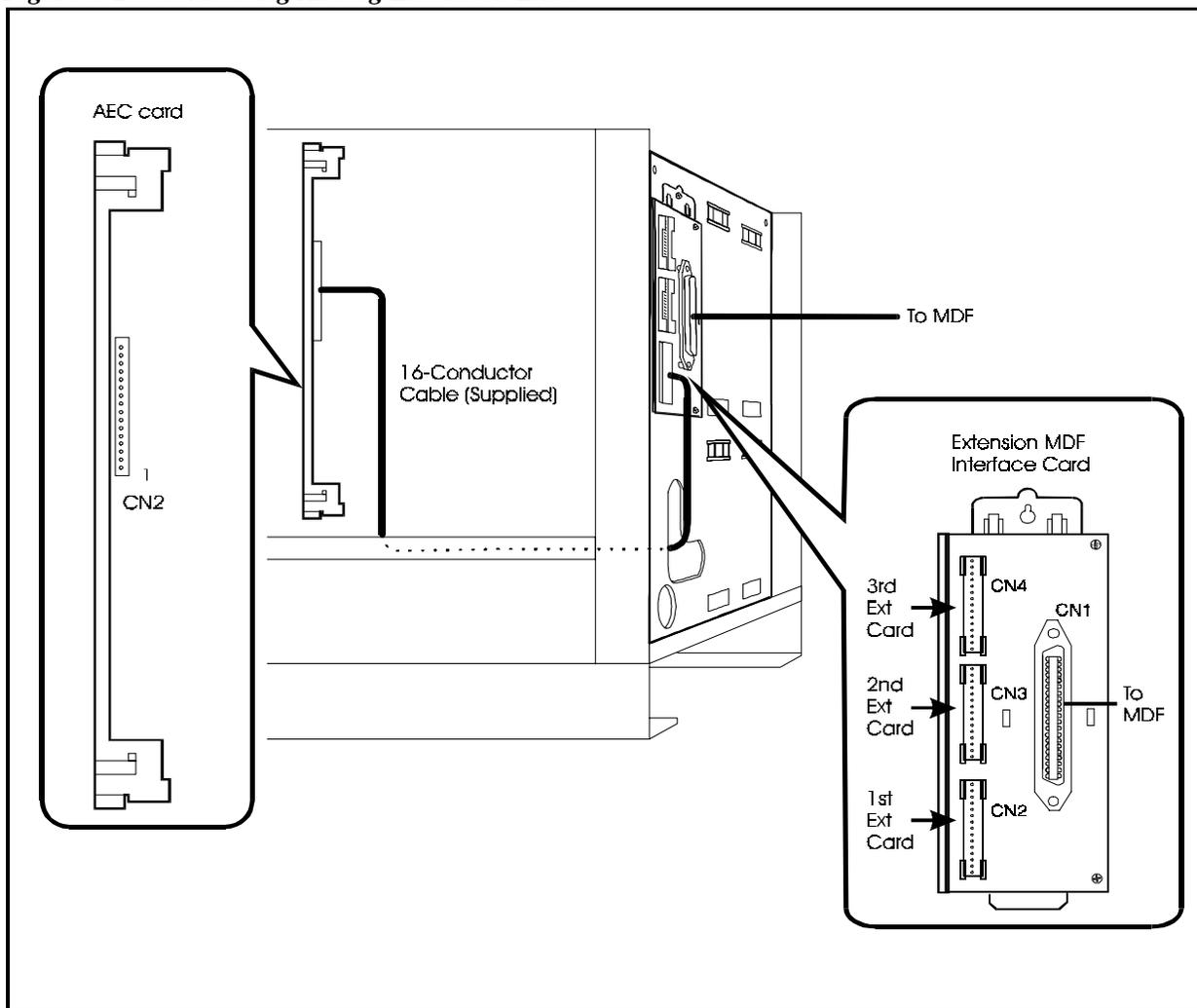
Table 5-29. Analog Extension Connections and Pinouts.

Extension Circuit Card(s)				MDF Interface Card (Extension)		
B (Cabinet)	SS (Slot)	C (Circuit)	Connector	Modular Connector	CN1 Color Code	CN1 Pin No.
_____	_____	1	CN2	CN2 (Bottom)	WH-BL / BL-WH	26 / 1
		2			WH-OR / OR-WH	27 / 2
		3			WH-GN / GN-WH	28 / 3
		4			WH-BR / BR-WH	29 / 4
		5			WH-SL / SL-WH	30 / 5
		6			RD-BL / BL-RD	31 / 6
		7			RD-OR / OR-RD	32 / 7
		8			RD-GN / GN-RD	33 / 8
	_____	1	CN2	CN3 (Middle)	RD-BR / BR-RD	34 / 9
		2			RD-SL / SL-RD	35 / 10
		3			BK-BL / BL-BK	36 / 11
		4			BK-OR / OR-BK	37 / 12
		5			BK-GN / GN-BK	38 / 13
		6			BK-BR / BR-BK	39 / 14
		7			BK-SL / SL-BK	40 / 15
		8			YL-BL / BL-YL	41 / 16
	_____	1	CN2 (Bottom)	CN4 (Top)	YL-OR / OR-YL	42 / 17
		2			YL-GN / GN-YL	43 / 18
		3			YL-BR / BR-YL	44 / 19
		4			YL-SL / SL-YL	45 / 20
		5			VI-BL / BL-VI	46 / 21
		6			VI-OR / OR-VI	47 / 22
		7			VI-GN / GN-VI	48 / 23
		8			VI-BR / BR-VI	49 / 24
	No Connection			No Connection	VI-SL / SL-VI	50 / 25

S-Point ISDN Interface (SBRI)

SBRI/4 card

Guidelines

- S-point ISDN is accommodated by the SBRI/4 card which is installed in the flexible slot. Four S-point ISDN lines can be connected to each SBRI/4 card.

- S-point ISDN is connected to the SBRI/4 card using 8-conductor modular connectors. See Figure 5-16 on page 5-43 for the pin configuration of the 8-conductor modular connectors.

- Setting the rotary switch SW1 of the SBRI/4 enables you to display the status of the selected circuits using the LED. The way to set it is the same as that of the TBRI/4 card. See Table 5-12 on page 5-20 for details.

- The SBRI/4 card can be attached or detached when the power is turned ON. Confirmation during the extension conversation is not possible, therefore announcements using paging need to be made when attaching or detaching. See page 5-1 for details.

- Table 5-30 shows the maximum number of cards that can be installed in each system size.

Table 5-30. Maximum Number of S-point ISDN Interfaces Per System

System Type	Maximum Cards	Maximum Lines (No. of channels)
96 ports (CAB96x1)	12	48/(96ch)
192 ports (CAB96 + CAB96B)	24	96/(192ch)
288 ports (CAB96 + CAB96Bx2)	36	144/(288ch)
384 ports (CAB96x2 + CAB96Bx2)	48	192/(384ch)
480 ports (CAB96x2 + CAB96Bx3)	60	240/(480ch)
576 ports (CAB96x2 + CAB96Bx4)	72	288/(576ch)

Installation

1. Insert the SBRI/4 card in an available flexible slot.

2. Connect the 8-conductor modular jack to the S-point ISDN wires from the ISDN terminal equipment.

3. Pass the S-point ISDN wires with 8-conductor modular jack through the wiring aperture in the cabinet and connect it to the modular connector on the SBRI/4 card.

Figure 5-16. Connection of S-point ISDN Interface (SBRI)
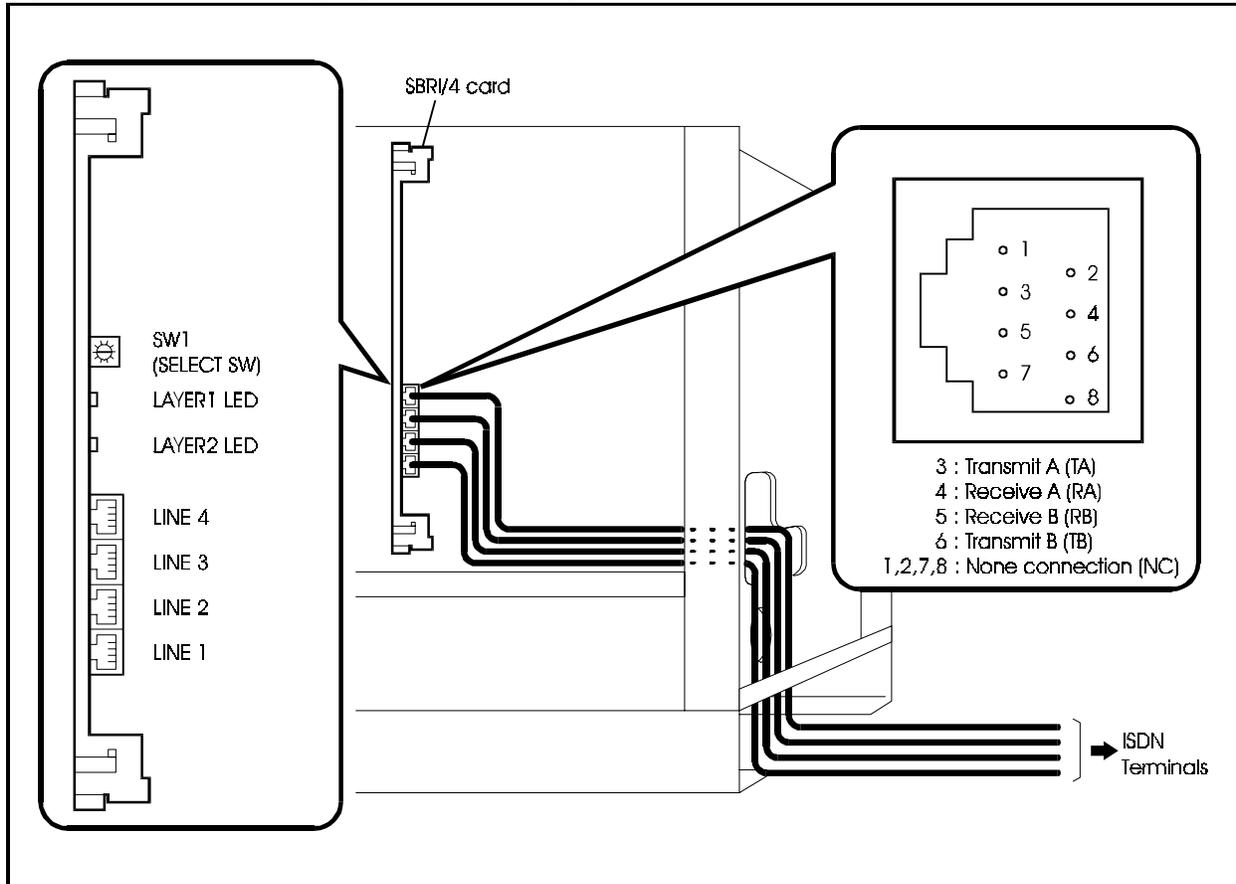
Point to Multi-point connection

Point to Multi-point connection is available in S-point BRI.

If you use point to multi-point connection, wiring length limitation is different depending on the program setting. (Passive Bus : FF31 BSSC 0202)

0:   Short distance away:

Wire	Distance
High Impedance wire (Zo = 150 ohms)	22 AWG - 4630 Ft. 24 AWG - 2890 Ft. 26 AWG - 1800 Ft.
Low Impedance wire (Zo = 75 ohms)	22 AWG - 2315 Ft. 24 AWG - 1445 Ft. 26 AWG - 900 Ft.

1: Long distance away:

Maximum 6/10 of a mile (1km)
The distance between terminal equipments must be connected
within 25-50m in order to restrict delay of the signal.

Figure 5-17. Point to multi-point connection (Long distance away)
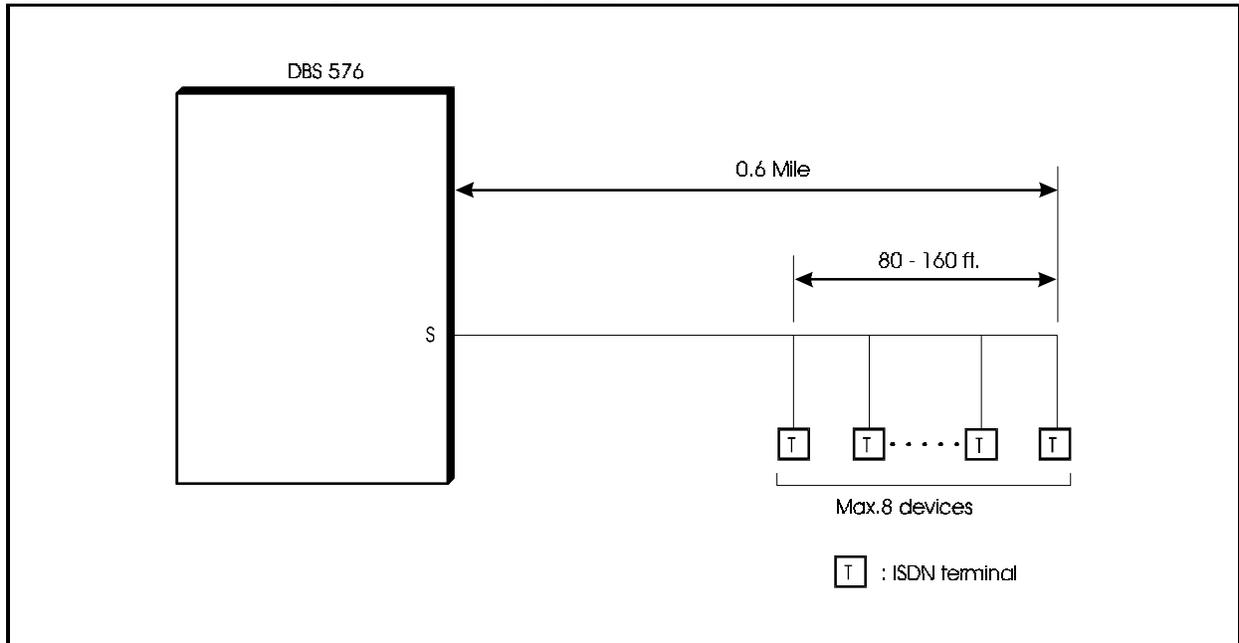
S-point ISDN Primary Rate Interface (PRI)

$$\boxed{\textbf{PRI/23 card}}$$

Guidelines

- The S-point ISDN primary rate interface is accommodated on the PRI/23 card which is installed in the flexible slot. You can connect one S-point ISDN primary rate interface carrier line to each PRI/23 card.

- By setting the switch and reprogramming, the PRI/23 card can also be set up as an T-point ISDN primary rate interface (see page 5-22).

- The S-point ISDN primary rate interface is connected to the PRI/23 card using an 8-conductor modular jack. See Figure 5-18 on page 5-47 for the pin configuration of the 8-conductor modular connectors.

- The PRI/23 card can be set using Dip switch SW2-2 for "8-channel mode" or "Other mode".

  Table 5-31 shows the mode settings of the PRI/23 card.

Table 5-31. Mode Settings of PRI/23 Card

Card Name	Switch Setting Mode	Card Assignment/ No. of Channels Used
PRI/23 card (Primary Rate Interface)	8 ch mode	PRIS/8: 1 to 8B+D
	Other mode	PRIS/23: 1 to 23B+D/24B

- The DBS 576 can accommodate a maximum of 8 communication channels per flexible slot. If you select "Other mode", there is a limit of the number of cards that can be installed in other slots (see page 4-36.)

- The PRI/23 card can be attached or detached when the power is turned ON by setting the maintenance switch (SW3). See page 5-1 for details.

- Table 5-32 shows the maximum number of S-point ISDN primary rate interfaces that can be installed in each system size.

Table 5-32. Maximum Number of S-point ISDN Primary Rate Interface Cards Per System

System Type	Maximum Cards (Available flexible slot positions)	Maximum Lines (No. of channels)
96 ports (One Cabinet)	3/(1, 5, 9)	3/(71ch)
192 ports (Two Cabinets)	6/(1, 5, 9 x2)	6/(143ch)
288 ports (Three Cabinets)	9/(1, 5, 9 X 3)	9/(215ch)
384 ports (Four Cabinets)	12/(1, 5, 9 X 4)	12/(287ch)
480 ports (Five Cabinets)	15/(1, 5, 9 X 5)	15/(359ch)
576 ports (Six Cabinets)	18/(1, 5, 9 X 6)	18/(431ch)

Installation

1. Set the Dip switch (SW2-1) of the PRI/23 card OFF (extension).

2. Set the Dip switch (SW2-2) of the PRI/23 card as shown in Table 5-33.

Table 5-33. Switch Setting for SW2-2 on PRI/23 Card

Switch No.	Function	
SW2-1	ON	Set to "Exchange line" for T-point.
	OFF	Set to "extension" for S-point.
SW2-2	ON	Set to "Other mode." Can be used with 1 to 23B+D/24B channels.
	OFF	Set to "8-channel mode." Can be used with 1 to 8B + D channels.

3. Set SW1 on the PRI/23 card according to the following table.

   These switch settings correspond to the distance between the DBS 576 and the ISDN terminal. To turn a switch on, set it to the "up" position.

Table 5-34. Switch Setting for SW1 on PRI/23 Card

Switch No.	Distance from the DBS 576 to the ISDN terminal		
	0 to 150 ft.	150 to 450 ft.	450 to 655 ft.
SW1-1	ON	OFF	OFF
SW1-2	OFF	ON	OFF
SW1-3	OFF	OFF	ON
SW1-4	OFF	ON	OFF
SW1-5	OFF	OFF	ON
SW1-6	OFF	ON	OFF
SW1-7	OFF	OFF	ON
SW1-8	Not used		

4. Insert the PRI/23 card into the specified flexible slot.

5. Connect the 8-conductor modular jack to the S-point ISDN primary rate interface wires from the ISDN terminal equipment.

6. Pass the S-point ISDN wires with 8-conductor modular jack through the wiring aperture in the cabinet and connect it to the modular connector on the PRI/23 card.

Figure 5-18. Connection of S-point ISDN Primary Rate Interface (PRI)
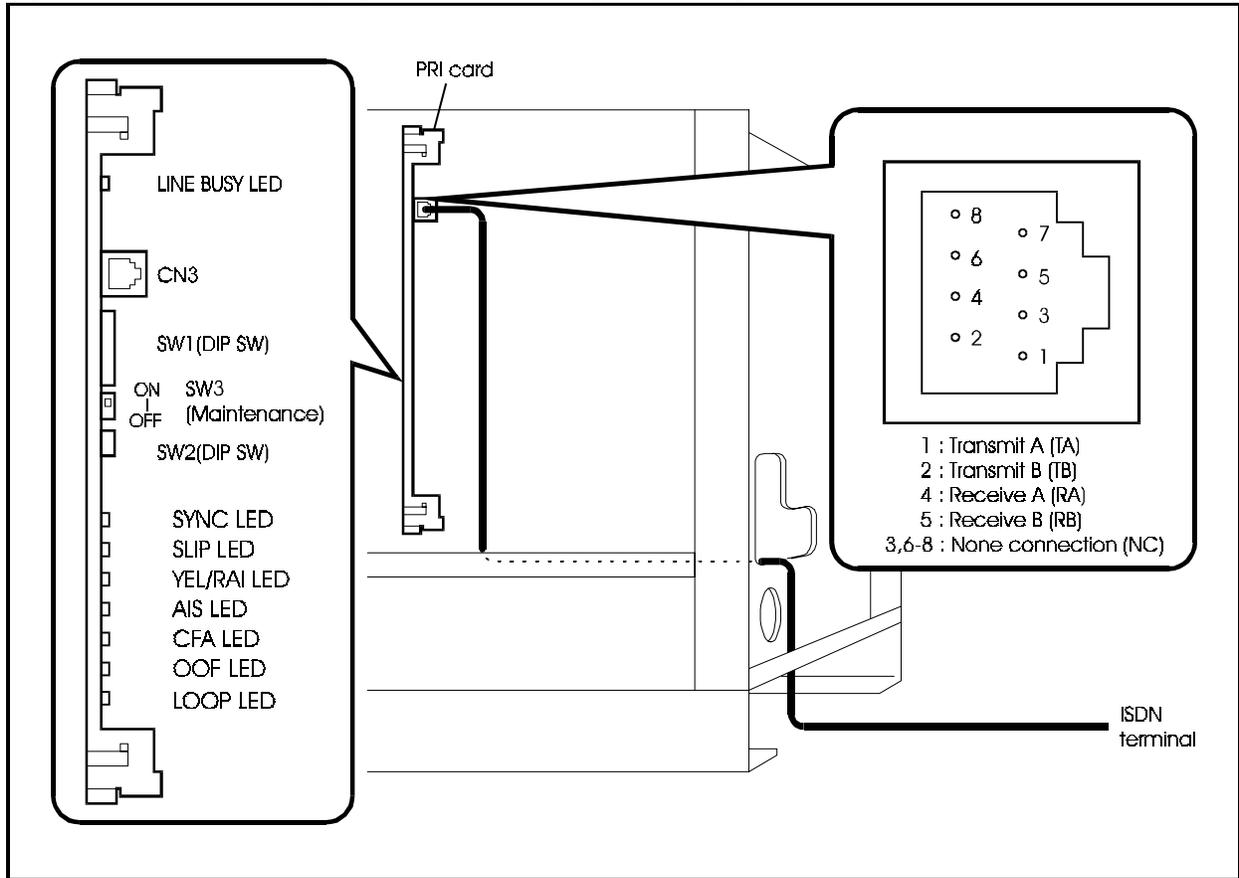
Key Phone Wall Mounting

Guidelines

- DBS 576 key phones can be mounted on the wall using the wall mounting adapter on the bottom of the phone.

Installation

1. Remove the wall mounting adapter from the bottom of the phone taking care not to damage the adapter hooks.

2. Rotate the wall mounting adapter by 180 degrees, then slot it into the two guides.

3. Remove the handset guide, rotate it by 180 degrees, and replace it.

4. Insert two screws in the wall.

5. Hook the two mounting holes on the bottom of the phone onto the two screws in the wall.

Figure 5-19. Wall mounting of phone
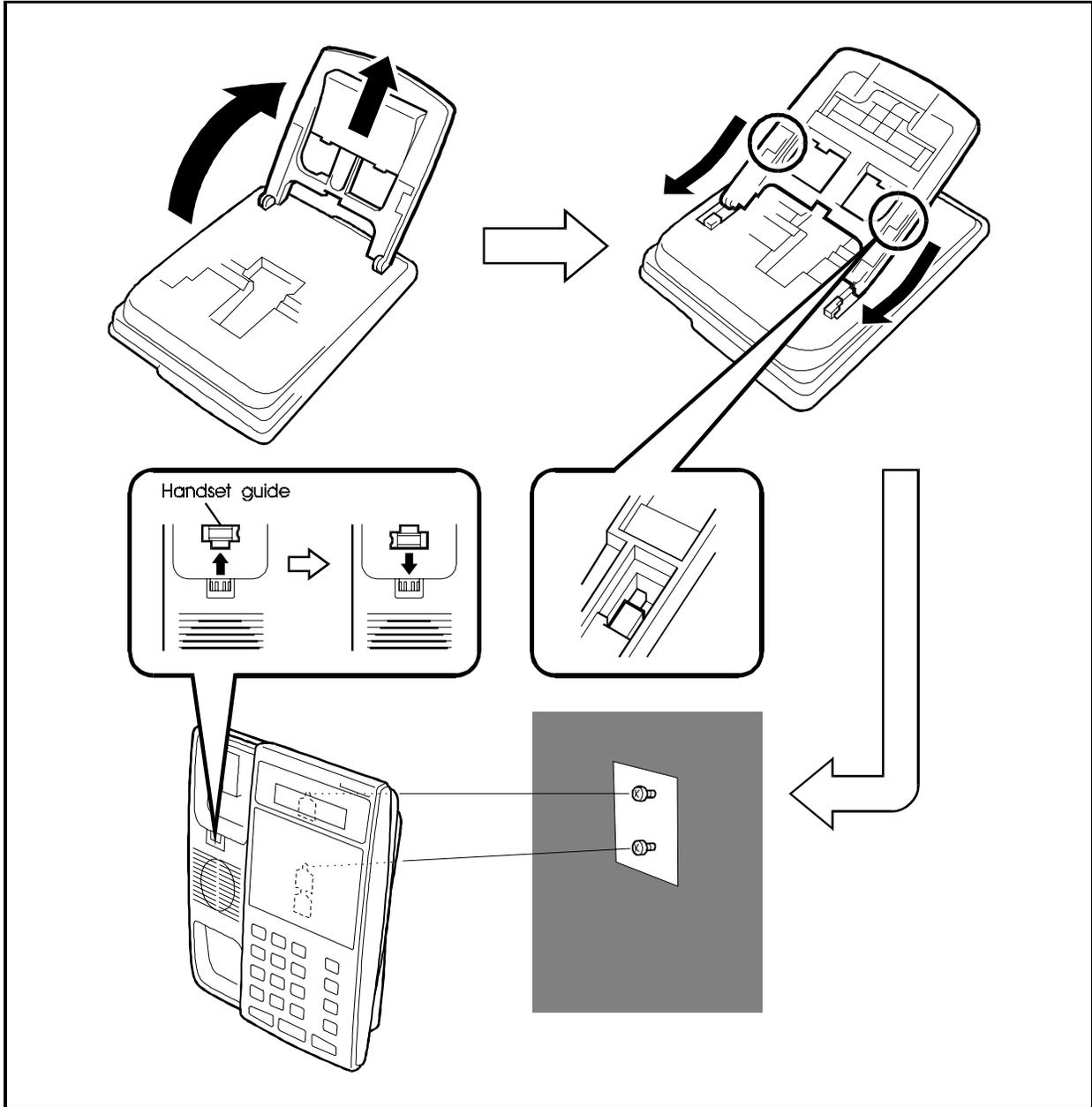
Chapter 6. Peripheral Equipment

This chapter describes how to install and connect DSS, doorphone adaptors, other peripheral equipment, and replacing the backup battery of CPC card.

Music-On-Hold (MOH)

CPC96, CPC288, CPC576 Card ⊗

Guidelines

- A music source such as a CD player or tape recorder can be connected to the MOH input of a CPC96, CPC288, or CPC576 card installed in the CPC slots of the cabinet to provide music-on-hold (MOH).

- CPC96, CPC288, and CPC576 cards cannot be installed and removed while the cabinet is operating. First, turn the power off.

- The maximum input impedance of the MOH input (CN4: RCA) is 10k Ohms. The maximum input signal level is -10dB.

Installation

1. Connect one end of an RCA pin cable (2-core shielded cable) to the CN4 (RCA) connector on the CPC96, CPC288, or CPC576 card.

2. Connect the other end of the RCA pin cable to the output (AUX) of a music source such as a CD player or tape recorder.

   Fit the appropriate connector (RCA or mini-plug, etc.) as required to the end of the RCA pin cable to suit your music source.

Figure 6-1. Installation of music-on-hold source
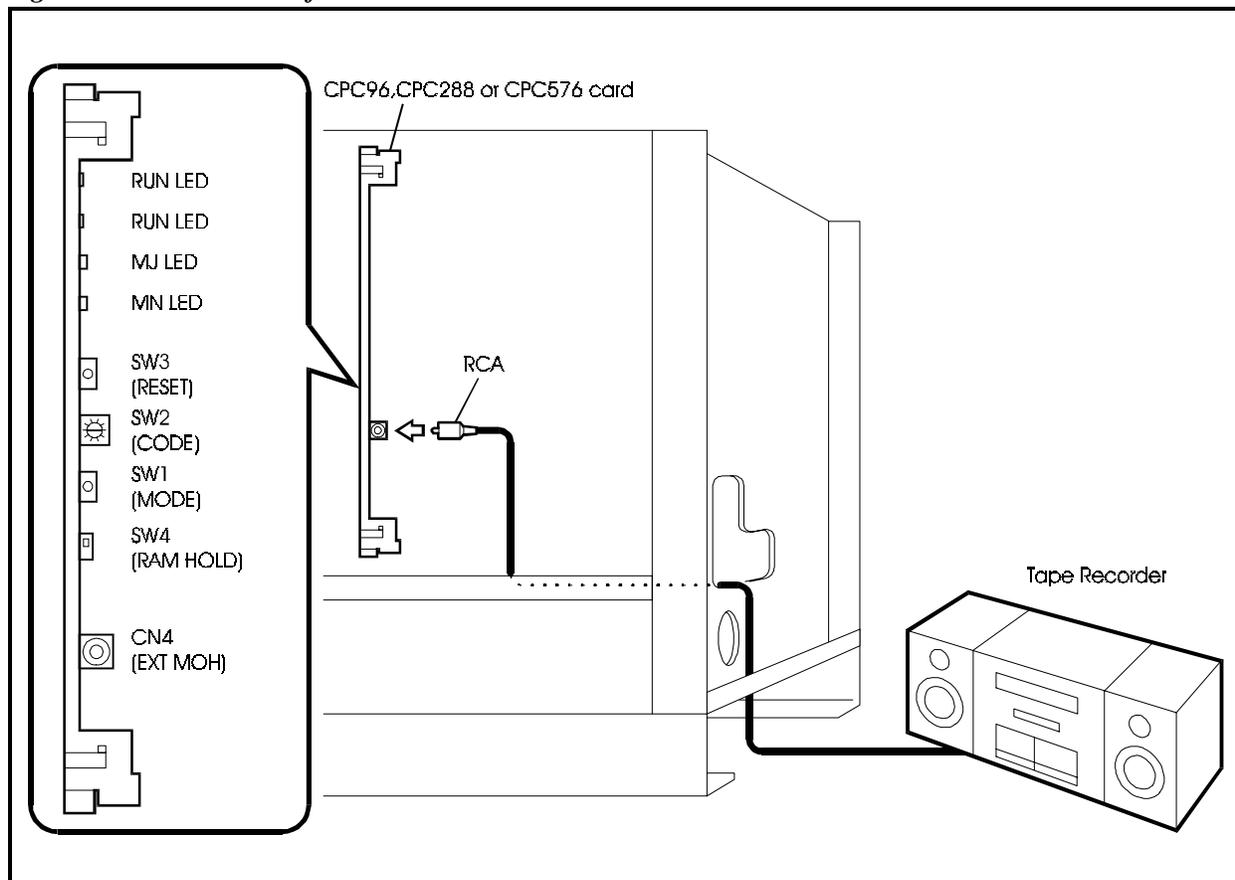
Background Music (BGM)   SCC card ⊗

Guidelines

- A music source such as a CD player or tape recorder can be connected to the BGM input (RCA) of an SCC card installed in one of the optional card slots of the cabinet to provide background music (BGM).

- SCC cards cannot be installed and removed while the cabinet is operating. First, turn the power off.

- If an FM radio is connected as a music source, it must be located at least 16.5 ft. (5m) from the cabinet.

- The maximum input impedance of the BGM input (CN4: RCA) is 10k Ohms. The maximum input signal level is -10dB.

Installation

1. Install the SCC card in an available optional card slot.

2. Connect one end of an RCA pin cable (2-core shielded cable) to the CN4 (RCA) connector on the SCC card.

3. Connect the other end of the RCA pin cable to the output (AUX) of a music source such as a CD player or tape recorder.

    Fit the appropriate connector (RCA or mini-plug, etc.) as required to the end of the RCA pin cable to suit your music source.

Figure 6-2. Installation of background music source
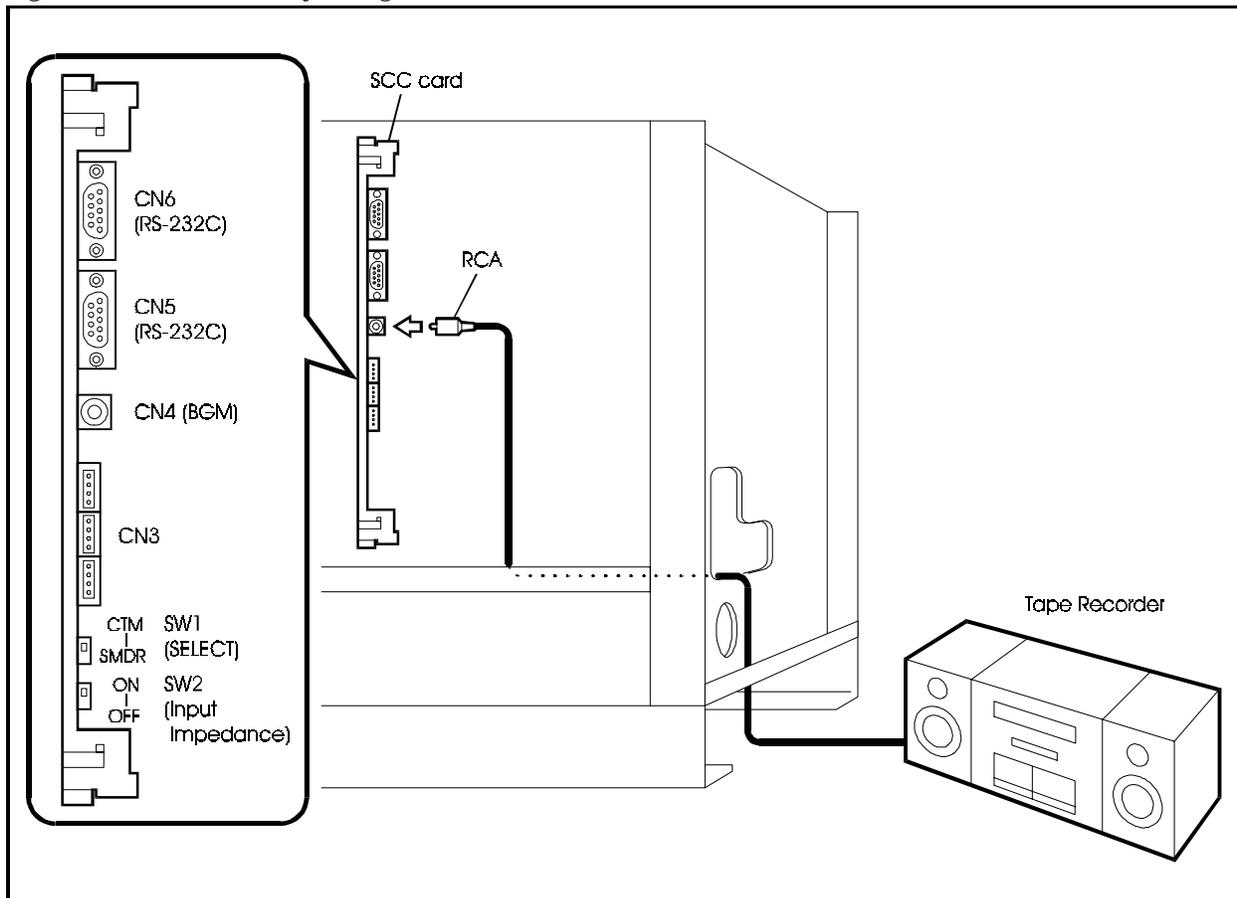
Paging

SCC card ⊗

CAUTION:
⚠
   • Turn the power switch and the external breaker OFF, and disconnect the
     AC cable before installing the Paging equipment.

Guidelines

   • Paging can be performed by connecting a paging amplifier, relays, and speakers
     to an SCC card installed in one of the optional card slots.

   • SCC cards cannot be installed and removed while the cabinet is operating. First,
     turn the power off.

   • The paging amplifier, relays, and speakers are not provided with the DBS 576 and
     must therefore be purchased separately.

   • Table 6-1 shows the pinout of the external connector (CN3) of the SCC card.

Table 6-1.   Pinout of external connector (CN3) of SCC card

Pin No.	Signal	Description
1	GND	Signal ground
2	-	
3	-	
4	S5	External paging control output 5 (withstand voltage: 30V)
5	S4	External paging control output 4 (withstand voltage: 30V)
6	S3	External paging control output 3 (withstand voltage: 30V)
7	S2	External paging control output 2 (withstand voltage: 30V)
8	S1	External paging control output 1 (withstand voltage: 30V)
9	MB	External paging control output B (relay loop make contact: maximum current: 2A)
10	MA	External paging control output A (relay loop make contact: maximum current: 2A)
11	B	External paging I/O B
12	A	External paging I/O A

Installation

1. Set SW2 on the SCC card to match the input impedance of the connected device. See Table 6-2 for SW2 settings.

Table 6-2.   Settings of SW2 on SCC card

Switch No.	Position	Setting
SW2	ON	External paging device input impedance: 600 Ohms
	OFF	External paging device input impedance: high impedance (default when shipped)

2. Install the SCC card in an available optional card slot.

3. Prepare a cable with a DDK connector and connect one end of it to CN3.

4. Connect the other end of the cable to the paging amplifier, relays, and speakers.

Figure 6-3. Connection of paging device
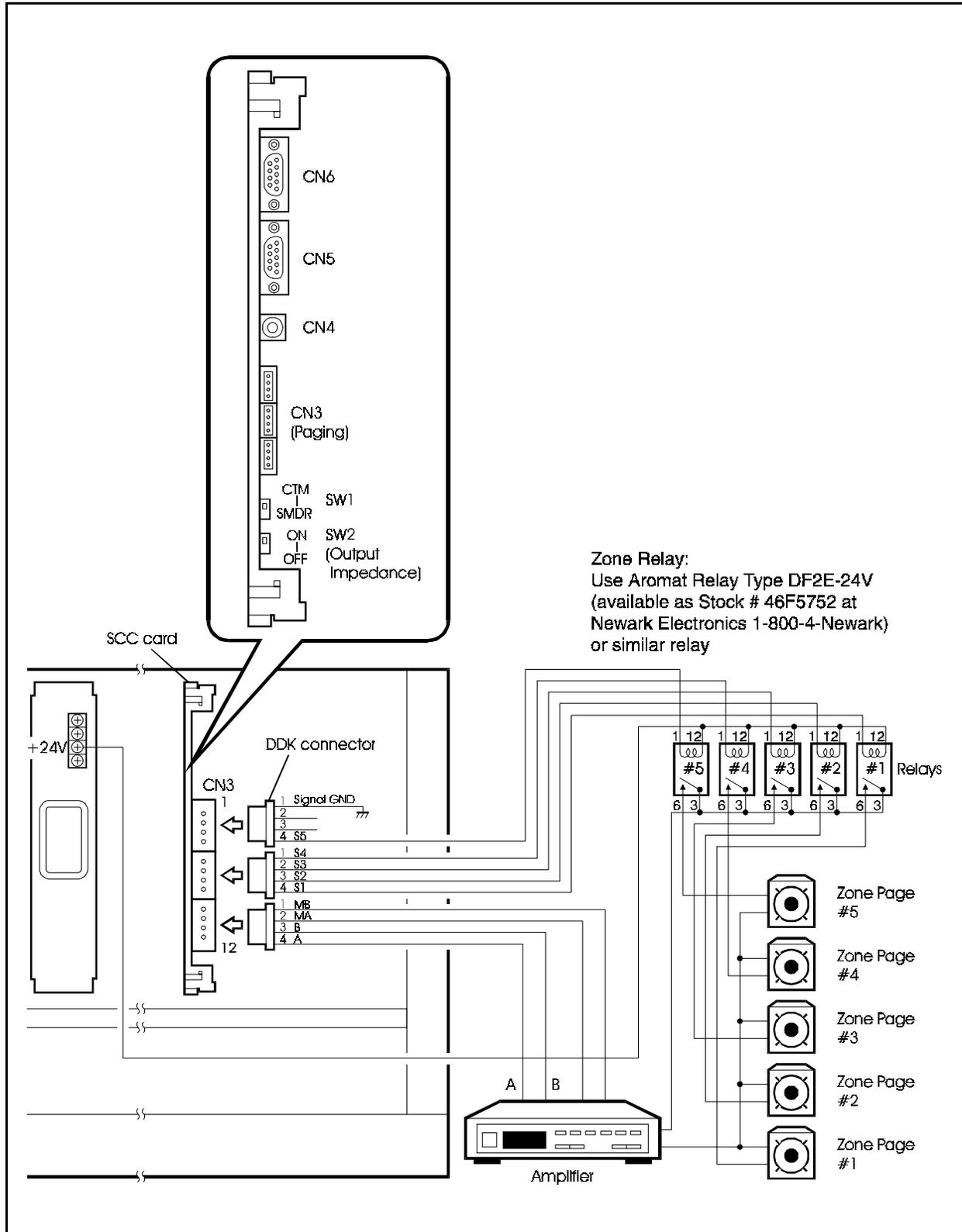
PC Customization Tool

SCC card ⊗

Guidelines

- You can connect a PC to an SCC card in an optional card slot to customize the setup without using a telephone for customization.

- SCC cards cannot be installed and removed while the cabinet is operating. First, turn the power off.

- If you are using a PC for customizing the setup, a Windows®-based computer is required:

- Prepare an RS-232C cable.

- To send data from a PC to the main unit, you will need not only the PC customization software but also Windows and a 3.5-in. 2HD floppy disk (formatted for Windows®) for saving the customization data.

- Table 6-3 shows the pinout for the RS-232C port (CN5 and CN6) of the SCC card.

Table 6-3.   RS-232C port (CN5 and CN6) pinout of SCC card

Connector pin No.	Signal	IN/OUT	Description
1	CD	-	Not used
2	RD	IN	Receive data
3	TD	OUT	Send data
4	DTR	OUT	Ready signal from PBX
5	SG	-	Signal ground
6	DSR	IN	Data set ready
7	RTS	OUT	Request to send
8	CTS	IN	Clear to send
9	FG	-	Not used

Making an RS-232C Cable

Depending on the RS-232C connector on your PC, you will need to make one of the following RS-232C cables.

- D-SUB 9-pin to D-SUB 25-pin

  - If your PC is equipped with a 25-pin D-SUB RS-232C connector, make a cable as shown in Figure 6-4. The cable should be less than 50 ft. (15m) long.

Figure 6-4. Connections for D-SUB 9-pin to D-SUB 25-pin cable

Signal name	Connector PIN No.			Connector PIN No.	Signal name
CD	1	× (NC)		1	FG
RD	2			2	TD
TD	3			3	RD
DTR	4			6	DSR
SG	5			7	SG
DSR	6			20	DTR
RTS	7			5	CTS
CTS	8			4	DTR
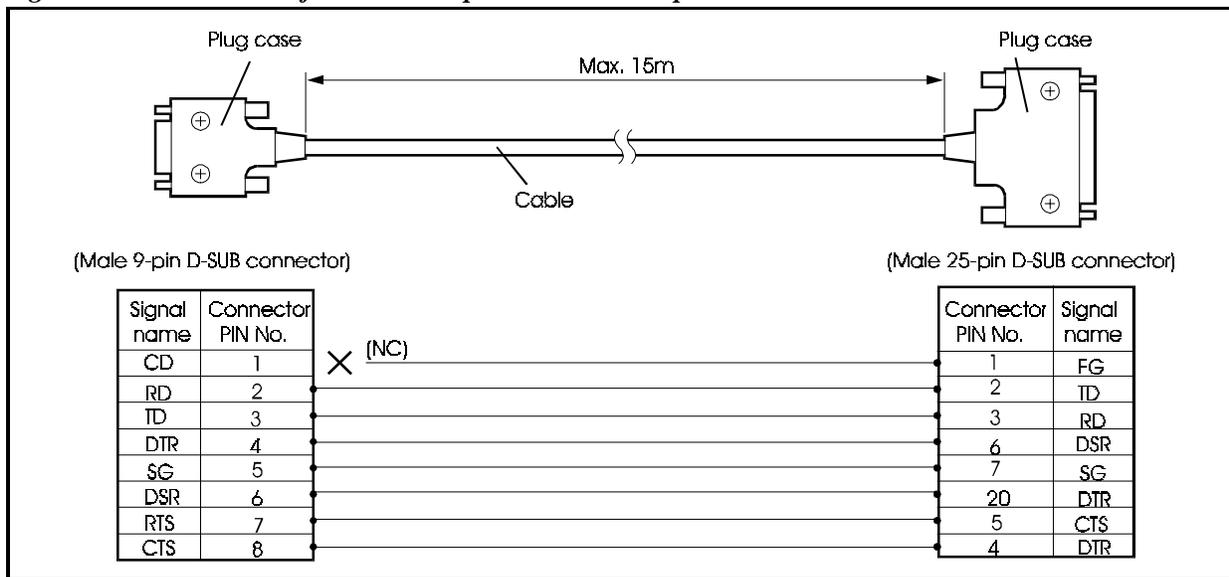
- D-SUB 9-pin to D-SUB 9-pin

  - If your PC is equipped with a 9-pin D-SUB RS-232C connector, make a cable as shown in Figure 6-5. The cable should be less than 50 ft. long.

Figure 6-5. Connections for D-SUB 9-pin to D-SUB 9-pin cable

Signal name	Connector PIN No.			Connector PIN No.	Signal name
RD	2			3	TD
TD	3			2	RD
DTR	4			8	CTS
SG	5			5	SG
DSR	6			7	RTS
RTS	7			6	DSR
CTS	8			4	DTR
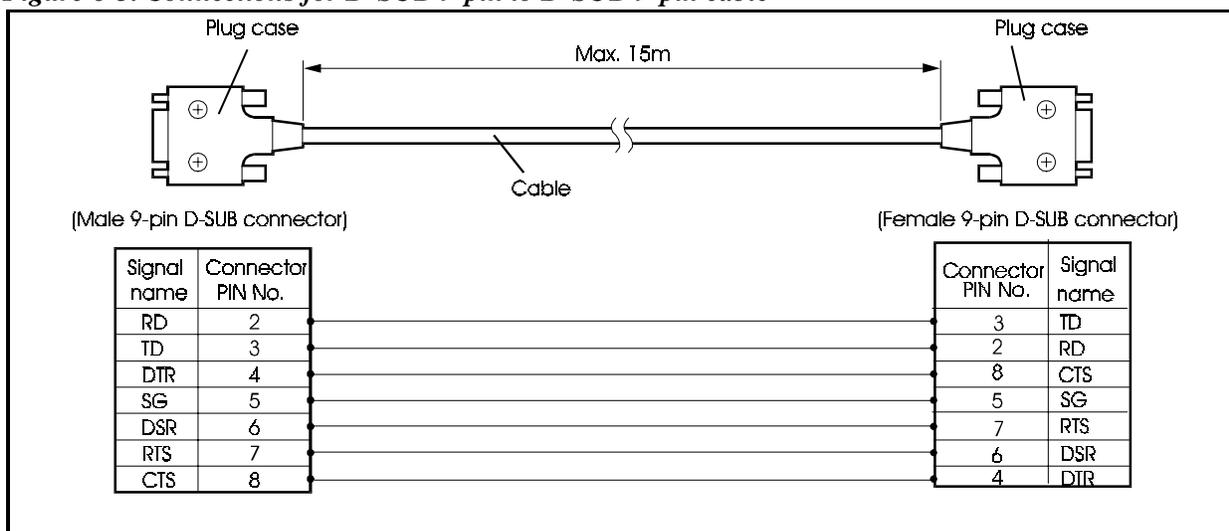
Installation

1. Set switch SW1 on the SCC card to the CTM position.

   See Figure 6-4for details of SW1 positions.

Table 6-4.   Positions of SW1 on SCC card

Switch No.	Position	Setting
SW1	CTM	Customization tool can be connected to RS-232C port (CN5)
	SMDR	Call logging device can be connected to RS-232C port (CN5) (default when shipped)

2. Install the SCC card in one of the optional card slots.

3. Connect the 9-pin D-SUB connector on the RS-232C cable to the CN5 connector (port 1) on the SCC card.

4. Pass the RS-232C cable through the wiring slot in the cabinet, then connect the 9-pin or 25-pin D-SUB connector on the other end to the RS-232C connector of your PC.

Figure 6-6. Connection to PC
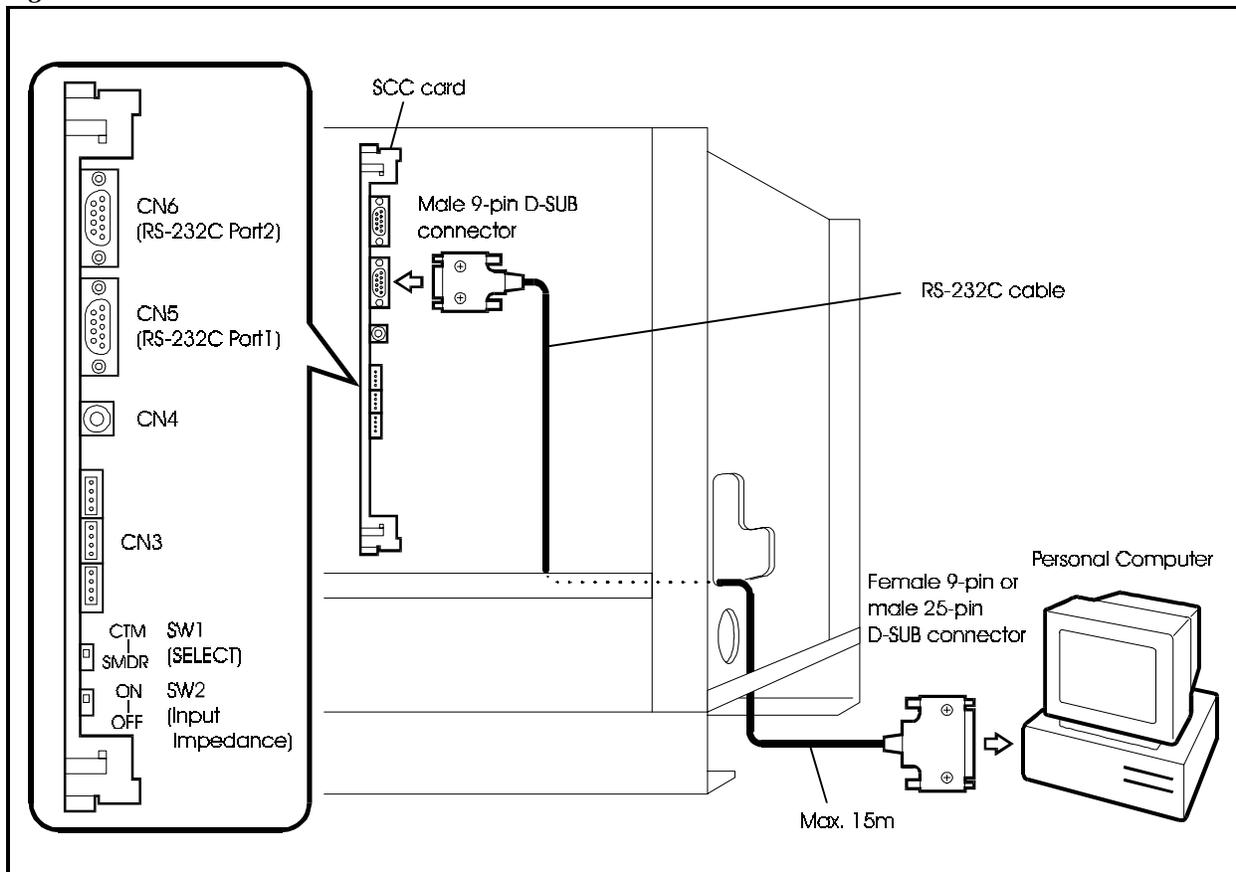
Call Logging Device

SCC card ⊗

Guidelines

- You can connect a call logging device such as a call accounting machine or a printer to an SCC card in an optional card slot.

- SCC cards cannot be installed and removed while the cabinet is operating. First, turn the power off.

- A 9-pin to 25-pin or 9-pin to 9-pin RS-232C cable is required.

- Table 6-3 shows the pinout for the RS-232C ports (CN5 and CN6) of the SCC card.

Making an RS-232C Cable

Depending on the RS-232C connector on your call logging device, you will need to make one of the following RS-232C cables.

- D-SUB 9-pin to D-SUB 25-pin

- If your call logging device is equipped with a 25-pin D-SUB RS-232C connector, make a cable as shown in Figure 6-7. The cable should be less than 50 ft. long.

Figure 6-7. Connections for D-SUB 9-pin to D-SUB 25-pin cable

(Male 9-pin D-SUB connector)

No.	Signal name	Direction
3	SD	→
4	ER	→
5	SG	
6	DR	←
8	CS	←

(Male 25-pin D-SUB connector)

No.	Signal name	Direction
3	RD	→
7	SG	
20	ER	←

- D-SUB 9-pin to D-SUB 9-pin

  - If your call logging device is equipped with a 9-pin D-SUB RS-232C connector, make a cable as shown in Figure 6-8. The cable should be less than 50 ft. long.

Figure 6-8. Connections for D-SUB 9-pin to D-SUB 9-pin cable

Installation
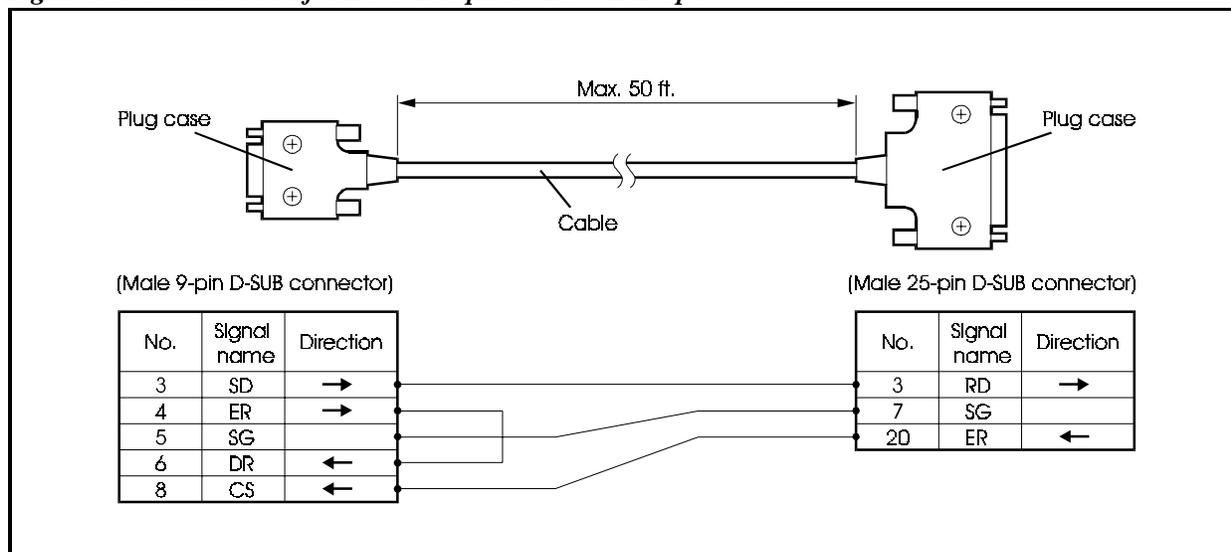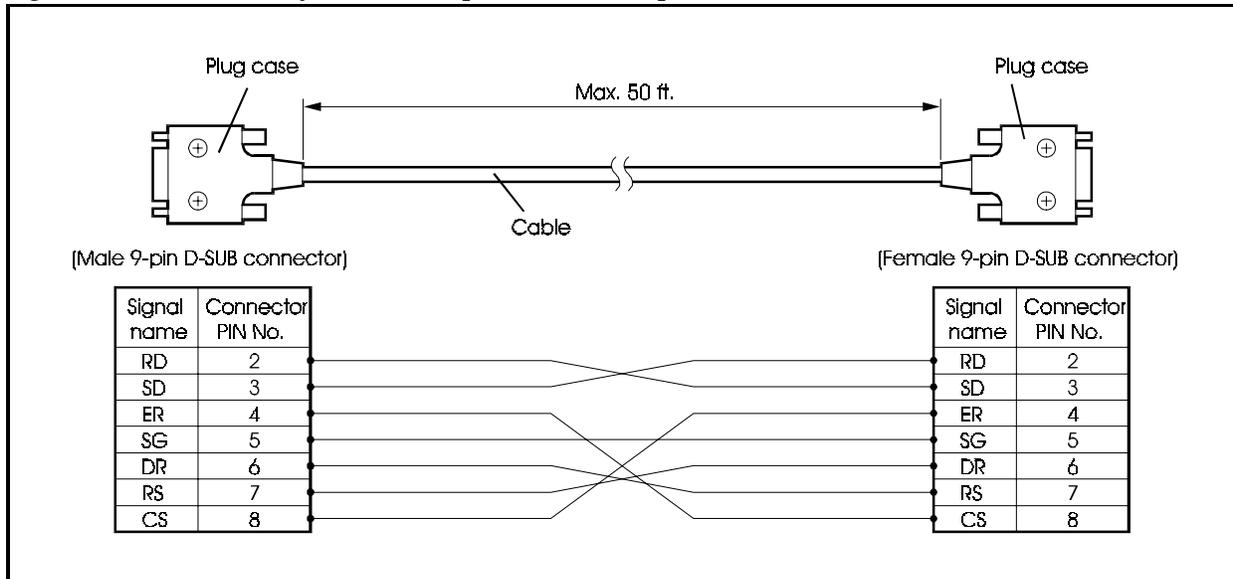
1. Set switch SW1 on the SCC card to the SMDR position (see Table 6-4 for details).

2. Install the SCC card in one of the optional card slots.

3. Connect the 9-pin D-SUB connector on the RS-232C cable to the CN5 connector (port 1) on the SCC card.

4. Pass the RS-232C cable through the wiring slot in the cabinet, then connect the 9-pin or 25-pin D-SUB connector on the other end to the RS-232C connector of your call logging device.

Figure 6-9. Connection to call logging device
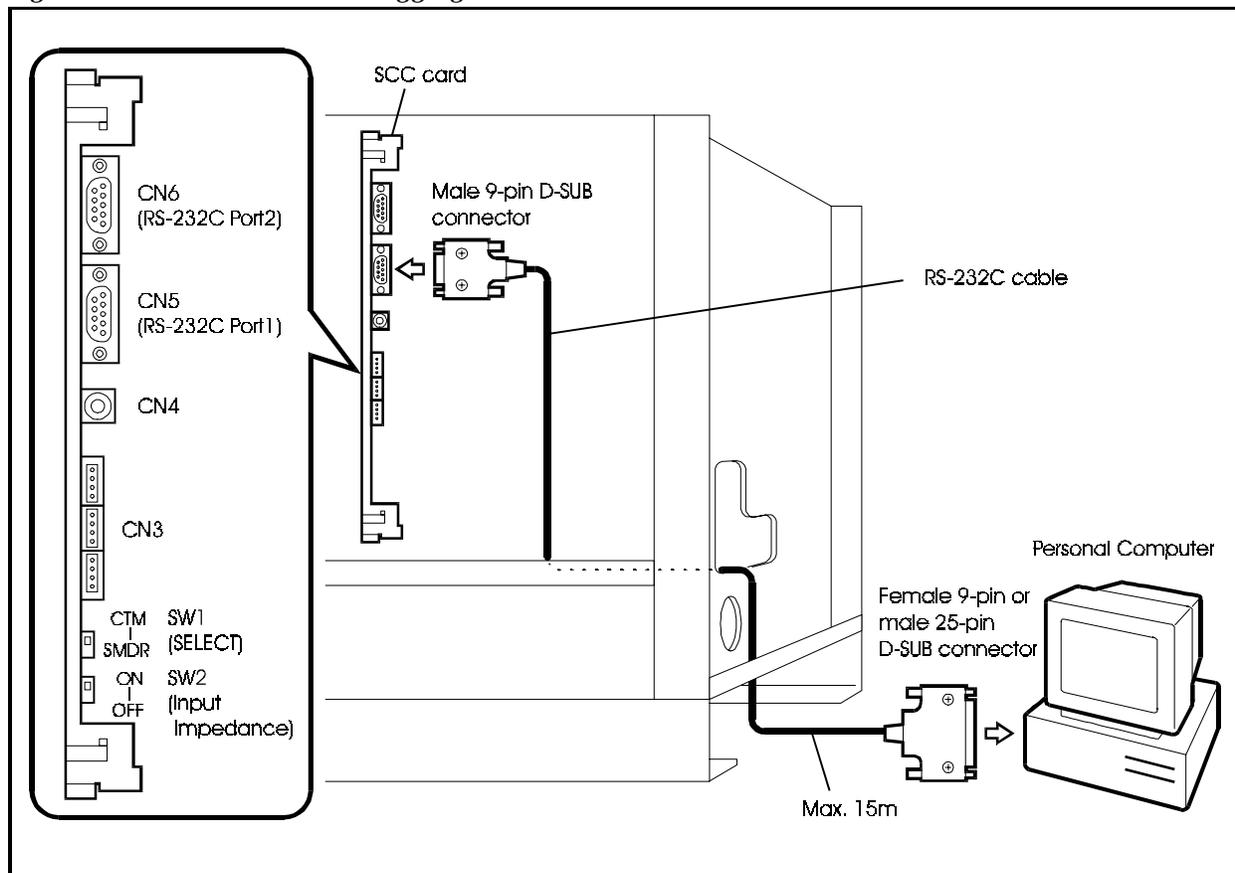
Output Format

- You can use the system program to select format #1 or #2 for the call logging device.

- Figure 6-10 shows the output format and display contents for calls.

Figure 6-10. SMDR Output data format

<u>Format #1</u>

<u>T</u> <u>MM/DD</u> <u>HH:MM:SS</u> <u>HH:MM:SS</u> <u>NNNN</u> <u>TTT</u> <u>dddddddddddddddddddddddd</u> <u>aaaaaaaaaa</u> <u>vvvvv</u>H
①   ②   ③   ④   ⑤   ⑥   ⑦   ⑧

<u>Format #2</u>

<u>T</u> <u>MM/DD</u> <u>HH:MM:SS</u> <u>HH:MM:SS</u> <u>NNNN</u> <u>TTT</u> <u>ddddddddddddddddddddddddd</u> <u>ddddddddddddddddd</u> <u>aaaaaaaaaa</u> <u>v</u>
①   ②   ③   ④   ⑤   ⑥   ⑨   ⑦

<u>vvvv</u> <u>cccccccc</u>H
⑧   ⑩

①   Condition code (I: Incoming call / S:DISA incoming call / D: DID.DDI incoming call / O: Outgoing call / L: LCR outgoing call / h: Hold / t: Transfer call / F: call forward outside call / W: Closed numbering call, Tandem connection call

②   Call start time (MM=01 to 12 / DD=01 to 31 / HH=00 to 23 / MM=00 to 59 / SS=00 to 59)

③   Call time (HH=00 to 23 / MM=00 to 59 / SS=00 to 59)

④   Trunk user No. (internal line No.: 0 to 9999 / Trunk No.: C1 to C576)

⑤   Trunk No. (Trunk No.: 1 to 576 / When trunk is disconnected while the call is on hold: *1 to *576)

⑥   Dialled No. (24 digits max.)

⑦   Accounting code (10 digits max.)

⑧   ID code (V001 to V400)

⑨   Caller data (format #2 only)

⑩   ISDN charge data (format #2 only)

MIS Report Output

ACD card ⊗

Guidelines

⚠

CAUTION:
- The back up battery will last about 5 years. Be sure to replace the battery before it is exhausted.

- Connecting a personal computer to the ACD card mounted on the flexible slot using the RS-232C cable (supplied) allows output of MIS Reports from the printer connected to the personal computer. You cannot connect a printer directly to the ACD card for output.

- The RS-232C cable (supplied) is a 9-pin D-Sub connector. If the connection port on the personal computer or printer is a 25-pin D-Sub connector, connect via a 9-pin/25-pin conversion adaptor.

- When connecting the ACD card to a personal computer, regular communications software must be installed on the personal computer.

- The ACD card cannot be removed or attached with the power turned ON. Be sure to turn the power OFF before removing or attaching the ACD card.

- The supplied cable will only work with ACD. The cable will not support SMDR or PC Customization Tool.

- For details on ACD, refer to "Section 520 ACD Reference Manual."

Installation

1. Set SW1 on the ACD card referring to the settings in Table 6-5.

Table 6-5.   ACD Card SW1 Settings

Switch No.	Setting	Description
SW1	BACK UP	Set when retaining RAM data.
	INITIAL	Set when clearing RAM data.

2. Slot the ACD card into flexible slot (FS11).

3. Connect the 5-pin connector of the RS-232C cable (supplied) to CN3 on the ACD card.

4. Pass the RS-232 cable through the wiring hole on the cabinet, and connect the D-Sub 9-pin connector to the RS-232 port of the personal computer or printer. If the connection port is a 25-pin D-Sub connector, connect via a 9-pin/25-pin conversion adaptor.

Figure 6-11. Connecting the ACD Card Personal Computer/Printer
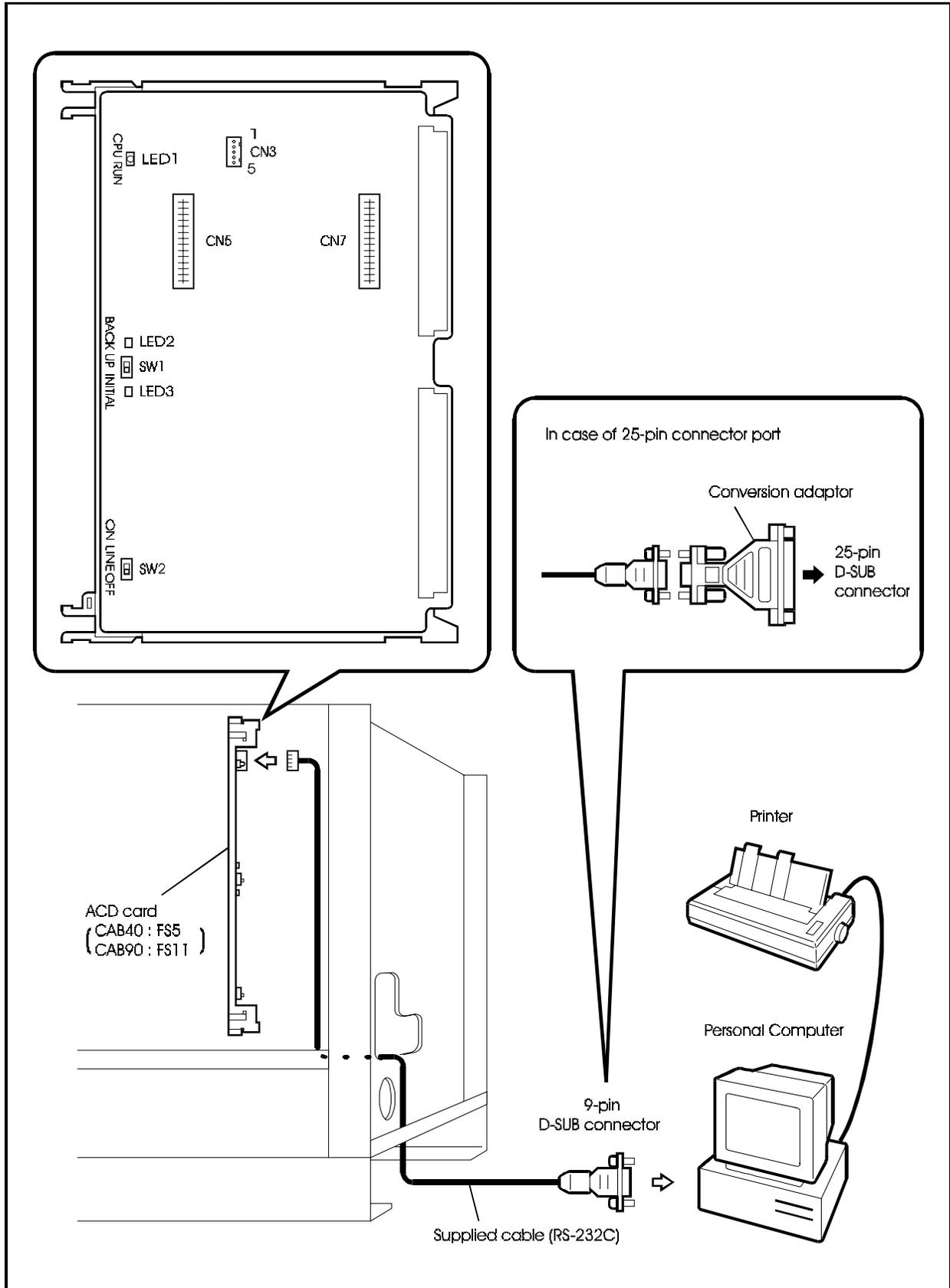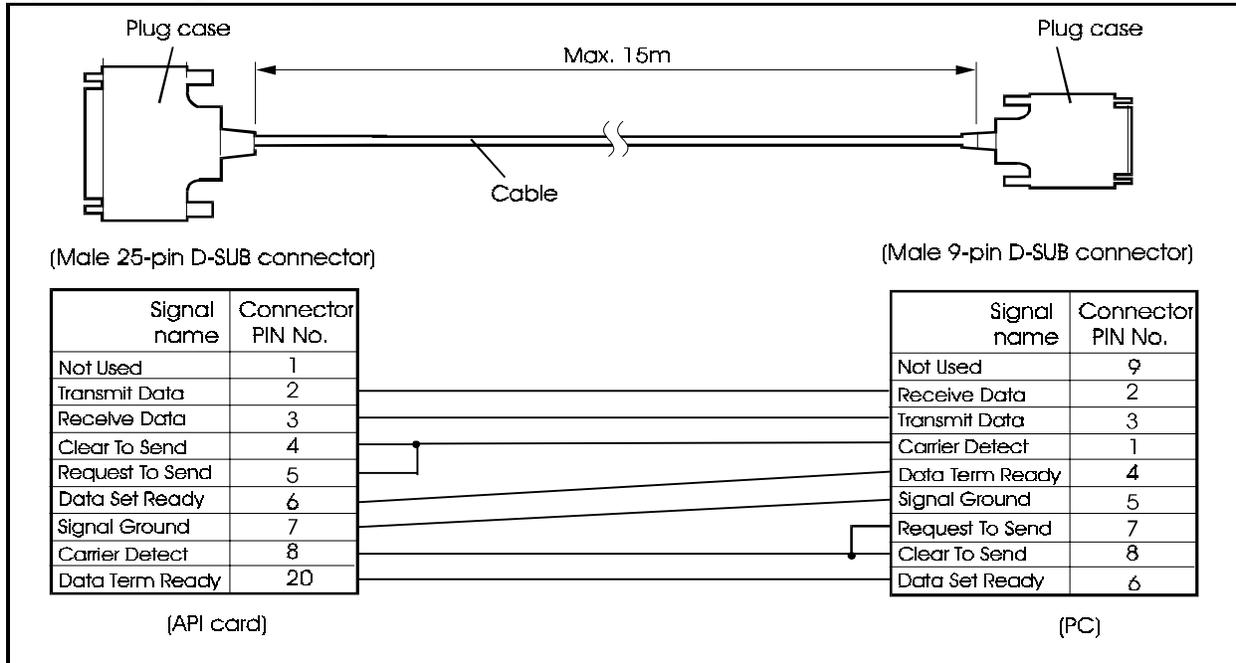
Application Interface (API)

Guidelines

- The application interface (API) card enables data from a range of applications such as voice mail and ACD to be sent to a PC.

- Control is provided by the RS-232C interface.

- Only one API card can be installed in a cabinet. The card must be installed in one of the optional card slots (OP1 or OP2) or in a flexible slot (FS1 to FS12).

- Specific applications may have additional requirements. See the application documentation. For instance, the External Integrated Digital Voice Mail requires that the API be installed in a Flexible Slot that has an availble Flexible Slot in the next slot position for a DEC card used for the VM voice paths.

- The maintenance switch (SW1) on the API card can be set so that the card can be installed and removed while the main cabinet is operating. See "Maintenance Switches" on page 5-1 for details.

- The API card performs a self test when the test mode switch (SW401) is ON.

- Setting the RAM HOLD switch (SW3) OFF deletes data from the API card memory. When this switch is ON, the backup battery ensures that the data is retained in memory.

Preparing an RS-232C cable

- See Figure 6-11 for details of how to prepare a 25-pin D-SUB to 9-pin D-SUB RS-232C cable if one is not supplied.

Figure 6-12. 25-pin to 25-pin D-SUB cable connections

Signal name	Connector PIN No.
Not Used	1
Transmit Data	2
Receive Data	3
Clear To Send	4
Request To Send	5
Data Set Ready	6
Signal Ground	7
Carrier Detect	8
Data Term Ready	20

(API card)

Signal name	Connector PIN No.
Not Used	9
Receive Data	2
Transmit Data	3
Carrier Detect	1
Data Term Ready	4
Signal Ground	5
Request To Send	7
Clear To Send	8
Data Set Ready	6

(PC)

Installation

1. Install the API card in an available optional card slot or flexible slot.

2. Connect one end of the RS-232C cable to the RS-232C port (CN4) of the API card and the other end to the PC.

Figure 6-13. Connecting API card to PC
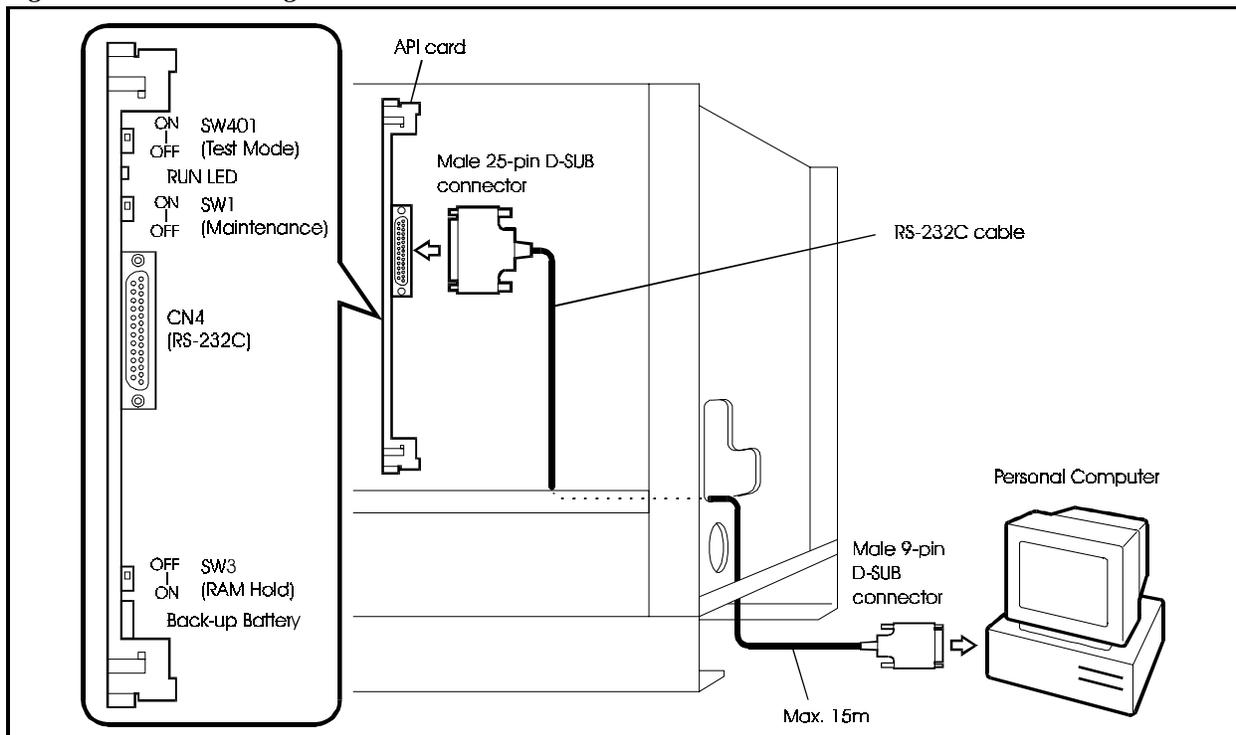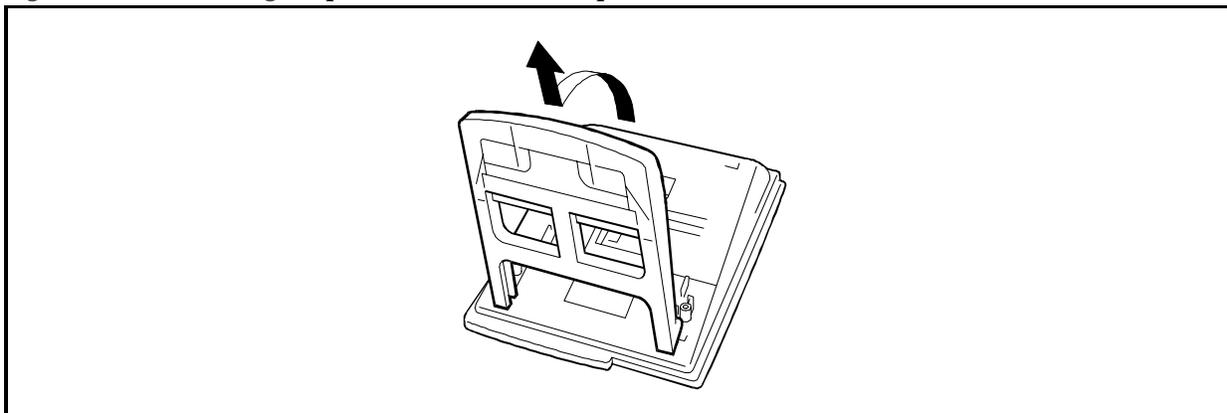
Voice Recognition Adaptor

Guidelines

- A VB-44101 voice recognition adaptor can be installed in the VB-44224 key phone so that the phone can be used as a voice recognition phone.

- You can call by name or execute other functions by function names.

- Locate the Voice Recognition Adaptor within 400 ft. (120m) of the cabinet. The maximum loop circuit resistance to a Voice Recognition Adaptor is 20 Ohms.

- When the Voice Recognition Adaptor is installed, the telephone cannot be wall mounted.

- When the Voice Recognition Adaptor is installed, a DSS or EM24 cannot be attached to the case.
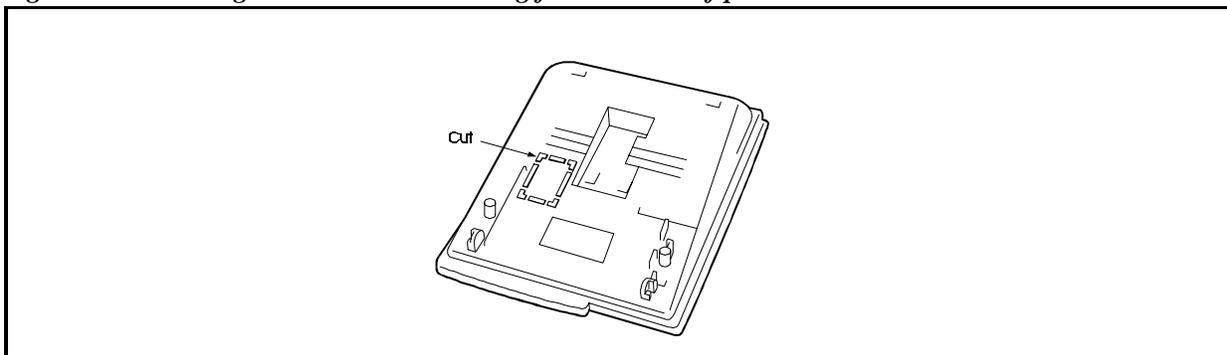
Installation

1. Remove the wall-mount adaptor from the bottom of taking care not to damage the hooks.

*Figure 6-14. Removing telephone wall-mount adaptor*

2. Cut the connector covering from the bottom of the phone to expose the connectors (CN11 and CN12).

Figure 6-15. Cutting the connector covering from bottom of phone

3. Connect one end of the CW11 and CW13 cables provided with the voice recognition adaptor to connectors CN11 and CN12 in the bottom of the phone.

4. Secure the voice recognition adaptor using the two screws.

Figure 6-16. Connecting voice recognition adaptor to key phone
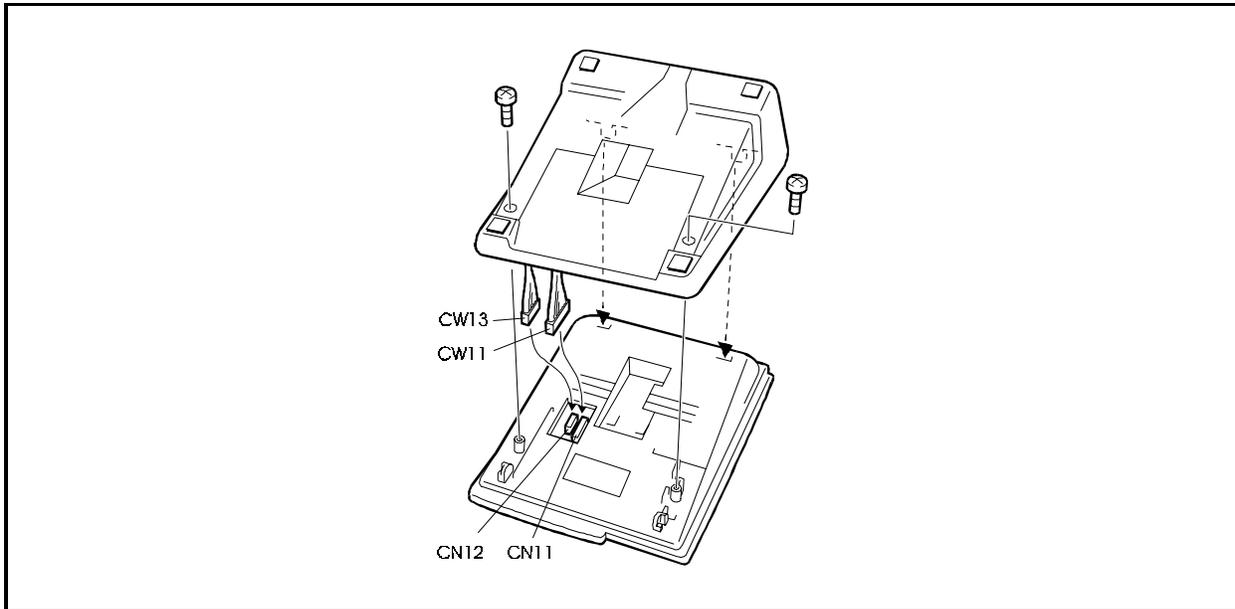
5. Connect the phone to the internal line port on a DEC/8 card (see page 5-31).

*Figure 6-17. Connecting phone to secondary socket*
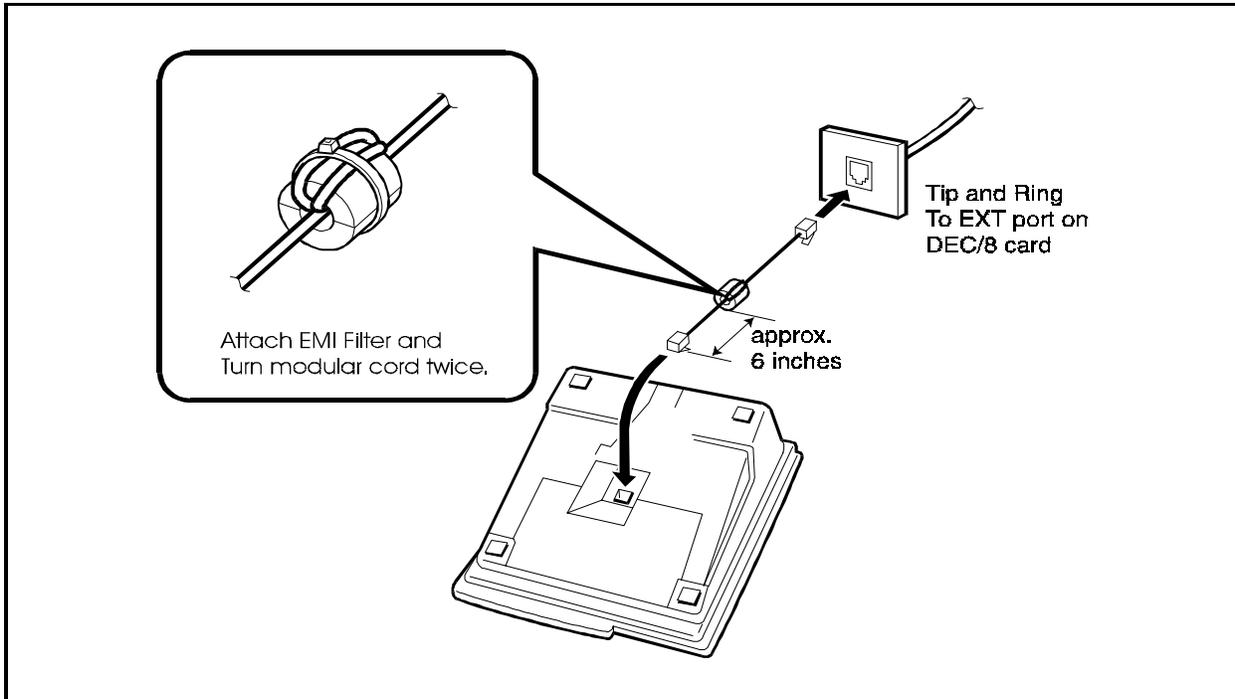
DSS

Guidelines

- The DSS (VB-44320) is a 72-key console that can be attached to a telephone. It provides direct station selection and busy lamp fields for internal lines.

- If more than one DSS is assigned to a telephone, only one of the DSS can be cabled from the same wall jack as the telephone. An additional DSS must be cabled from separate wall jacks.

- The DSS comes with a mounting bracket, screws, and a two-conductor cable for connecting the DSS to the key phone.

- Locate the DSS within 400 ft. (120m) of the cabinet. The maximum loop circuit resistance to a DSS is 20 Ohms.

Installation

1. Attach the DSS 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 secondary socket using a four-conductor cable.

Figure 6-18. DSS connection
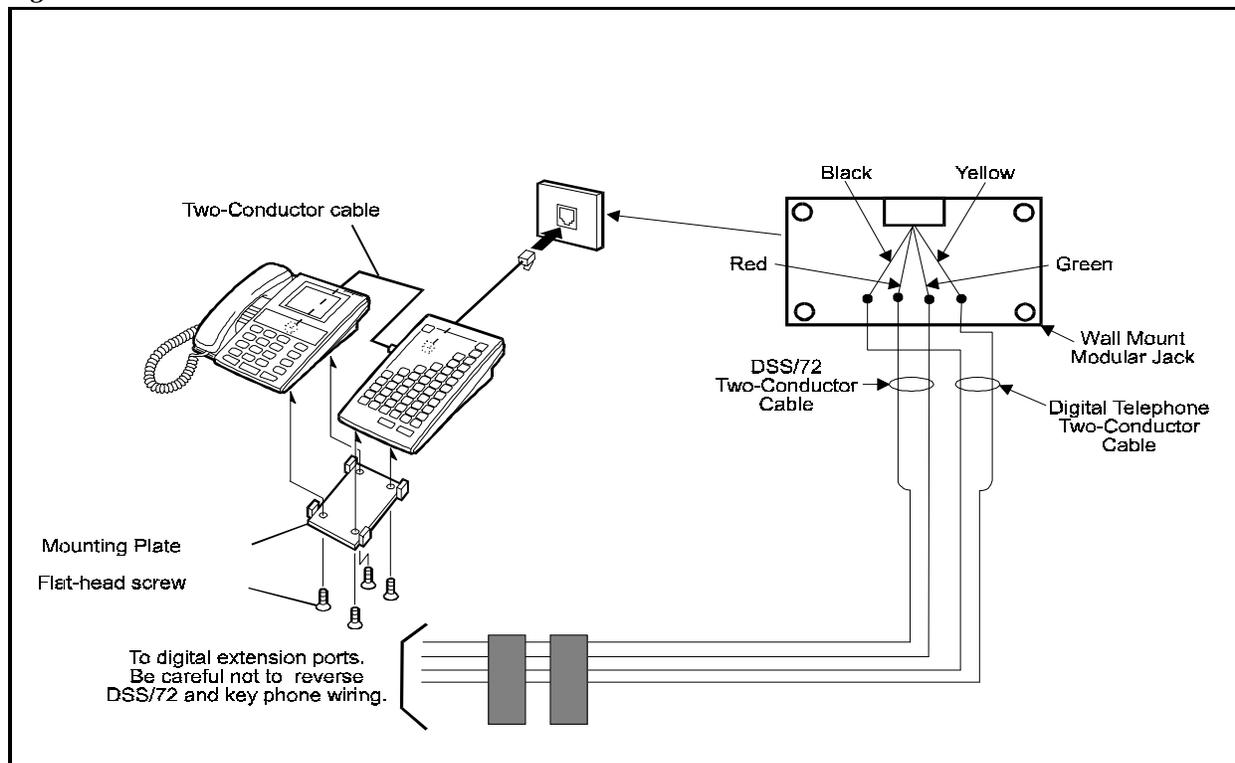
EM24

Guidelines

- The EM24 (VB-44310) provides 24 flexible function (FF) keys. It can be attached to any key phone.

- The EM24 comes with a mounting bracket, screws, and a two-conductor cable for connecting it to the key phone.

- Locate the EM24 within 400 ft. (120m) of the cabinet. The maximum loop circuit resistance to a EM24 is 20 Ohms.

Installation

1. Attach the EM24 to the key phone using the mounting plate and the four screws, as shown in Figure 6-19.

2. Connect the EM24 to the key phone using the two-conductor cable.

3. Connect the EM24 to the secondary socket using a four-conductor cable.

Figure 6-19. EM24 connection
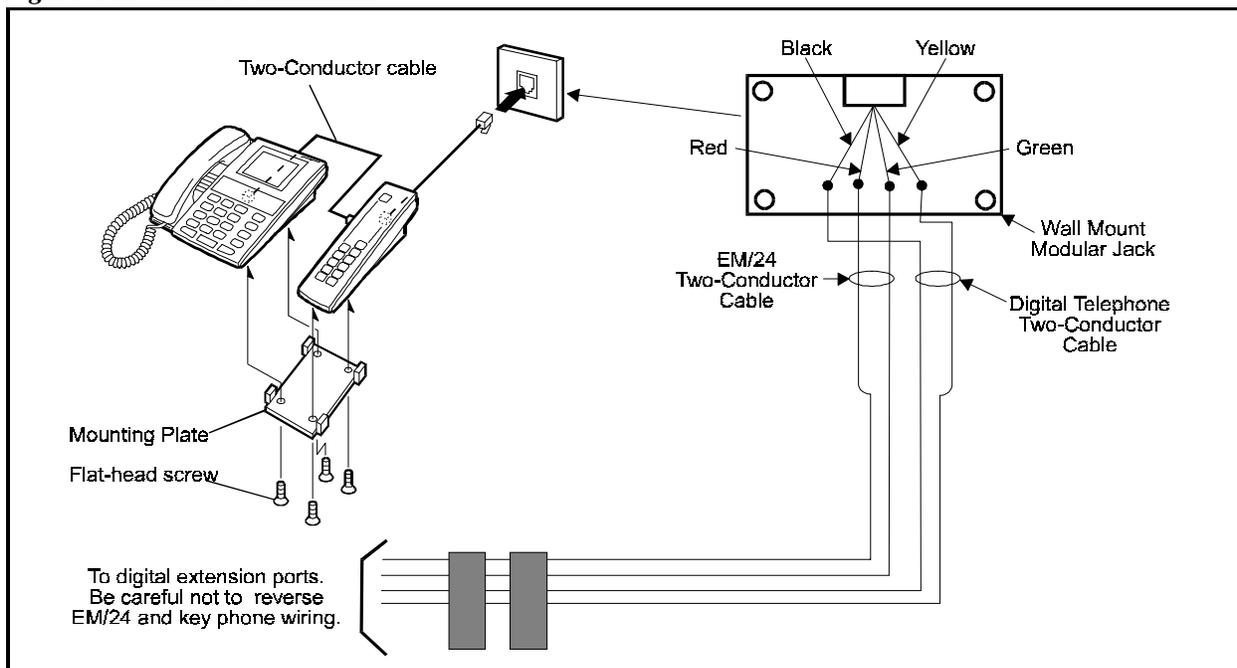
TAPI Adaptor

Guidelines

- The TAPI adaptor acts as an interface between the DBS 576 and the TAPI application on your PC.

- To use the TAPI adaptor, you will need a TAPI Service Provide (SP) software.

- A 9-pin (female) D-SUB RS-232C cable is provided with your TAPI adaptor.

- If your PC is equipped with a 25-pin D-SUB RS232C connector, make the RS-232C cable shown in Figure 6-4, "Connections for D-SUB 9-pin to D-SUB 25-pin cable".

- See "Section 570 TAPI Installation Guide" for details of TAPI.

Installation

1. Connect one end of the RS-232C cable to an available serial (Com) port on the PC.

2. Connect the other end of the RS-232C cable to the TAPI adaptor, as shown in Figure 6-20.

3. Connect the phone line to the TAPI adaptor, then the DBS 576 line.

Note: Be sure to attach the phone line before connecting the DBS 576 internal line. Connecting the DBS 576 internal line before the phone line may result in operational errors. Also, be sure the lines are plugged into the appropriate receptacles.

Figure 6-20. Installing the TAPI adaptor
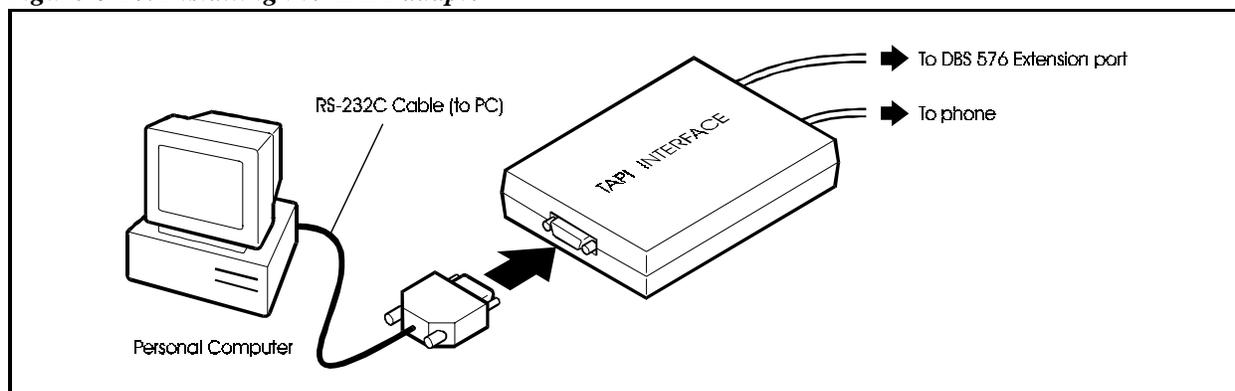
Doorphone Adaptor

⚠️ **CAUTION:**
 • Turn the power switch and the external breaker OFF, and disconnect the AC cable before installing the Doorphone Adaptor.

Guidelines

 • The Doorphone Adaptor (VB-43701) requires a door opener. In addition, a Doorphone (VB-43705) is normally used with the Doorphone Adaptor. Door openers are not sold by Panasonic, but can be purchased separately from an electronics dealer.

 • Each Doorphone and door opener use one trunk port.

 • One or two door openers and two Doorphones can be connected to a Doorphone Adaptor.

 • The Doorphone can be set to call time for 15 seconds, 30 seconds, or one minute.

 • The Door opener can be set to open for one second, 2 seconds, or 15 seconds.

 • The maximum permissible wiring distance between the Doorphone Adaptor and a LTRK/8 card is limited to a maximum loop resistance of 2 Ohms.

 • The maximum permissible resistance of the wiring between the Doorphone Adaptor and Doorphone is 20 Ohms.

 • The following tools are required to install the Doorphone Adaptor:

   • Phillips screwdriver

   • Needle-nose pliers

   • Diagonal cutters

Installation

1. Remove the cover from the Doorphone Adaptor.

2. Set the switches in the Doorphone Adaptor according to Figure 6-24.

3. Remove the cable punch-out plate (Figure 6-23) in order to make an opening for the cables coming into the Doorphone Adaptor.

   To remove the plate, cut the groove with diagonal cutters, then bend the plate back and forth with needle-nose pliers to remove it.

4. Mount the Doorphone Adaptor on the wall using the three screws provided with the unit.

Figure 6-21. Doorphone Adaptor cable punch-out plate and wall mounting

8mm

Cable Punch-Out Plate
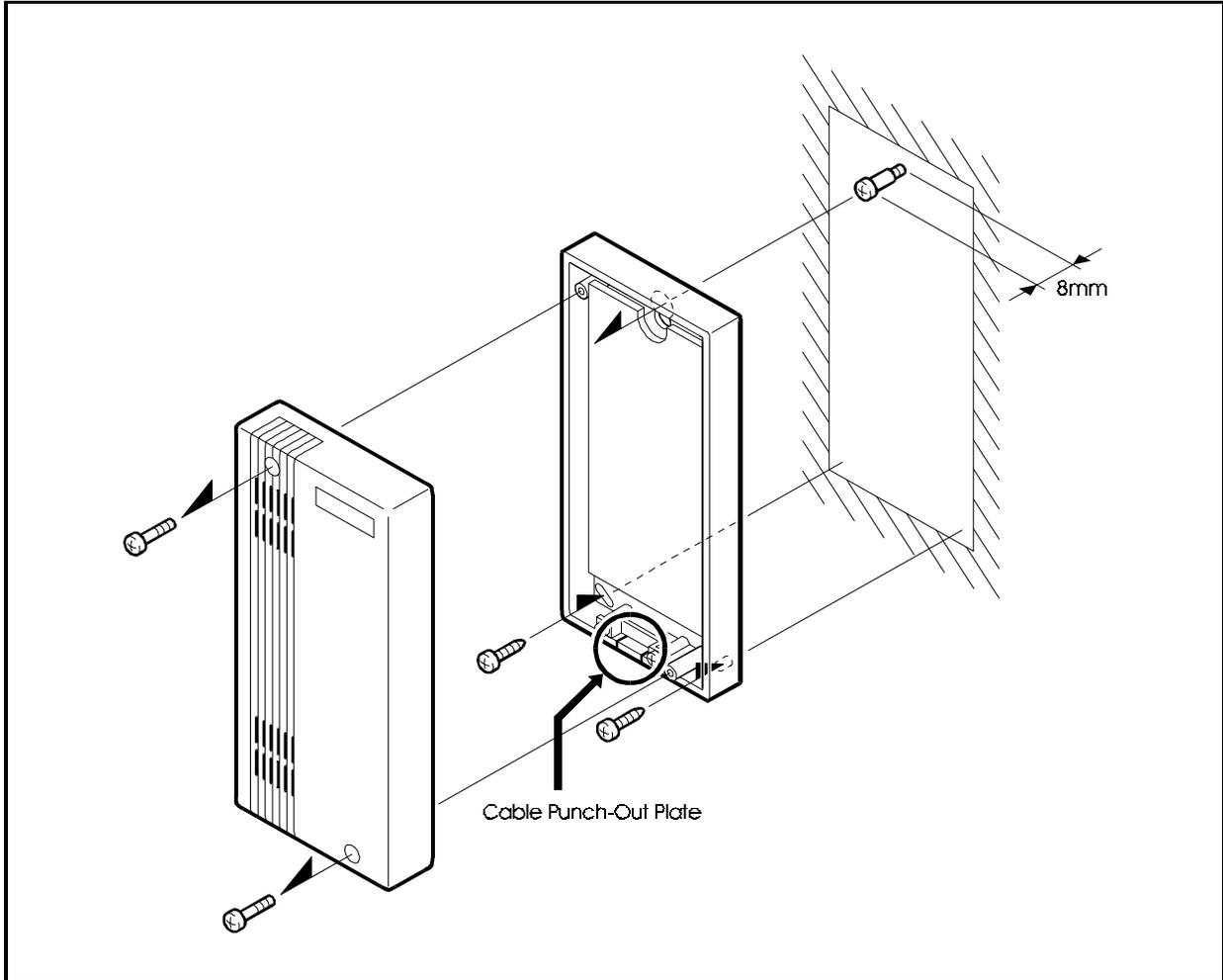
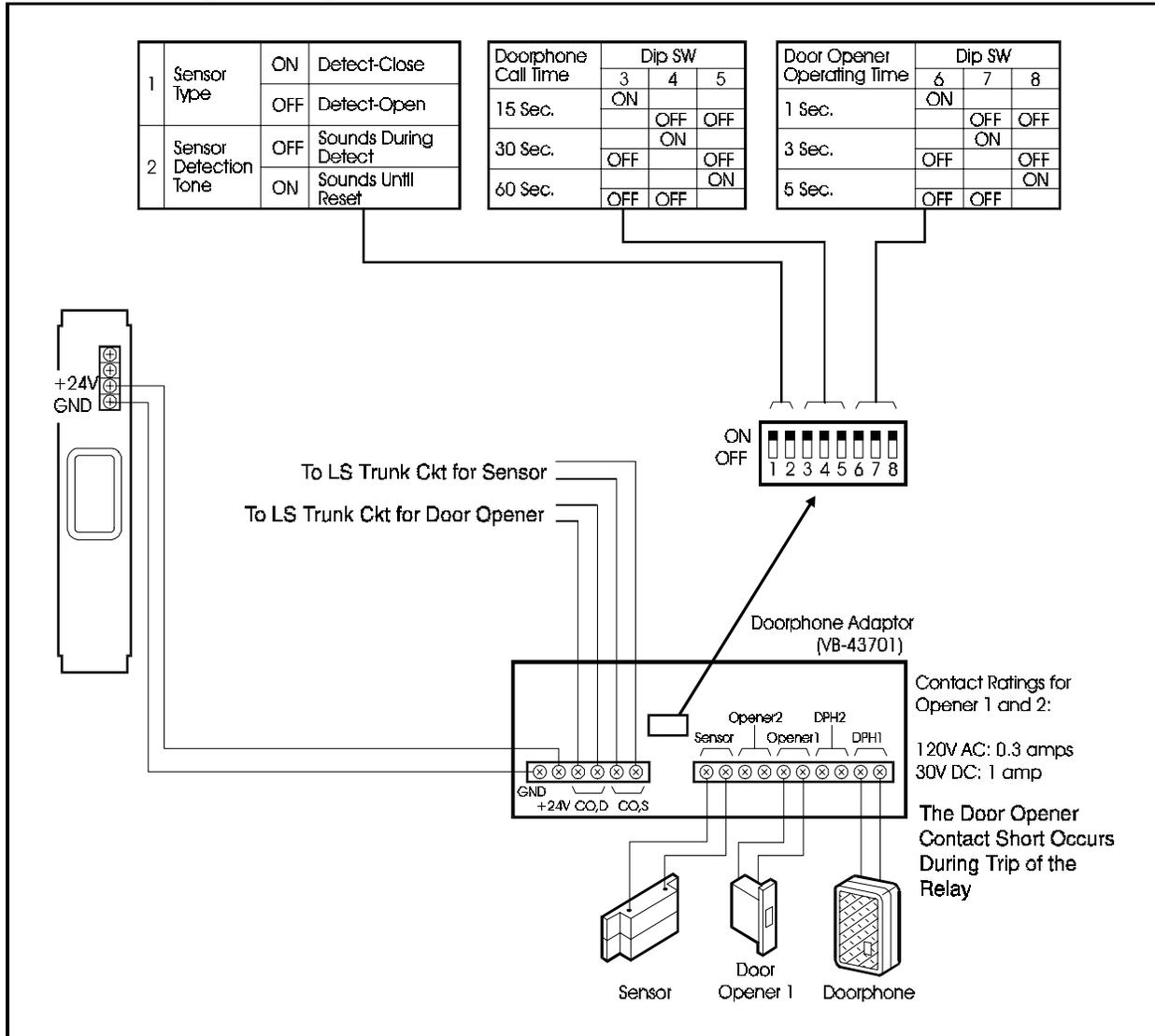5.   Connect the trunk line(s) to the Doorphone Adaptor, as shown in Figure 6-22.

The "CO.D" connector is used for the Doorphone and opener. The "CO.S" connector is used for the sensor.

6.   Connect the Doorphone, door opener, and sensor to the Doorphone Adaptor.

Figure 6-22. Doorphone Adaptor connections

Power Failure Transfer

⚠️ **CAUTION:**
  - Turn the power switch and the external broker OFF, and disconnect the AC cable before installing the Power Failure Transfer.

Guidelines

- Up to four SLTs can be connected to the Power Failure Unit (VB-43703). If a power failure occurs, the SLTs will automatically receive a dial tone from the trunk. The DBS 576 features and restrictions do not apply when SLTs are receiving a dial tone from the trunk line.

- 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 cutters

Installation

1. Remove the cover from the Power Failure Unit (PFU)

2. Remove the cable punch-out plate (Figure 6-23) to make an opening for the cables coming in to the PFU.

   To remove the plate, cut the groove with diagonal cutters, then bend the plate back and forth with needle-nose pliers to remove it.

3. Mount the PFU on the wall using the three screws provided with the unit.

Figure 6-23. Power Failure Unit cable punch-out plate and wall mounting
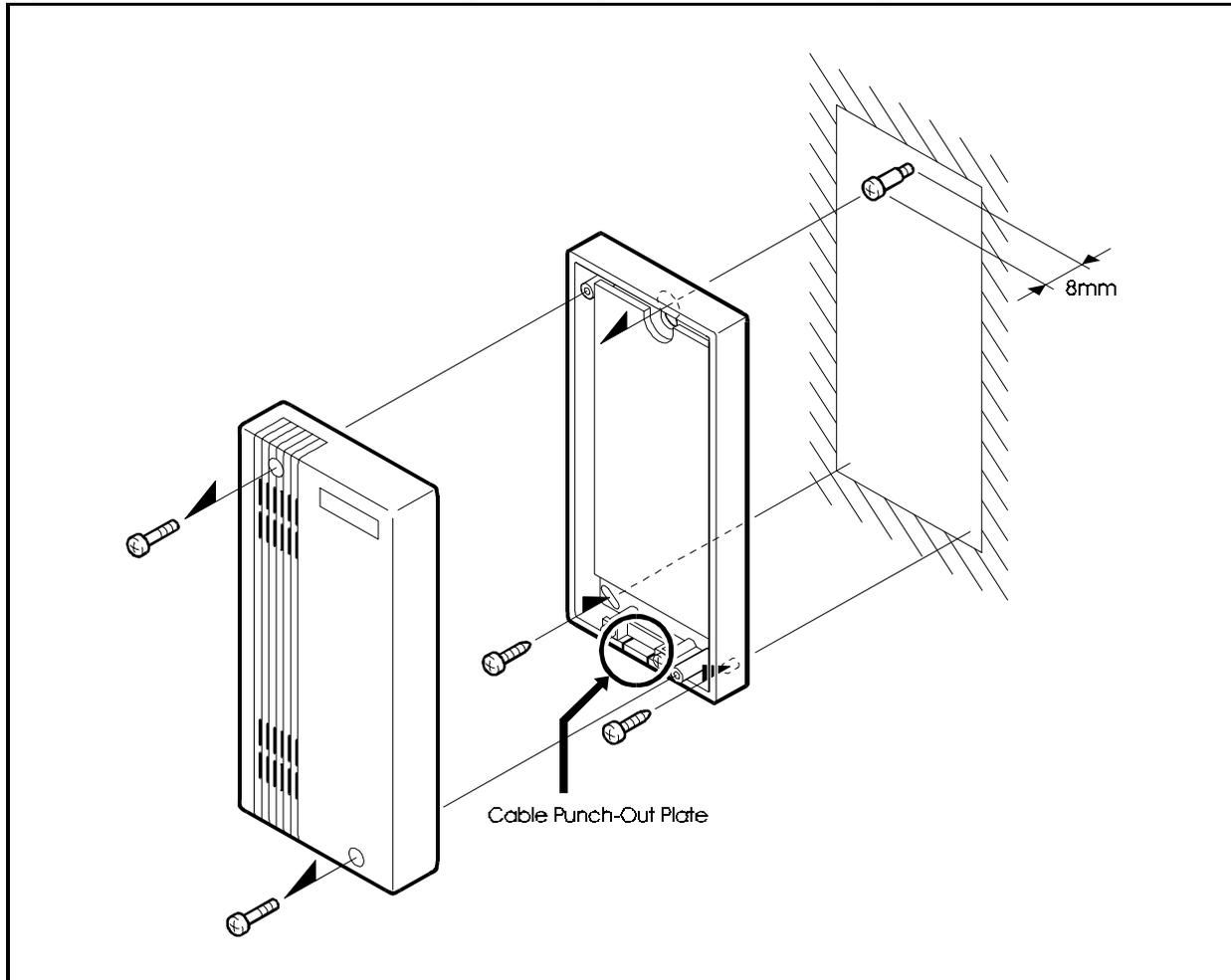
4. Connect the pin3 of CN5 (FG) to the earth.

5. Connect the SLTs to the AEC extension ports on the PFU.

6. Connect the trunks from the DBS 576 to the PFU.

7. Connect the AEC ports from the DBS 576 to the PFU.

    When a power failure occurs, AEC/8 card "A" line is switched to trunk "A" line, AEC/8 card "B" line is switched to trunk "B" line, and so on.

8. Connect the +24V and GND terminals from the DBS 576 power unit to the PFU.

9. Install the cover on the PFU.

Figure 6-24. Power Failure Unit connections
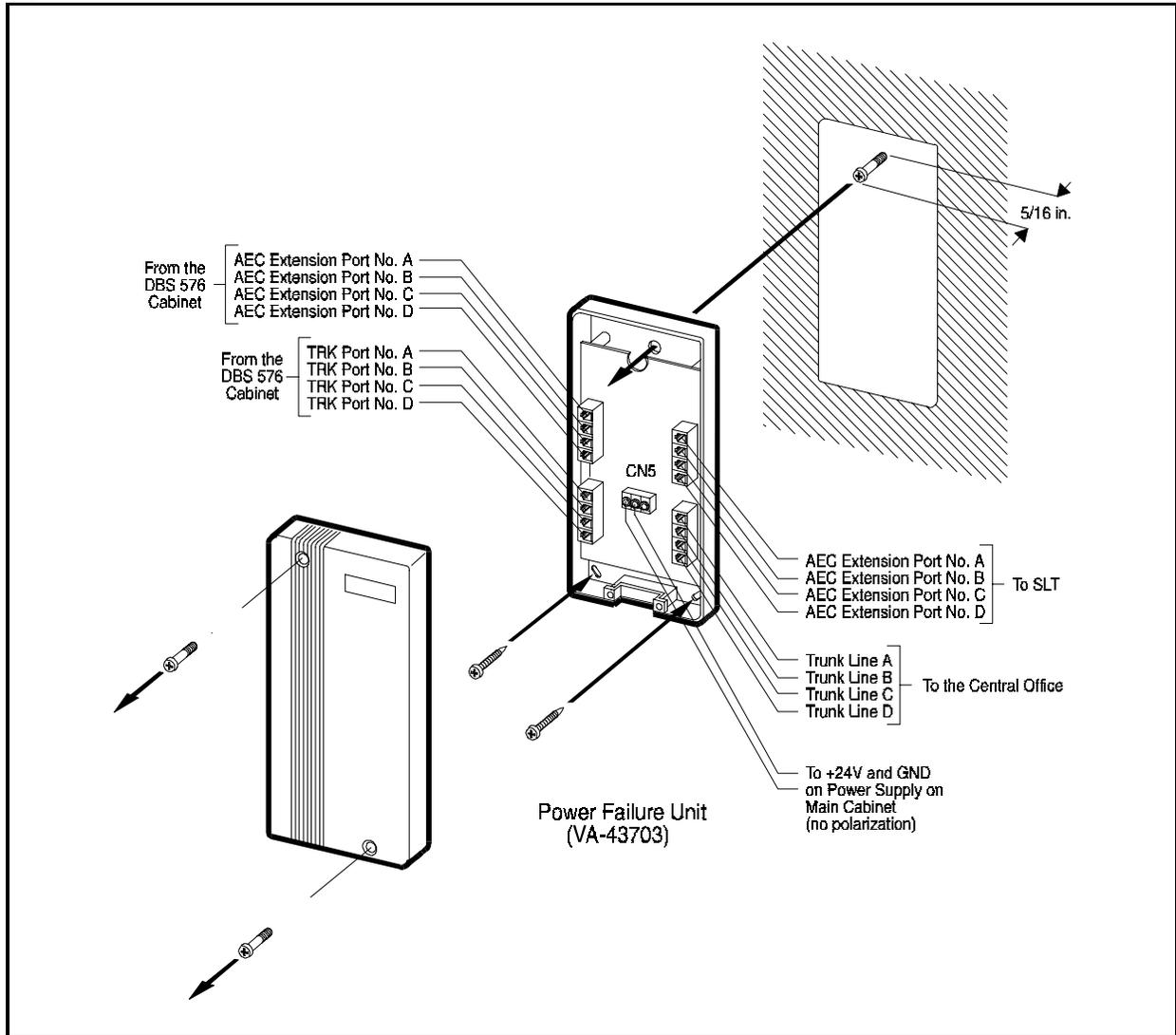
Replacing the Backup Battery of CPC card CPC96, CPC288, CPC576 Card ⊗

Guidelines

⚠

CAUTION:
- Turn the power switch and make certain the AC cable is before replacing the backup battery.
- The backup battery will last about 7 years. Be sure to replace the battery before it is exhausted.

- The backup batteries on the CPC96, CPC288, and CPC576 cards backup data such as program settings, speed dialing data, and the date and time. Be sure to replace the backup batteries before they are exhausted.

Installation

1. Connect the new backup battery to the following connectors on the CPC96, CPC288, and CPC576 cards:

Card	Connector
CPC96	CN6 or CN7
CPC288	CN6 or CN7
CPC576	CN5 or CN6

Note: The two connectors on each of these cards are connected in parallel.

2. Cut the two tie-wraps using nippers to remove the old backup battery.

3. Secure the new backup battery using the two tie wraps.

Note: Secure the battery so that it cannot move.

Figure 6-25. Replacing the backup battery of CPC card

• CPC96 card and CPC288 card

Note: A clear protective shield is present around the battery. However, this shield is not shown to better illustrate the battery position. This will not interfere with the battery replacement.

• CPC576 card

Note: A clear protective shield is present around the battery. However, this shield is not shown to better illustrate the battery position. This will not interfere with the battery replacement.

Chapter 7. Specifications

This chapter lists the specifications of the equipment constituting the DBS 576.

Note: The following specifications are subject to change without notice.

Electrical Characteristics

Table 7-1.   Input Power

Equipment	Power Requirements
All DBS 576 Cabinets	120V AC ± 10% 60 Hz
DBS 576 key telephones	3 watts maximum (powered from the DBS 576)

Environmental Requirements

Table 7-2.   Battery Backup Capacity

System	Battery Pack	Capacity (with maximum traffic)
DBS 576	VB-44025	30 minutes

Table 7-3.   Temperature and Humidity Requirements for System Operation (excludes Built-In Voice Mail)

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

Table 7-4.   Temperature and Humidity Requirements for Built-in VM

Environmental Conditions	Requirements
Temperature	41 to 95 degrees F (5 to 35 degrees C)
Relative Humidity	30 to 90%

Table 7-5.   Dimensions and Weight for Single-Cabinet Systems and Telephones

	Base Cabinet	**Expansion Cabinet**
Dimensions (H x W x D in inches)		
Cabinet	26 3/4" W x 10 7/8" D x 20 5/16" H (including top panel)	26 3/4" W x 10 7/8" D x 17 2/16" H (not including top panel)
VB-44225	4 1/8 x 7 3/8 x 9	
Other key telephones	3 3/4 x 7 3/8 x 9	
DSLT	3 1/8 x 7 3/8 x 9 1/8	
DSS/72	2 15/16 x 4 13/16 x 9 3/16	
EM/24	2 15/16 x 2 3/8 x 9 3/16	
Weight (lbs)		
Cabinet	Approximately 44	Approximately 44
VB-44225	2.3	
Other key telephones	2.2	
DSLT	1.6	
DSS/72	1.2	
EM/24	.95	

Table 7-6.   Resource Maximums

System Resources	**1 Cabinet**	**2 Cabinets**	**3 Cabinets**	**4 Cabinets**	**5 Cabinets**	**6 Cabinets**
CO line ports	96	192	288	384	480	576
Station ports	96	192	288	384	480	576
CO line/Station Speech path switching	nonblocking					

Table 7-7.   Feature Related Capacities

Resource	Maximum for					
	1 Cabinet	2 Cabinets	3 Cabinets	4 Cabinets	5 Cabinets	6 Cabinets
CPU configuration	CPC-96	-----	-----	-----	-----	-----
	CPC-288		-----	-----	-----	
	CPC-576					
Cabinet connection	1 KSU	2 KSU	3 KSUs	4 KSUs	5 KSUs	6 KSUs
Loop Start	96	192	288	384	480	576
Ground Start	96	192	288	384	480	576
ISDN BRI	48	96	144	192	240	288
ISDN PRI(8/16/24)	3	6	9	12	15	18
DID	96	192	288	384	480	576
T1(8/16/24)	3	6	9	12	15	18
E&M	48	96	144	192	240	288
Analog Ext.	96	192	288	384	480	576
Digital Ext.	96	192	288	384	480	576
ISDN BRI	48	96	144	192	240	288
ISDN PRI	3	6	9	12	15	18
EM 24	96	192	288	384	480	576
DSS	12	24	36	48	60	72
3 Member Conf. X 8	1	1	1	1	1	1
8 Member Conf. X 2	2	4	6	8	12	16
DTMFR Unit	2	4	6	8	8	8
API Unit	1	1	1	1	1	1
TSAPI Unit	1	1	1	1	1	1
ACD Unit	1	1	1	2	2	2
VM/AA Unit	1	2	3	4	4	4
Traffic Condition	6 OHCS					
Speech Pass	Time division PCM method					
MCO Tenant	12	24	36	48	60	72
MCO Trunk Group	99	99	99	99	99	99
Max. System Speed Dial	800	800	800	800	800	800
Max. Personal Speed Dial	20	20	20	20	20	20
Max. Digits of Speed Dial	24	24	24	24	24	24
Max. Name Digits of SPD	16	16	16	16	16	16
Max. Name Digits of PSD	7	7	7	7	7	7
Max. Name Digits of TRK	10	10	10	10	10	10
Max. Name Digits of EXT.	10	10	10	10	10	10
Attendant Group	1	1	1	1	1	1
Max. Attendant Member	20	20	20	20	20	20
Max. Hunting Group	12	24	36	48	60	72
Max. Hunting Member	20	20	20	20	20	20
External Page port	1	1	1	1	1	1
External Relay Control Port	5	5	5	5	5	5
Message Waiting Set (High) (Per Extension)	1	1	1	1	1	1

Resource	Maximum for					
	1 Cabinet	2 Cabinets	3 Cabinets	4 Cabinets	5 Cabinets	6 Cabinets
Message waiting set (Normal) (Per Extension)	4	4	4	4	4	4
Max Hot Line Setting	20	20	20	20	20	20
Flowing Park	96	192	288	384	480	576
Ext. Class Of Service Group	16	16	16	16	16	16
Trk. Class Of Service Group	16	16	16	16	16	16
TRS Class	50	50	50	50	50	50
TRS/LCR 10/Leading Dial	100	100	100	100	100	100
Table TRS/LCR 8 digits Following Digits	500	500	500	500	500	500
LCR Time Pattern	4	4	4	4	4	4
LCR Time List (Per Time Pat.)	50	50	50	50	50	50
LCR Route List	100	100	100	100	100	100
LCR Dial Modification Pattern	50	50	50	50	50	50
Authorization ID	5	5	5	5	5	5
DID Number Table	96 x 2	192 x 2	288 x 2	384 x 2	480 x2	576 x 2
ISDN S point DID Table	200	200	200	200	200	200
Closed Number	150	150	150	150	150	150
Tandem Exchange Number	50	50	50	50	50	50
Account Code Max. Digits	10	10	10	10	10	10
Verified Account Number	500	500	500	500	500	500
Verified Account Max. Digits	4	4	4	4	4	4
Pickup Group	12	24	36	48	60	72
Max. Paging Group	10	10	10	10	10	10
Max. Paging Member	72	72	72	72	72	72

Table 7-8.   Hardware Maximums

Part No.	Description	Maximum Quantity For					
		1 Cabinet	2 Cabinets	3 Cabinets	4 Cabinets	5 Cabinets	6 Cabinets
Station Equipment							
VB-44023	Switch Box	N/A	1	1	1	2	2
VB-44101	Voice Recognition Adaptor	96	192	288	384	480	576
VB-44210	16-key standard phone with handsfree answerback	96	192	288	384	480	576
VB-44220	22-key standard phone with handsfree answerback	96	192	288	384	480	576
VB-44223	22-key standard phone with LCD display	96	192	288	384	480	576
VB-44224	22-key speaker phone with LCD display voice recognition capability	96	192	288	384	480	576
VB-44225	22-key speakerphone with large LCD display	96	192	288	384	480	576
VB-44230	34-key speakerphone with handsfree answerback	96	192	288	384	480	576
VB-44231	34-key speakerphone with LCD display	96	192	288	384	480	576
VB-44310	24-key expansion module (EM24)	48	96	144	192	240	288
VB-44320	72-key DSS/BLF module (DSS/72)	12	24	36	48	60	72
VB-44884	7 ft. handset cord	96	192	288	384	480	576
VB-44885	15 ft. handset cord	96	192	288	384	480	576
VB-44886	25 ft. handset cord	96	192	288	384	480	576
VB-44890	K-type handset	96	192	288	384	480	576
Common Equipment							
VB-44120	Conference Card 8-party	2	4	6	8	12	16
VB-44181	Service circuit card (SCC)	1	1	1	1	1	1
VB-44410	CPC-96 call processor card	1	N/A	N/A	N/A	N/A	N/A
VB-444201	CPC-288 call processor card	1	1	1	N/A	N/A	N/A
VB-444202	Time switch card TSW288	1	1	1	N/A	N/A	N/A
VB-444301	CPC-576 call processor card	1	1	1	1	1	1
VB-444302	Time switch card TSW576	1	1	1	1	1	1
VB-44451	CBL (Building block expansion card - interface card for additional cabinet)	N/A	1	2	3	4	5
VB-44452	CBL DBS (Connection cable card - DBS) Note: 1 per DBS cabinet	N/A	1	2	2	2	2
Telephone Company Interfaces							
VB-43551	8-circuit Caller ID daughter board	12	24	36	48	60	72
VB-44460	Sync Unit	1	1	1	1	1	1
VB-44510	8-port loop-start trunk card (L-TRK/8)	12	24	36	48	60	72
VB-44511	8-port ground-start trunk card (G-TRK/8)	12	24	36	48	60	72
VB-44512	Trunk MDF connector	5	10	15	20	25	30
VB-44520	Direct-inward-dialing trunk card (DID)	12	24	36	48	60	72

Part No.	Description	Maximum Quantity For					
		1 Cabinet	2 Cabinets	3 Cabinets	4 Cabinets	5 Cabinets	6 Cabinets
VB-44530	Basic Rate Interface (BRI)	12	24	36	48	60	72
VB-44540	Primary Rate Interface (PRI)	3	6	9	12	15	18
VB-44550	T-1 Interface	3	6	9	12	15	18
VB-44560	E&M tie line trunk card	12	24	36	42	60	72
Station Interfaces							
VB-44110	DTMF signal receiver for 8 SLT lines (MFR/8)	2	4	6	8	8	8
VB-44610	8-port digital extension card (DEC)	12	24	36	48	60	72
VB-44611	Extension MDF connector	5	10	15	20	25	30
VB-446230	8-port analog extension card (AEC)	12	24	36	48	60	72
VB-44630	Basic Rate Interface (BRI)	12	24	36	48	60	72
VB-446540	Primary Rate Interface (PRI)I	3	6	9	12	15	18
Optional Equipment							
VB-43703	4-line power failure unit	24	48	72	96	120	144
VB-44025	Built-in system backup battery kit (2 batteries per kit)	1	2	3	4	5	6
VB-44130	Application processor interface API	1	1	1	1	1	1
VB-44140	Built-in ACD	1	1	1	2	2	2
VB-44150	Voice processing card/8 (VM only)	2	4	6	8	8	8
VB-44160	Voice processing card/4 (ACD or VM)	2	4	6	8	9	10
VB-44170	Built-in VM	1	2	3	4	4	4
VB-44330	PC Attendant (up to 96 EXT)	TBD	TBD	TBD	TBD	TBD	TBD
VB-44331	PC Attendant (up to 384 EXT)	TBD	TBD	TBD	TBD	TBD	TBD
VB-44332	PC Phone	96	192	288	384	480	576
VB-TBD	PC Customize Tool	1	1	1	1	1	1

Note: These maximum are based on overall CO line capacities and do not allow for CO lines used for outside lines.

Cabling Specifications

Table 7-9.   Maximum Cabling Distances

Loop Type Resistance	Resistance	Cable Gauge (AWG)	Maximum Cabling Length in Feet (distance from the DBS 576)
Key Telephone, EM/24[See note]	40 Ohms	22	1239
		24	779
		26	490
DSS/72	20 Ohms	22	619
		24	390
		26	245
SLT	100 Ohms	22	3097
		24	1948
		26	1225
Doorphone (Loop between the DBS and Doorphone Adapters)	10 Ohms	22	309
		24	194
		26	122
Doorphone (Loop between the Doorphone Adapter and the Doorphone)	10 Ohms	22	1239
		24	779
		26	490

[Note] If a TAPI box or Voice Response Telephone Adapter is installed with the telephone, the measured resistance must be less than 20 Ohms and the maximum cabling distance reduced in half compared to a standard key telephone.

Table 7-10. Voice Path from KTELS to DBS 576

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

Table 7-11. Data Communication Ports

Port	Parameters	
Serial Port 1	Interface	RS232-C
	Baud rate	300, 600, 1200, 2400, 4800, 9600 Bps
	Parity	Even, odd, none
	Stop bit length	2 or 1
	Data bit length	7 or 8
Maintenance (Built-in)	Baud rate	300
	Stop bit length	1
	Data bit length	8
	Parity	None

Port	Parameters	
Serial Port 2	Interface	RS232-C
	Baud rate	300, 600, 1200, 2400, 4800, 9600 Bps
	Parity	Even, odd, none
	Stop bit length	2 or 1
	Data bit length	7 or 8

Signaling Characteristics

Table 7-12. Signaling to CO

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

Table 7-13. 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	6 dB
	Digital station to analog station	6 dB
	Analog station to digital station	6 dB
	Analog station to analog station	6 dB

Table 7-14. DTMF Frequencies

Digit	Frequency (Hz)
1	700 + 1200
2	700 + 1340
3	700 + 1480
4	760 + 1200
5	760 + 1340
6	760 + 1480
7	860 + 1200
8	860 + 1340
9	860 + 1480
0	940 + 1340
*	940 + 1200
#	940 + 1480

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