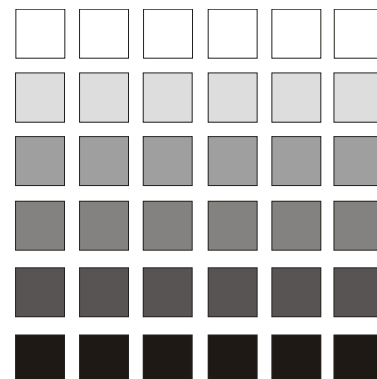
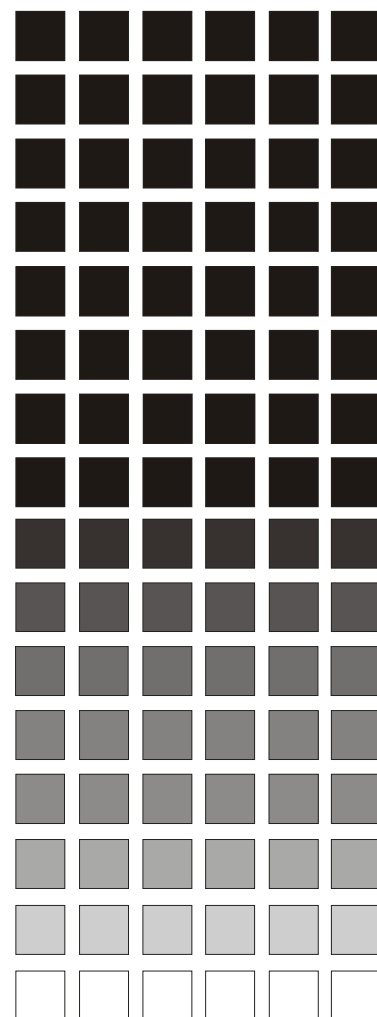


Panasonic®  
**DBS**  
Digital Business System



**Section 300  
Installation**



**(Applies to CPC-AII/B Version 9.2  
and CPC-EX Version 2.3)**

Version 2.3/9.2  
Revised April 2000



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**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.

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Revised April 2000

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# About This Manual

## Purpose

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

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

## Related Information

**Appendix A and Appendix B, located in the back of this manual.**

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

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



---

# Chapter 1. Requirements

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

This chapter covers the following topics:

| Topic                      | Page |
|----------------------------|------|
|                            | 1-1  |
| FCC Requirements           | 1-1  |
| Environmental Requirements | 1-4  |
| Cleaning                   | 1-5  |

---

## Model Numbers

*Table 1-1. DBS model numbers*

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

---

## FCC Requirements

### General Requirements

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

**Table 1-2. FCC information**

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

**Table 1-3. Interface information**

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

- This equipment complies with Part 68 of the FCC Rules. On the left cover panel of this equipment is a label that contains, among other information, the FCC registration number and Ringer Equivalence Number (REN) for this equipment. If requested, provided this information to your telephone company.
- If the DBS telephone equipment caused harm to the Telephone Network, the Telephone Company may discontinue your service temporarily. If possible, they will notify you in advance. But if advance notice isn't practical, you will be notified as soon as possible. You will be advised of your right to file a complaint with the FCC.
- Under the FCC Rules, no customer is authorized to repair this equipment. This restriction applies regardless of whether the equipment is in or out of

warranty. However, the customer may replace fuses, and plug-in cards, as needed.

- The Telephone Company may make changes in its facilities, equipment, operations or procedures, that could affect the proper operation of your equipment. If they do, you will be given advance notice so as to give you an opportunity to maintain uninterrupted service.
- The Digital Key Telephones designed for use with this system are hearing aid compatible.
- This equipment is capable of providing users access to interstate providers of operator services through the use of access codes. Modification of this equipment by call aggregators to block access dialing codes is a violation of the Telephone Operator Consumers Act of 1990.
- If you experience trouble with the DBS, please contact Panasonic Communication & Systems Company, Business Telephone Systems Division, Two Panasonic Way Panazip 7B-3, Secaucus, NJ 07094 (Phone: (1-800-822-0909) for repair/warranty information. Upon establishing contact, properly identify the equipment, along with your company name/service center, and address. The telephone company may ask you to disconnect this equipment from the network until the problem has been corrected.
- The software contained in the DBS 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.

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# Environmental Requirements

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

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

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

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

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

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

**Water Exposure:** Because the DBS is an electric device, exposure to water is dangerous. Do not place anything containing water on the system. Do not install



under overhead plumbing, sprinkler system valves, or in areas that are susceptible to flooding.

**Lighting:** Sufficient lighting is required for testing and maintenance.

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

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

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## Cleaning

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



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# Chapter 2. System Overview

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

This chapter covers the following topics::

| <b>Topic</b>          | <b>Page</b> |
|-----------------------|-------------|
| Cabinet Description   | 2-3         |
| Configurations        | 2-5         |
| Printed Circuit Cards | 2-6         |
| Processor Description | 2-9         |

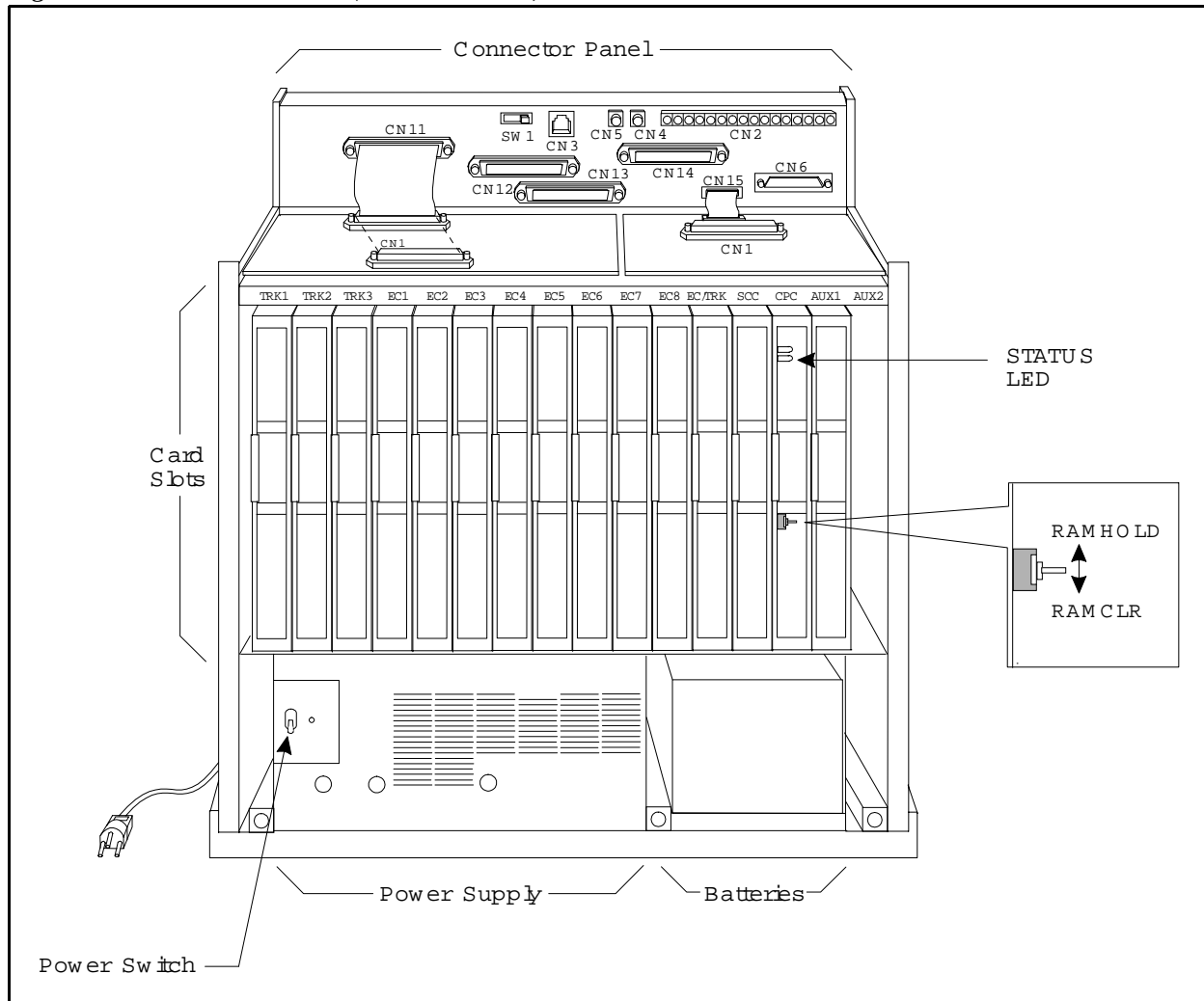


# Cabinet Description

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

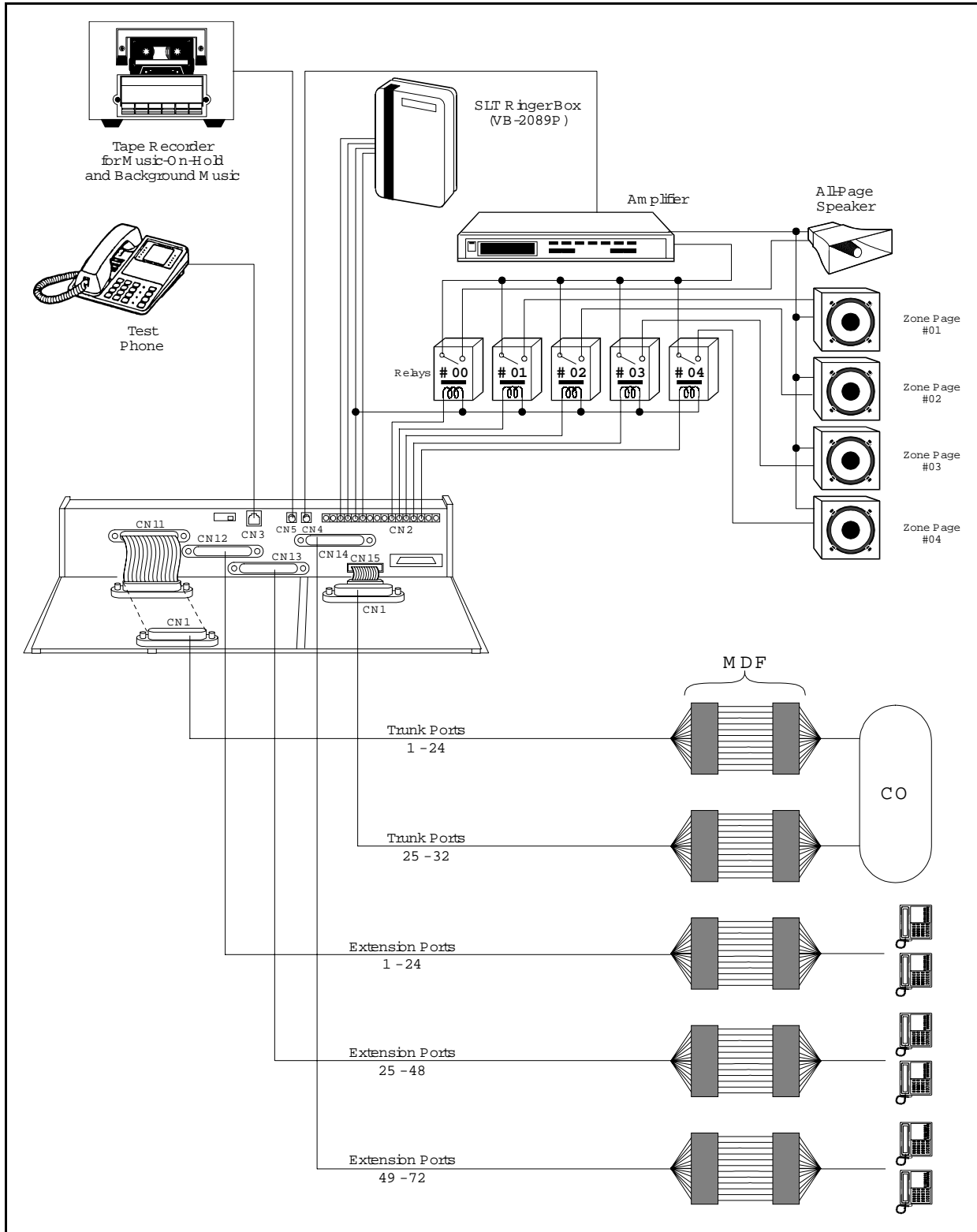
The DBS cabinet includes an AC power supply, backup batteries (optional), dedicated card slots, and a central connector panel for line and trunk connections.

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



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

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



# Configurations

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

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

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

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

# Printed Circuit Cards

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

*Table 2-2. Printed circuit card descriptions and maximums*

| Part No.                             | Printed Circuit Cards and Other Equipment     | Quantity |        |        |
|--------------------------------------|---|----------|--------|--------|
|                                      |   | DBS 40   | DBS 72 | DBS 96 |
| VB-43110                             | Cable kit for 2-system connection             | N/A      | N/A    | N/A    |
| VB-43410                             | Call processor card (CPC-A)                   | 1        | 1      | 1      |
| VB-43411                             | Call processor card (CPC-B)                   |          |        |        |
| VB-43412                             | Call processor card (CPC-AII)                 |          |        |        |
| VB-43420                             | Service circuit card (SCC-A)                  | 1        | 1      | 1      |
| VB-43421                             | Service circuit card (SCC-B)                  |          |        |        |
| VB-43431                             | DTMF signal receiver for 8 SLT lines (MFR/8)  | 1        | 1      | 1      |
| VB-43510A                            | 4-port loop-start trunk card (L-TRK/4)        | 2        | 3      | 4      |
| VB-43511A                            | 8-port loop-start trunk card (L-TRK/8)        |          |        |        |
| VB-43541                             | 8-port Direct-inward-dialing trunk card (DID) |          |        |        |
| VB-43531                             | 8-port ground-start trunk card (G-TRK/8)      |          |        |        |
| VB-43561                             | T1 Interface                                  | 1        | 1      | 1      |
| VB-43562                             | T1 MDF card                                   | 1        | 1      | 1      |
| VB-43563                             | T1 Sync Unit                                  | 1        | 1      | 1      |
| VB-43611                             | 8-port digital extension card (DEC)           | 4        | 7      | 9      |
| VB-43621A                            | 8-port analog extension card (AEC)            | 3        | 4      | 4      |
| <b>Expansion Connectors</b>          |   |          |        |        |
| VB-43120                             | Trunk expansion connector                     | 1        | 1      | 1      |
| VB-43121                             | Extension expansion connector                 |          |        |        |
| <b>Doorbox Equipment (Trunk)</b>     |   |          |        |        |
| VB-43701                             | 2-port Door box adaptor                       | 8*       | 12*    | 16*    |
| VB-43705                             | Door box                                      | 16*      | 24*    | 32*    |
| <b>Doorbox Equipment (Extension)</b> |   |          |        |        |
| VB-43711                             | 1-port Extension-Based Door box adaptor       | 4        | 4      | 4      |
| VB-43705                             | Door box                                      | 4        | 4      | 4      |

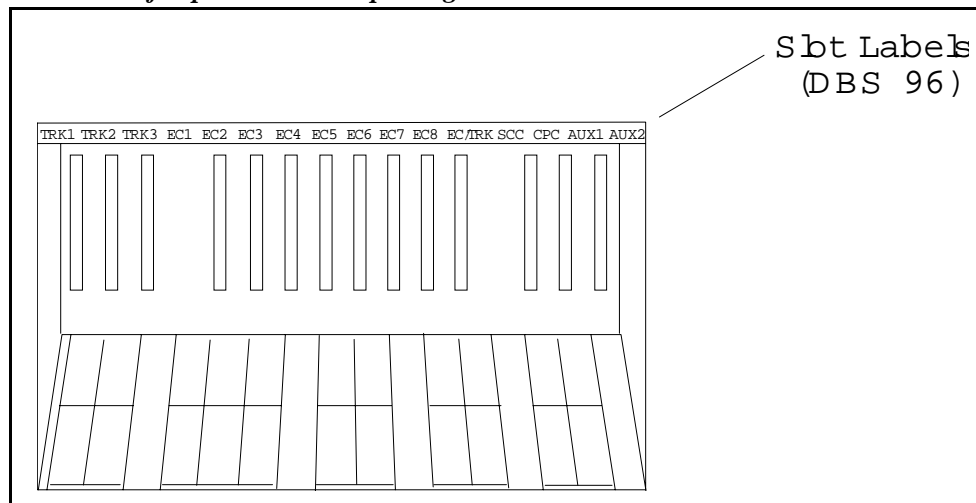


| Part No.  | Printed Circuit Cards and Other Equipment   | Quantity            |                     |                     |
|---|---|---------------------|---------------------|---------------------|
|   |   | DBS 40              | DBS 72              | DBS 96              |
| <b>Optional Equipment</b>   |   |                     |                     |                     |
| VB-43706  | Remote Administration Interface (RAI-A)   | 1                   | 1                   | 1                   |
| VB-43707  | Remote Administration Interface (RAI-B)   |                     |                     |                     |
| VB-43551  | 8-circuit Caller ID daughter board  | 1 per VB-43511A AEC | 1 per VB-43511A AEC | 1 per VB-43511A AEC |
| VB-43130  | Built-in system backup battery kit  | 1                   | 1                   | 1                   |
| VB-43709  | Single Line Telephone Adaptor   | 8                   | 14                  | 18                  |
| VB-2089P  | SLT ringer box  | 1                   | 1                   | 1                   |
| VA-43703  | 4-line power failure unit   | 6                   | 8                   | 8                   |
| VB-43702  | Off-premise extension adaptor   | 8                   | 8                   | 8                   |
| VB-43940  | Standard Application processor interface (API)  | 1                   | 1                   | 1                   |
| VB-43941  | Telephony Services Kit (includes revised API card, described in Telephone Services Documentation) | 1                   | 1                   | 1                   |
| * <b>Note:</b> These maximums are based on overall trunk capacities and do not allow for trunks used for outside lines. |   |                     |                     |                     |

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

**Table 2-3. Printed circuit package slot usage**

| Card Type   | Card                  | Acceptable Slots                  |
|---|-----------------------|-----------------------------------|
| Analog Trunks   | L-TRK/4               | TRK or EC/TRK                     |
|   | L-TRK/8               |                                   |
|   | G-TRK/8               |                                   |
|   | DID/8                 |                                   |
| Digital Trunks  | T1/24                 | EC/TRK                            |
| Digital Lines   | DEC/8                 | EC 1-8 or EC/TRK                  |
| Analog Lines  | AEC/8                 | EC 2-8 or EC/TRK                  |
| Service Circuits  | SCC-A                 | SCC                               |
|   | SCC-B                 |                                   |
| Processor Cards   | CPC-A                 | CPC                               |
|   | CPC-B                 |                                   |
|   | CPC-AII               |                                   |
| DTMF Circuits   | MFR/8                 | AUX1 or AUX2<br>CPC (See Note 1.) |
| Interface Cards   | API (1 or 2 Circuits) | AUX1 or AUX2 (See Note 2.)        |
|   | CBL-M                 | CPC or AUX2 (See Note 3.)         |
|   | CBL-S                 |                                   |
| <b>Notes:</b>   |                       |                                   |
| 1. With one-cabinet systems, the MFR card can be installed in the AUX1 or AUX2 slot, depending on whether an API card is used. With two-cabinet systems, placement of the MFR cards differs according to the cable kit used. With Cable Kit Version 1.1, one MFR is installed in the Master AUX1, and one MFR is installed in the Slave AUX1. With Cable Kit Version 1.2, both MFR cards are installed in the slave cabinet--one in the CPC slot and one in AUX1. (See page 6-10 for instructions on installing MFR cards in double-cabinet systems.) |                       |                                   |
| 2. The API card is installed in AUX1 only when a CBL card is used.  |                       |                                   |
| 3. Part VB-43110 includes both the CBL-M and CBL-S cards, as well as the required connecting cables. CBL-M is installed in the master cabinet, CBL-S in the slave cabinet.  |                       |                                   |

**Figure 2-3. Slot labels for printed circuit packages**

## Processor Description

DBS call-processing is controlled by the Call Processor Card (CPC). Four CPC models are available: CPC-A, CPC-B, CPC-AII, and CPC-EX. For a complete list of hardware enhancements available with the CPC-B, CPC-AII, and CPC-EX, please see Appendix A and Appendix B, located in the back of this manual. See the Appendix in Section 700 - Feature Operation for a complete list of feature enhancements associated with each of these CPCs.

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

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

**Table 2-4. CPC/SCC features**

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



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# Chapter 3. Cabinet Installation

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

This chapter covers the following topics::

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



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# Wall-Mounting the Cabinet

## Guidelines



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

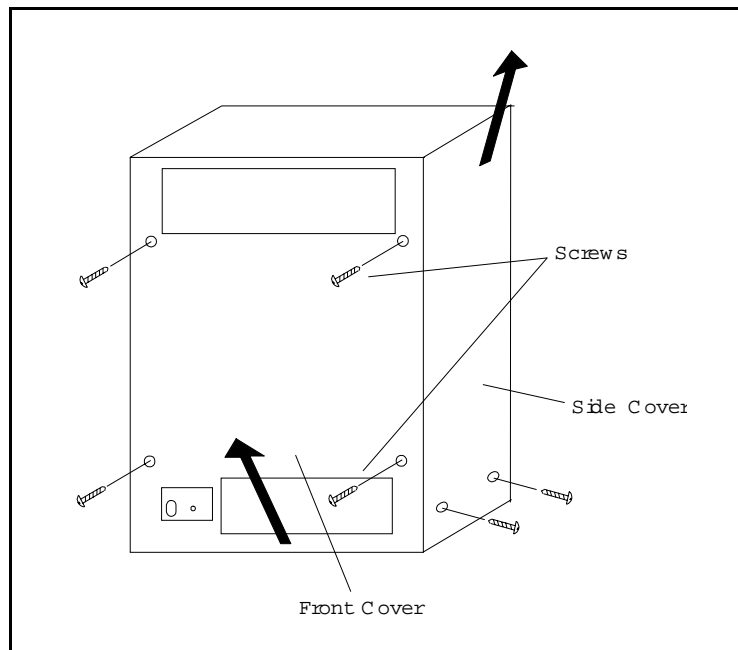
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- The DBS is shipped with the cover installed to protect components. Before wall-mounting the cabinet, remove the cover.
- Handle the cabinet carefully to avoid damage.

## Installation

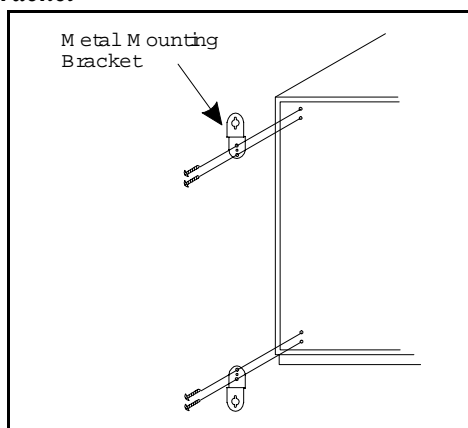
1. Remove the eight screws from the front and sides of the cabinet.
2. Take the front cover off by pulling it from the bottom and lifting it up.
3. Take the side covers off by sliding them up, then away.

*Figure 3-1. Cover removal*



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

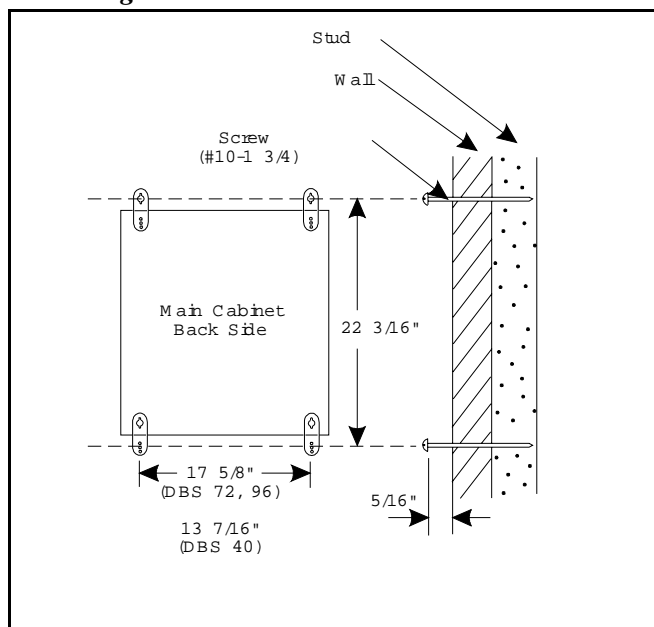
**Figure 3-2. Cabinet mounting bracket**



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

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

**Figure 3-3. Cabinet wall-mounting**



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



# Grounding

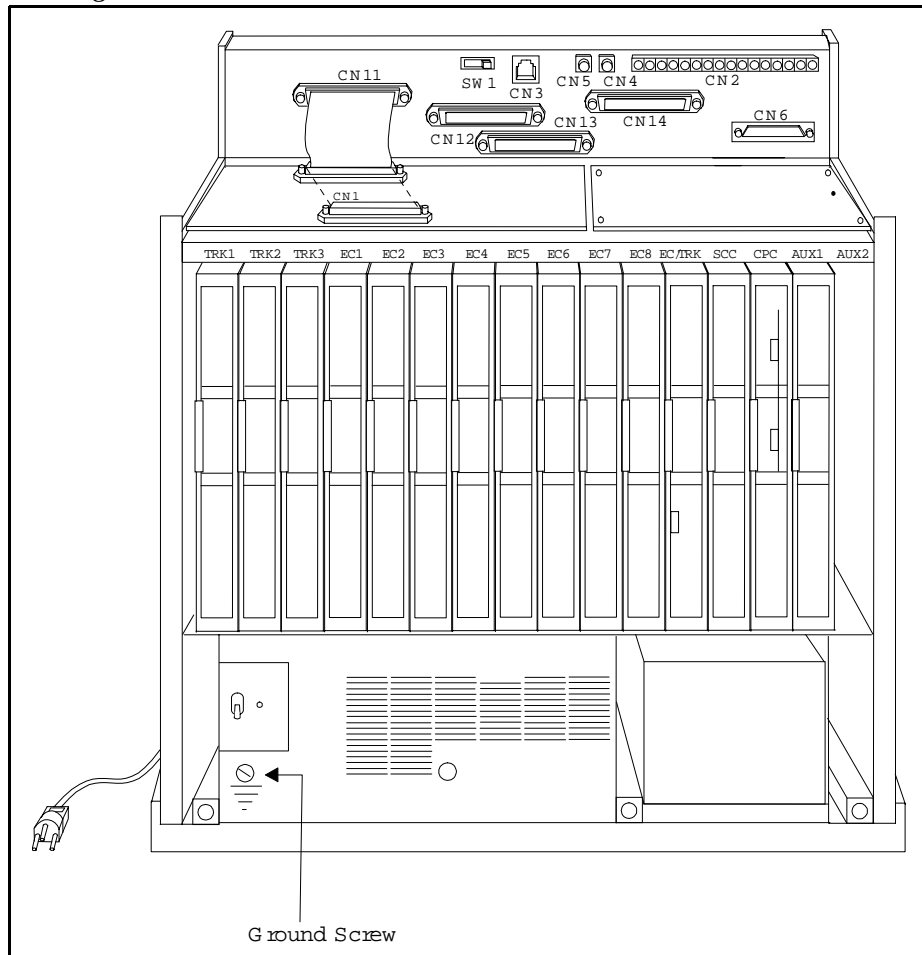
## Guidelines

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

## Installation

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

*Figure 3-4. Cabinet ground screw*



# Card Installation

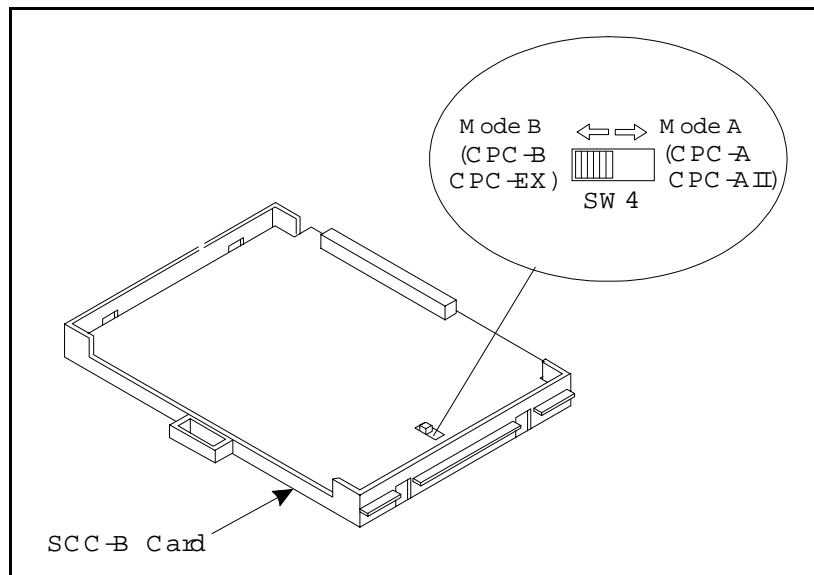
## Guidelines



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

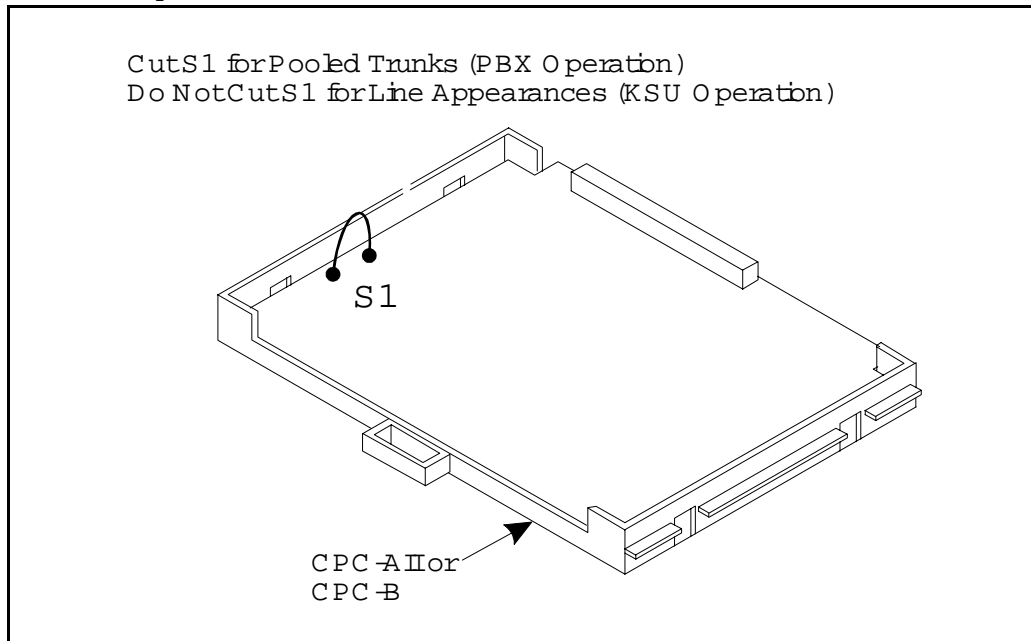
- Install the cards in the following order:
  - TRK
  - DEC
  - AEC or API
  - SCC
  - CPC
  - MFR or CBL
- If you are installing a CPC-A or CPC-AII card with an SCC-B card, set SW4 to “Mode A.” The default setting is “Mode B,” which specifies that CPC-B is used.

*Figure 3-5. SCC-B Switch 4*



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

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

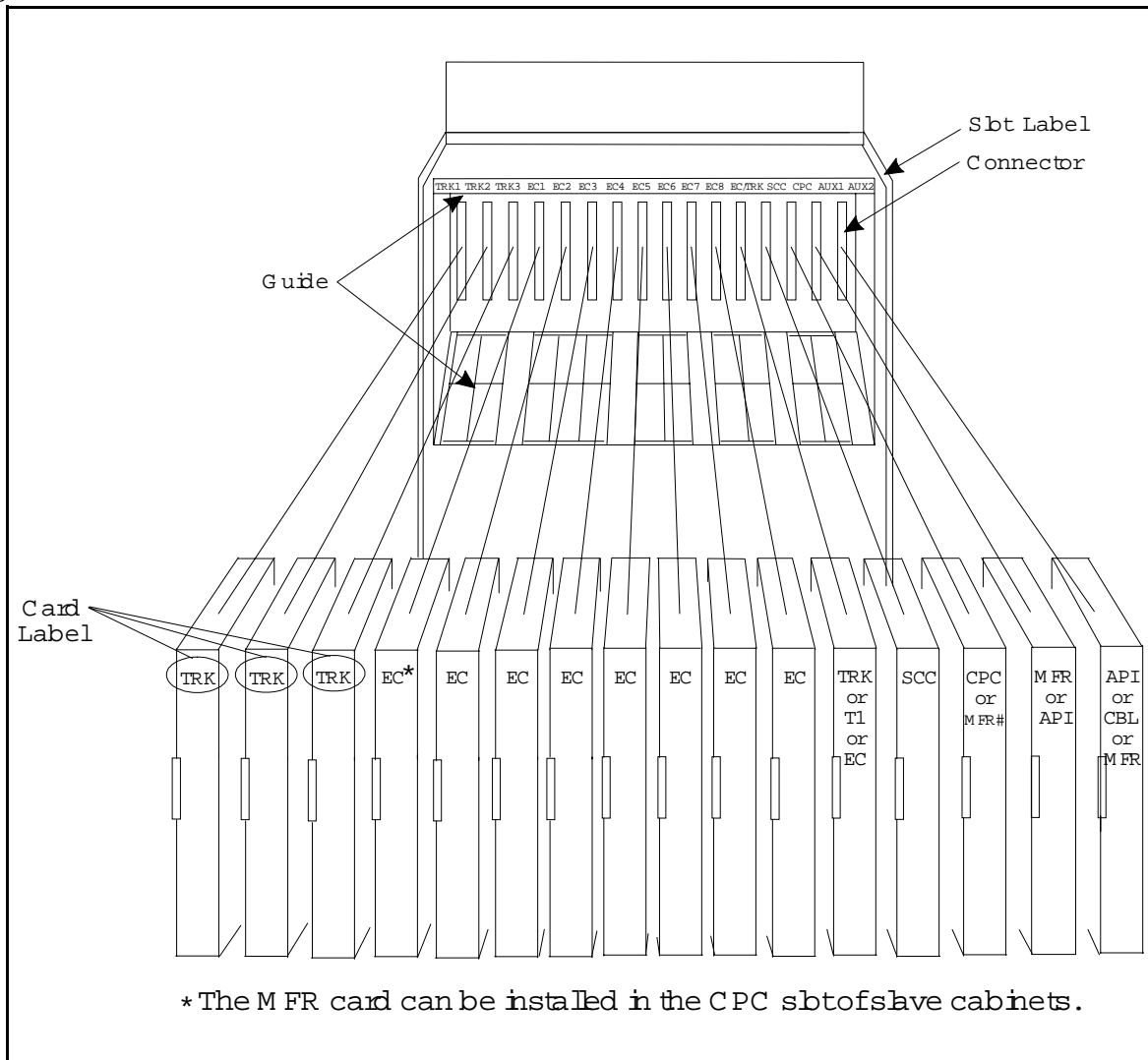


- Install cards only in their dedicated slots. The slot type is marked on the cabinet directly above each slot.

# Installation

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

**Figure 3-7. Printed circuit card installation**



# Battery Backup


## Guidelines

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

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

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

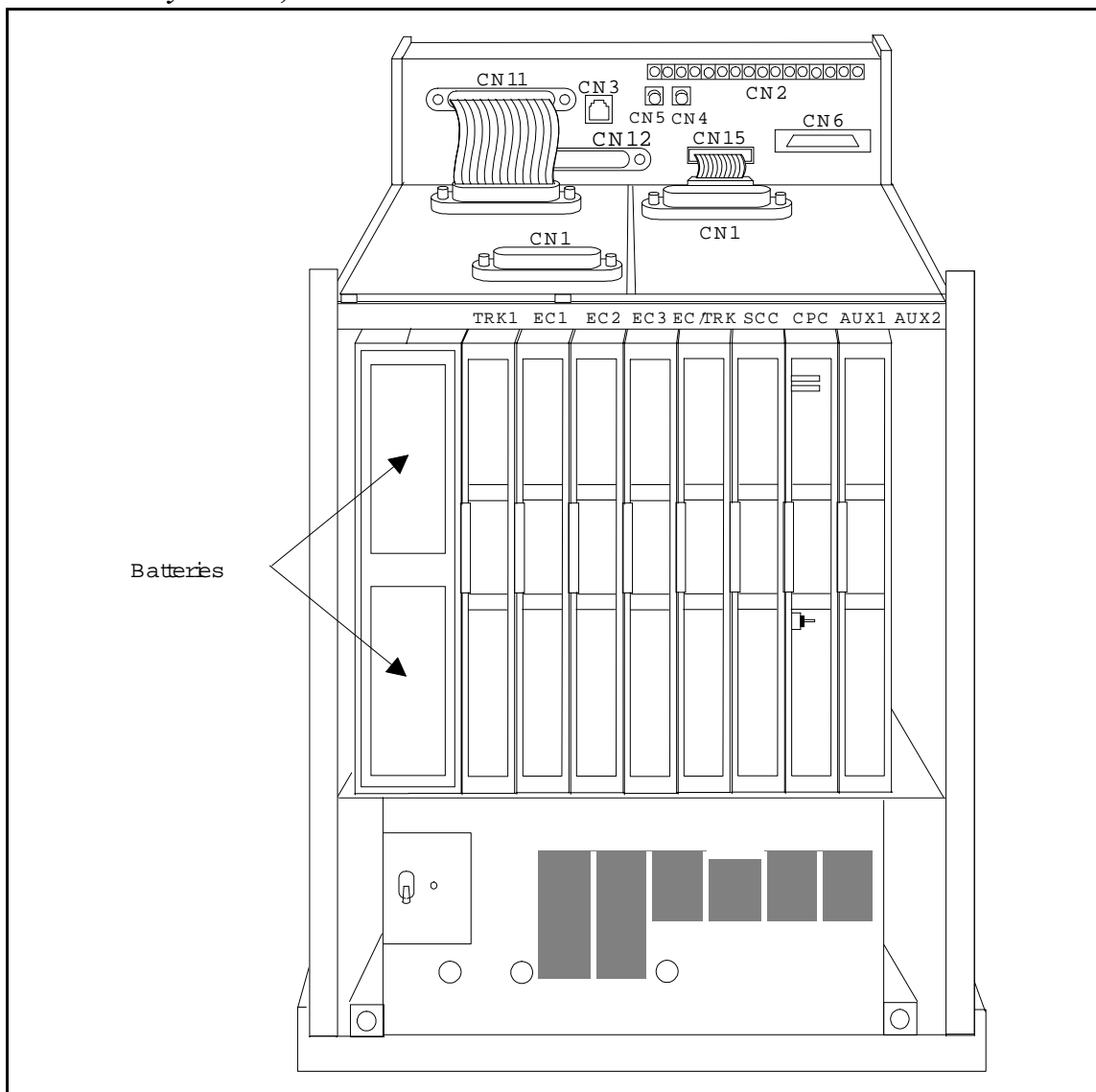
- The backup batteries are connected in a series circuit, using cables provided with the DBS.
- With maximum traffic, the backup batteries last up to 40 minutes for the DBS 40 and 72, and up to 30 minutes for the DBS 96.
- The backup batteries should be replaced about every 3 years.

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

## Installation for the DBS 40

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

*Figure 3-8. Battery location, DBS 40*

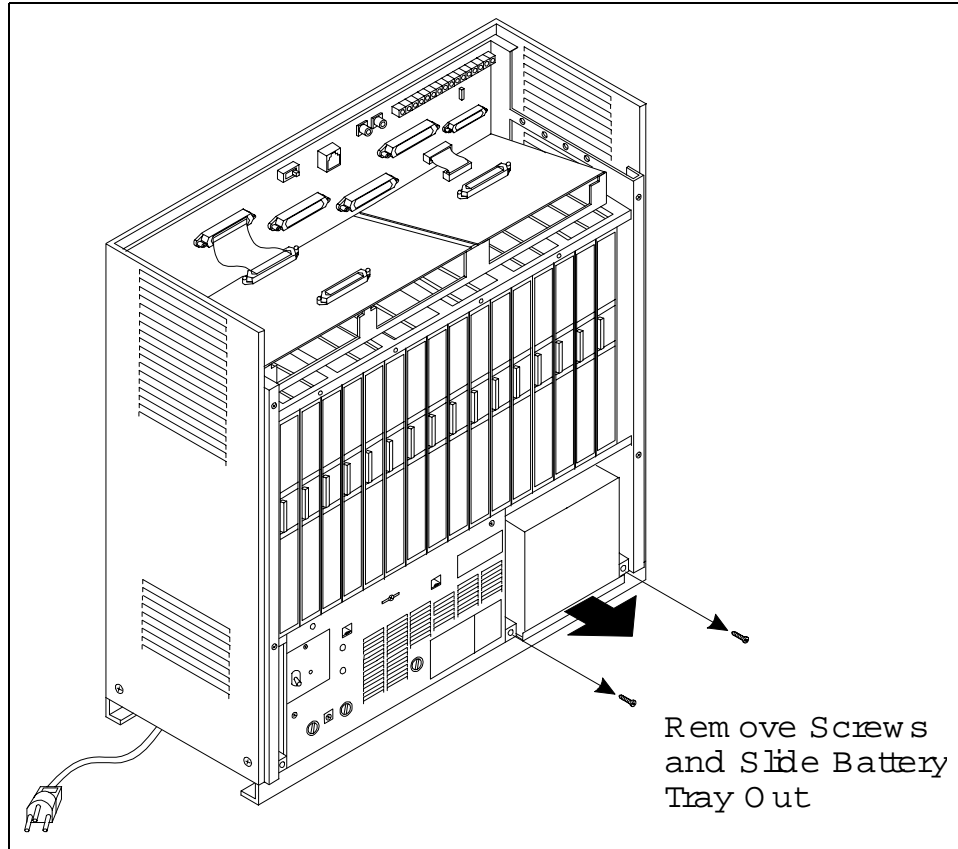


2. Connect the positive cable (red) to the + terminal of the top battery.
3. Connect the connecting cable (white) to the - terminal of the top battery.
4. Connect the negative cable (blue) to the - terminal of the bottom battery.
5. Connect the connecting cable (white) from the top battery to the + terminal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

## Installation for the DBS 72 and 96

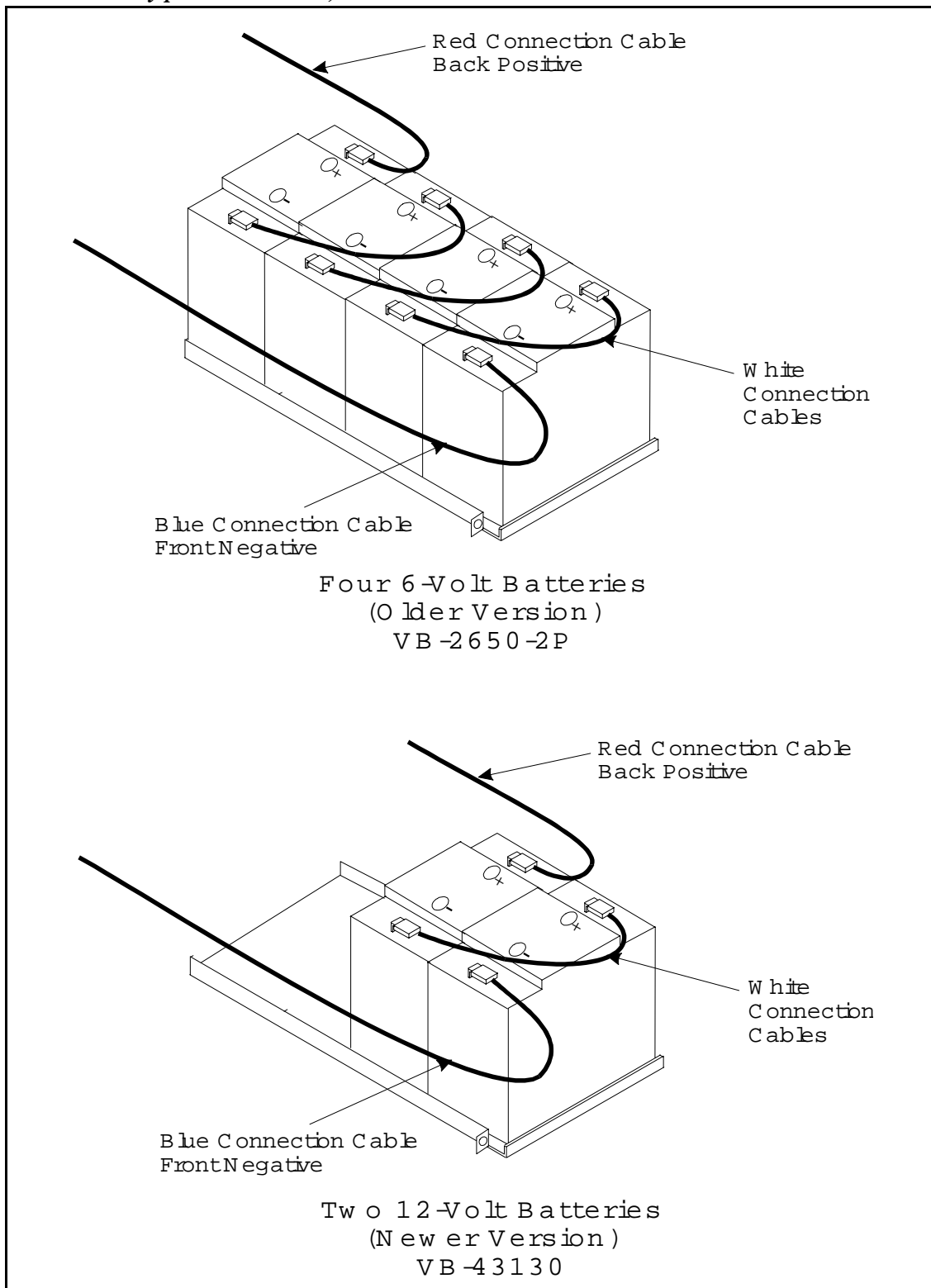
1. Slide the battery compartment out and place the batteries inside the tray.

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



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

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



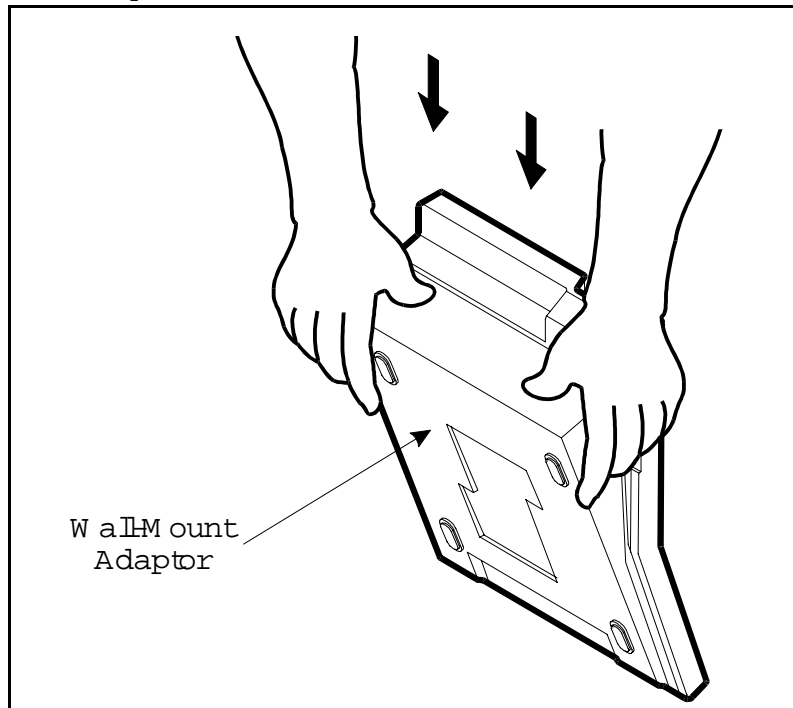


# Key Phone Wall Mounting

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

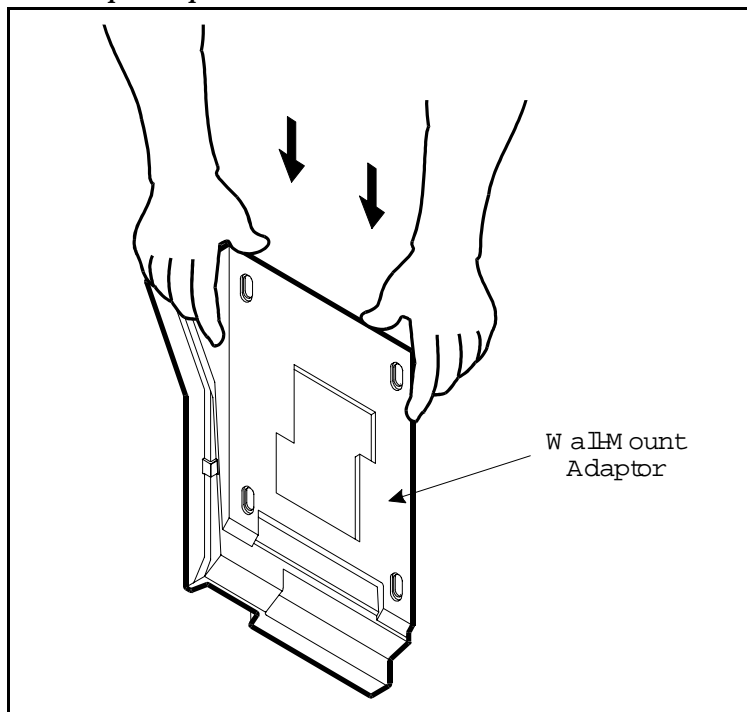
1. Place the bottom edge of the telephone on a desk or other hard surface.
2. Press the wall-mount adaptor down until it detaches from the phone (Figure 3-11).

*Figure 3-11. Wall-mount adaptor removal*



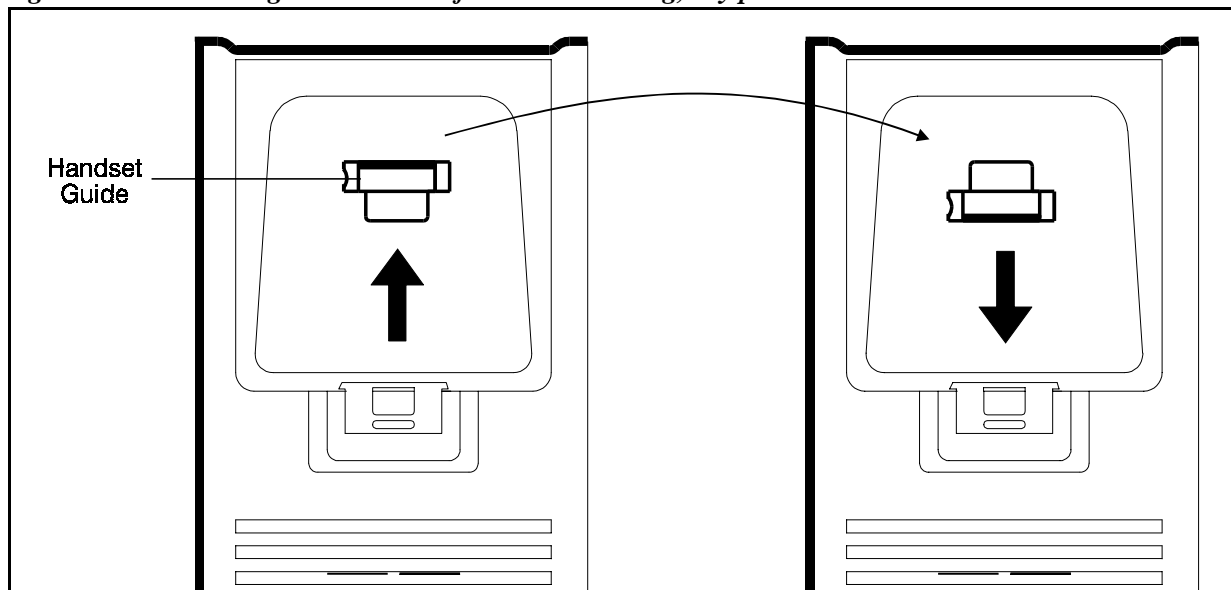
3. Turn the wall-mount adaptor around and re-attach it to the phone.

*Figure 3-12. Wall-mount adaptor replacement*



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

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

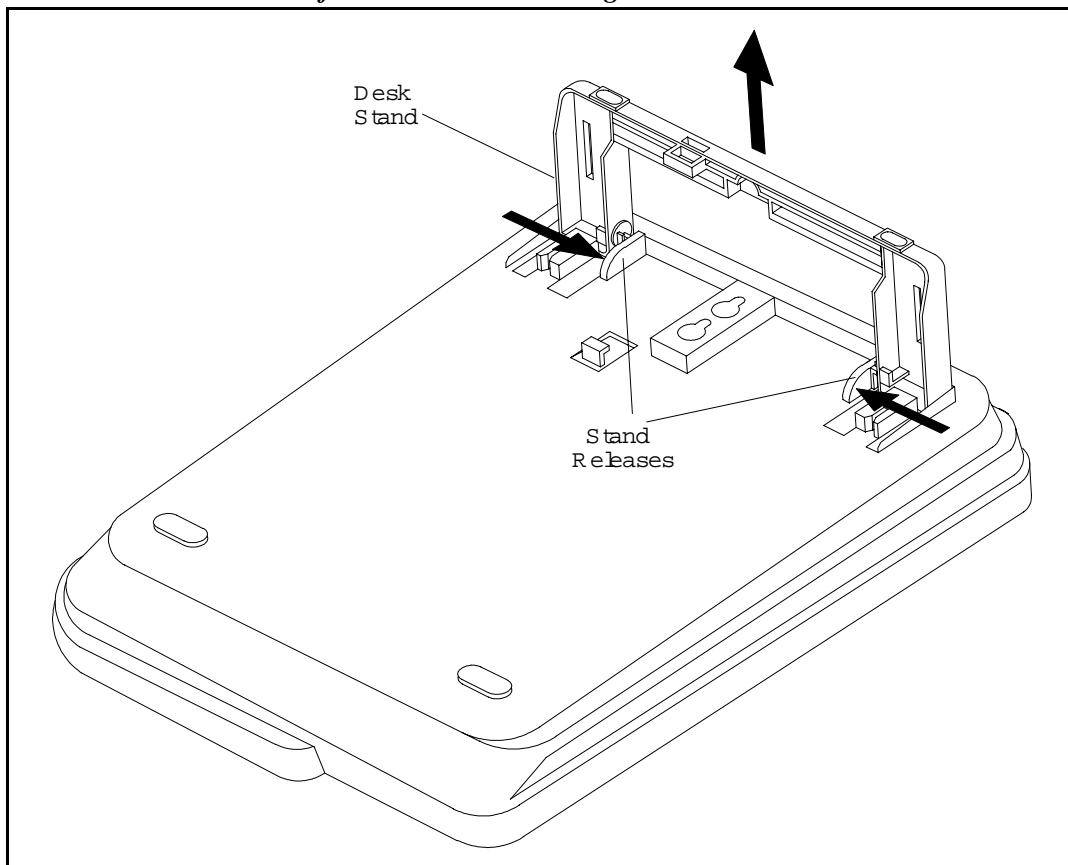


# DSL T Wall Mounting

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

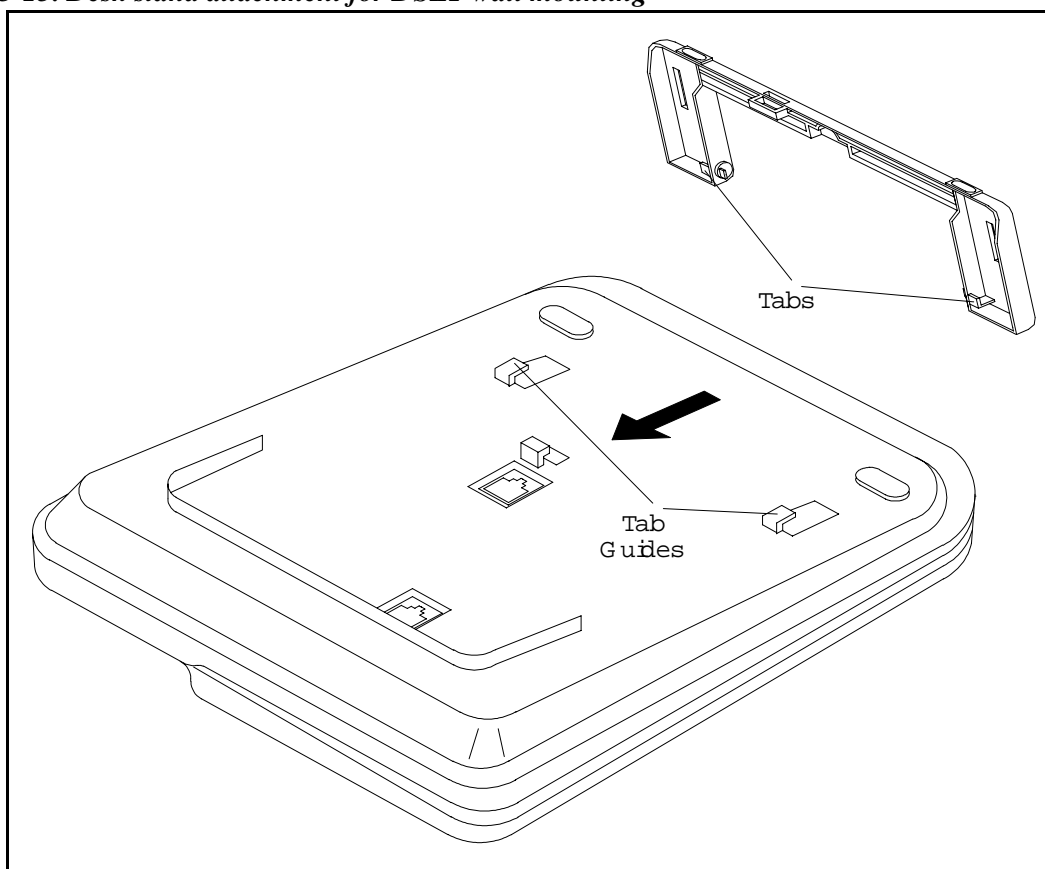
1. Press the stand releases in toward the middle of the phone to release the desk stand (Figure 3-14).

*Figure 3-14. Desk stand removal for DSL T wall mounting*



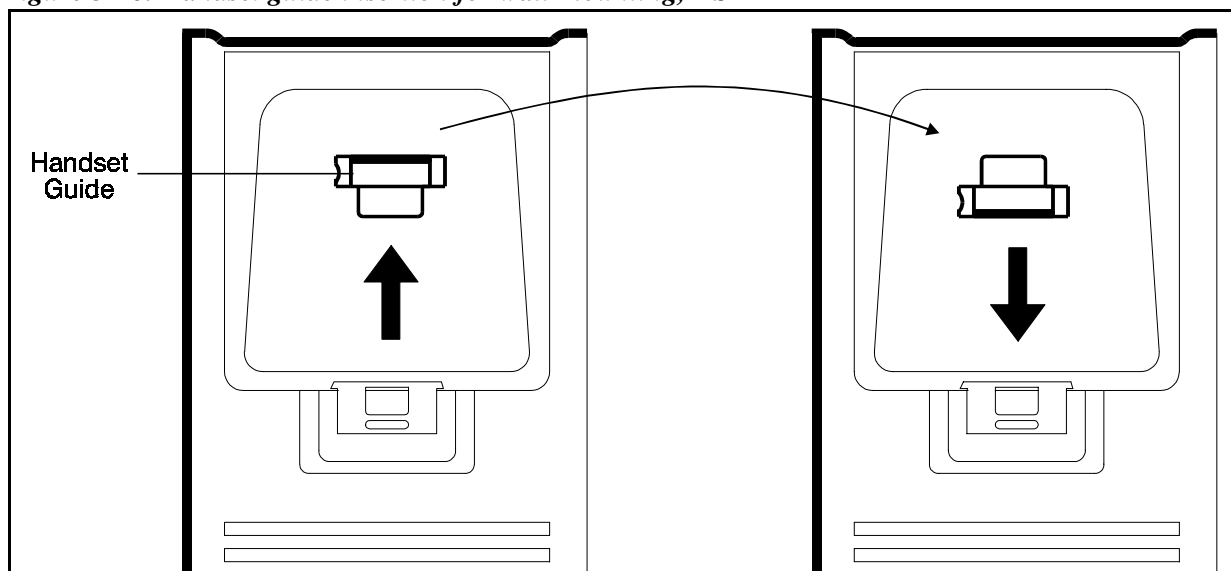
2. Attach the desk stand to the bottom of the phone by aligning the tabs and tab guides and sliding it into place (Figure 3-15).

**Figure 3-15. Desk stand attachment for DSLT wall mounting**



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

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



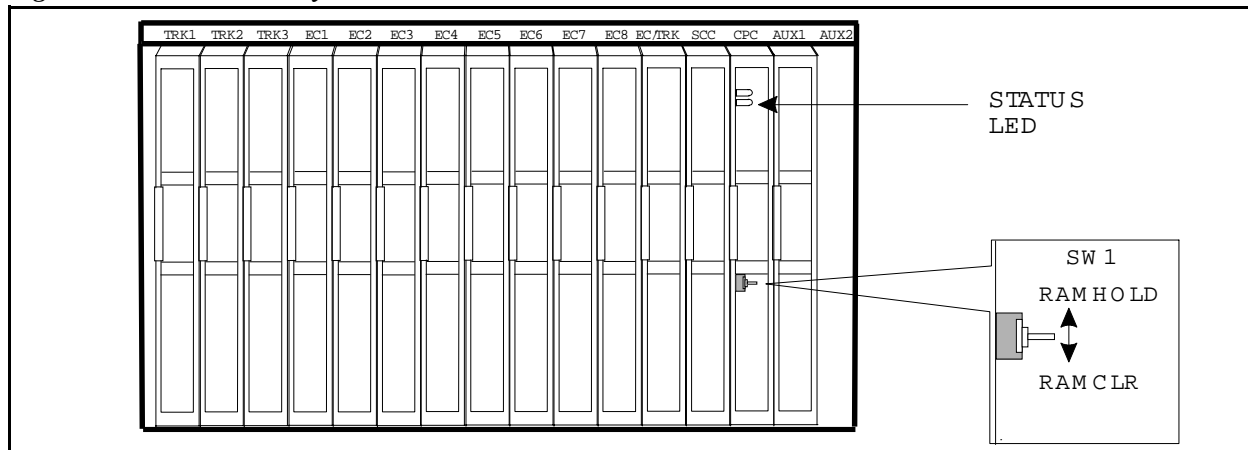
# System Initialization

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

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

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

*Figure 3-17. CPC memory clear switch*



4. Turn the power switch on.

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

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

---

# Test Phone

## Guidelines

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

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

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

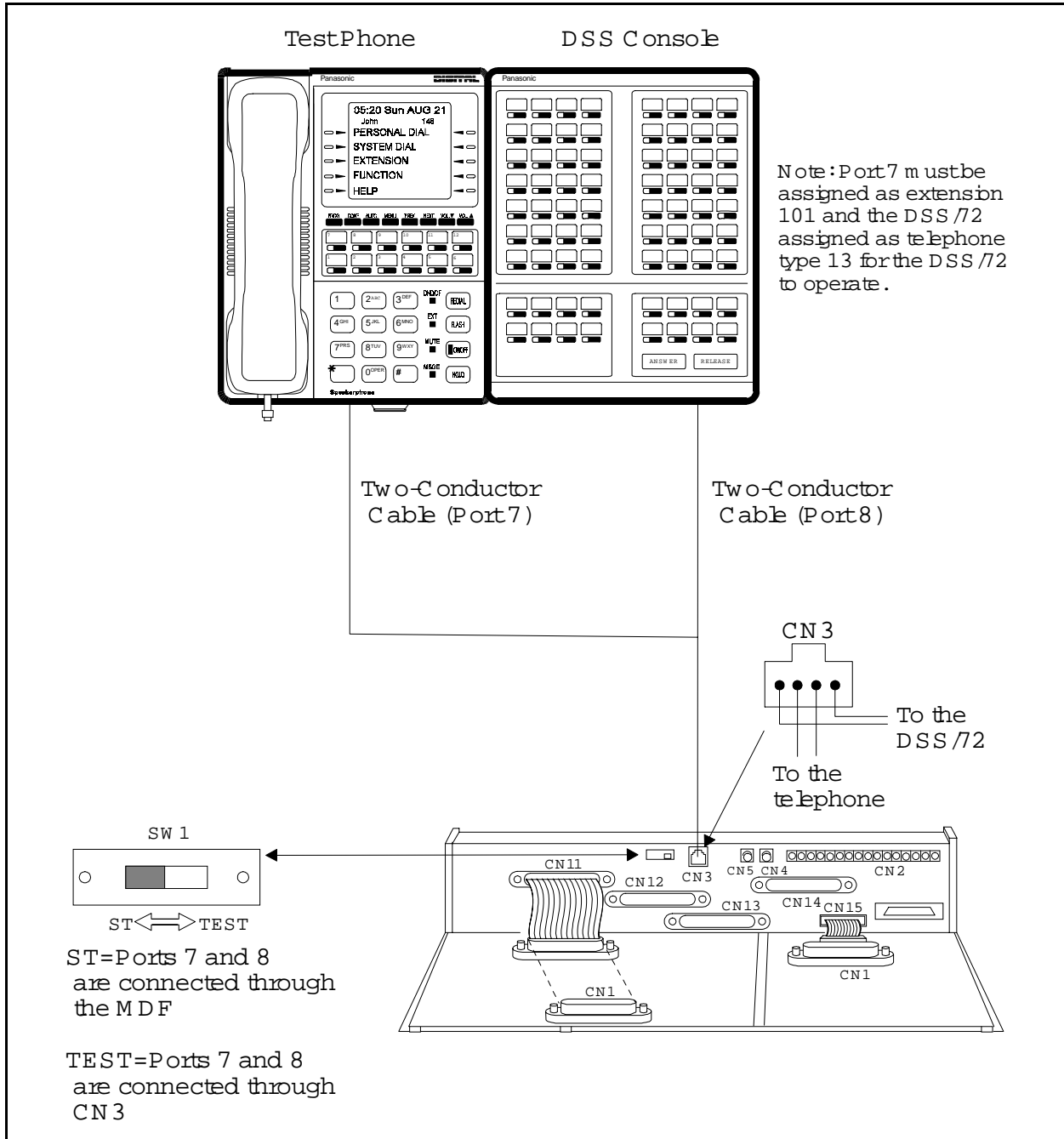
**Note:** Before using the test terminal on a DBS that is operational, be sure the phones connected to ports 7 and 8 can be taken out of service.

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

## Installation

1. Connect the telephone and DSS (optional) to CN3 on the Connector Panel. (See Figure 3-18 on page 3-19.)
2. Set SW1 to “Test.”
3. When programming is completed, set SW1 back to “ST.”

Figure 3-18. Test telephone connection







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# Chapter 4. Trunks and Lines

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

This chapter covers the following topics::

| <b>Topic</b>                | <b>Page</b> |
|-----------------------------|-------------|
| Trunks                      | 4-3         |
| Loop-Start Trunks           | 4-7         |
| Ground Start and DID Trunks | 4-9         |
| T1 Interface                | 4-11        |
| Lines                       | 4-31        |
| Analog Extensions           | 4-37        |
| Digital Extensions          | 4-41        |
| DSS/72                      | 4-41        |
| EM/24                       | 4-43        |
| Trunk and Line Expansion    | 4-44        |



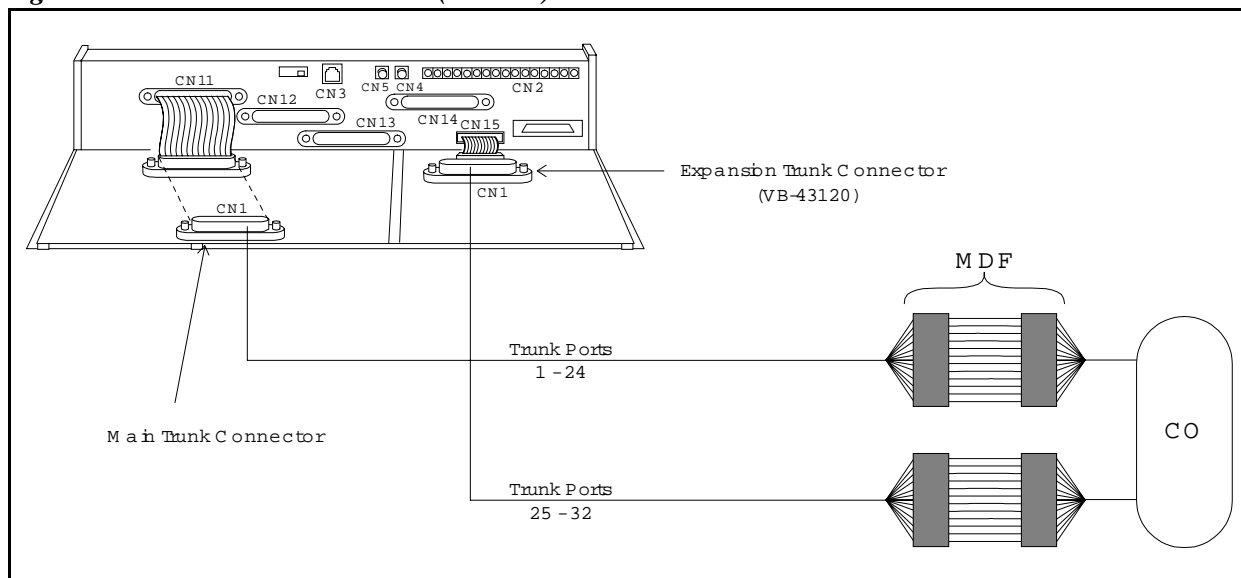
# Trunks

## Trunk Connectors

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

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

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



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

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

| <b>System Type</b> | <b>Main Trunk Numbers</b> | <b>Expansion Trunk Numbers</b> |
|--------------------|---------------------------|--------------------------------|
| DBS 40             | 1-8                       | 9-16                           |
| DBS 72             | 1-16                      | 17-24                          |
| DBS 96             | 1-24                      | 25-32                          |

## Trunk Connector Pinouts

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

Instructions on installing the expansion connector begin on 4-44.

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

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

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

**Table 4-3. Pinouts and trunk numbers for trunk expansion connector CN1**

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

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

# Loop-Start Trunks

## Guidelines

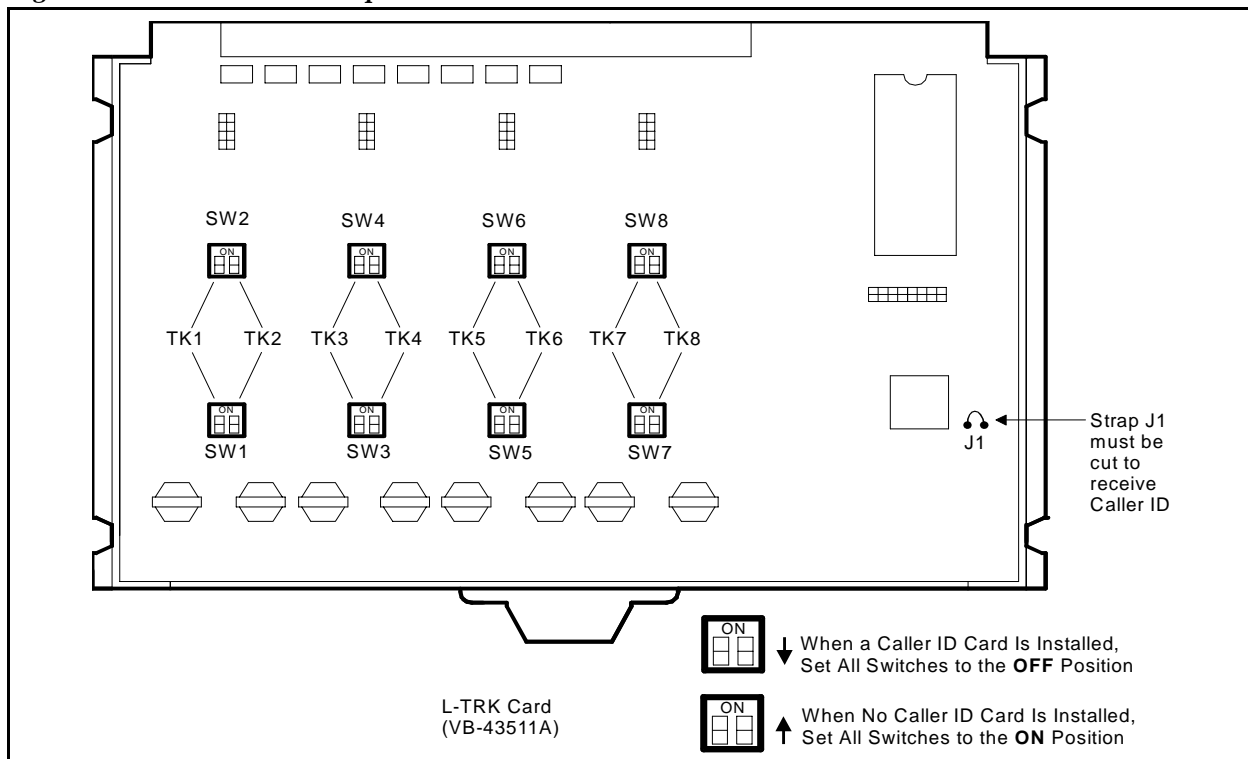
- Two versions of the loop-start trunk are available: the four-port version (VB-43510) and the eight-port version (VB-43511).
- The following procedure covers loop-start trunk installation using the main trunk connector. For instructions on using the expansion trunk connector, see “Trunk and Line Expansion” on page 4-44
- For pinouts and color codes for the main trunk connector, see Table 4-2 on page 4-5.

## Installation

### Installation without Caller ID

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

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



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

### Installation with Caller ID

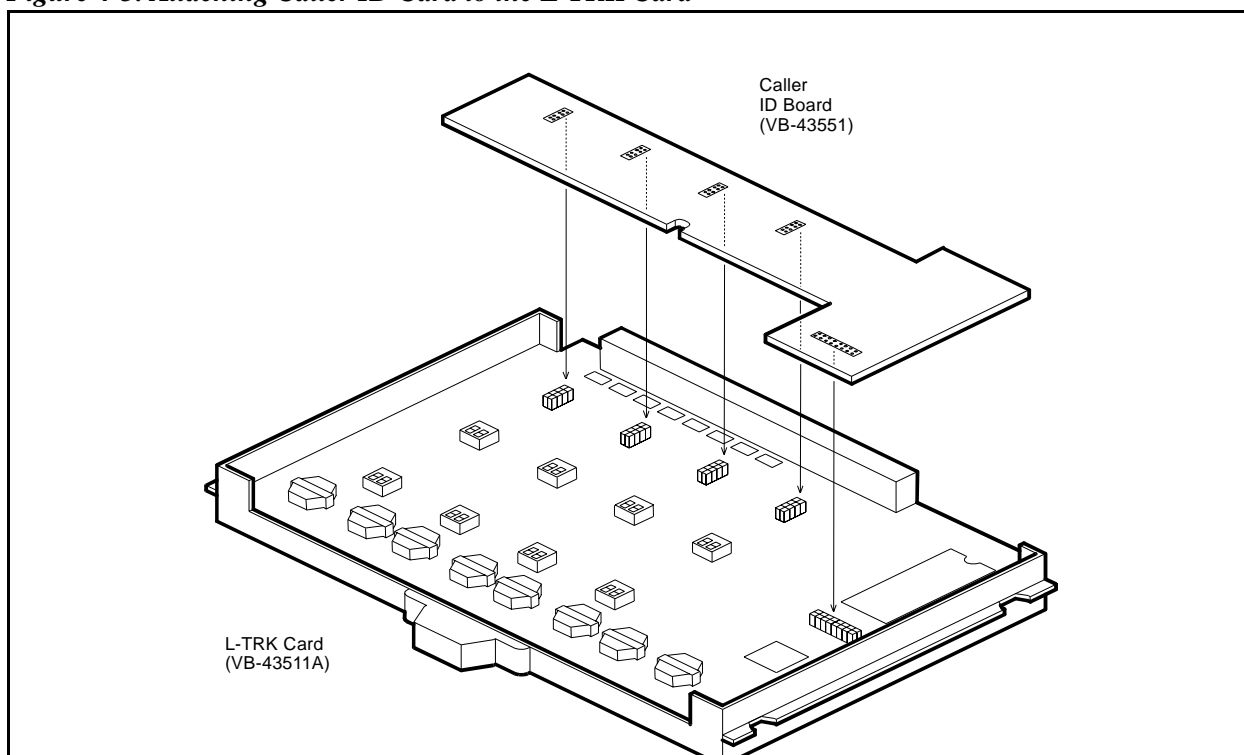
1. Remove the cover from the L-TRK card (VB-43511A). This cover should be set aside since it cannot be reinstalled with a Caller ID Board installed.
2. Cut strap J1 on the L-TRK card as shown in Figure 4-2.
3. Set switches SW1 through SW8 on the L-TRK card (VB-43511A) to OFF.



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

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

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



5. Install the L-TRK card in a trunk slot.
6. Use a standard 50-pin cable to connect the trunks from the MDF to the main trunk connector CN1.



## Ground Start and DID Trunks

### Guidelines

- The following procedure covers ground-start (VB-43531) and DID (VB-43541) installation using the main trunk connector. For instructions on using the expansion trunk connector, see “Trunk and Line Expansion” on page 4-44.
- For pinouts and color codes for the main trunk connector, see Table 4-2 on page 4-5.
- Each circuit on the ground-start trunk card can be used as either a loop-start or ground-start trunk. By default, all circuits on the ground-start trunk are assigned as loop start.
- The ground-start trunk card requires CPC-B Version 1.0 or higher.
- The DID card requires CPC-B (Version 2.0 or higher) and SCC-B (Version 1.2 or higher).
- Both ground start and DID trunks require an external -48V floating output power supply. The following table shows -48V power consumption for one- and two-cabinet systems.

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

| System Size        | Current Consumption<br>(Output voltage = $48 \pm 4$ V<br>Ripple voltage = $\pm 500$ mVp-p) |
|--------------------|--|
| One-cabinet system | 1 Amp  |
| Two-cabinet system | 2 Amps   |

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

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

| Manufacturer | Model Number | Rating |
|--------------|--------------|--------|
| Valcom       | VP-2048B     | 2 Amps |
| Tellabs      | 81-8002      | 2 Amps |

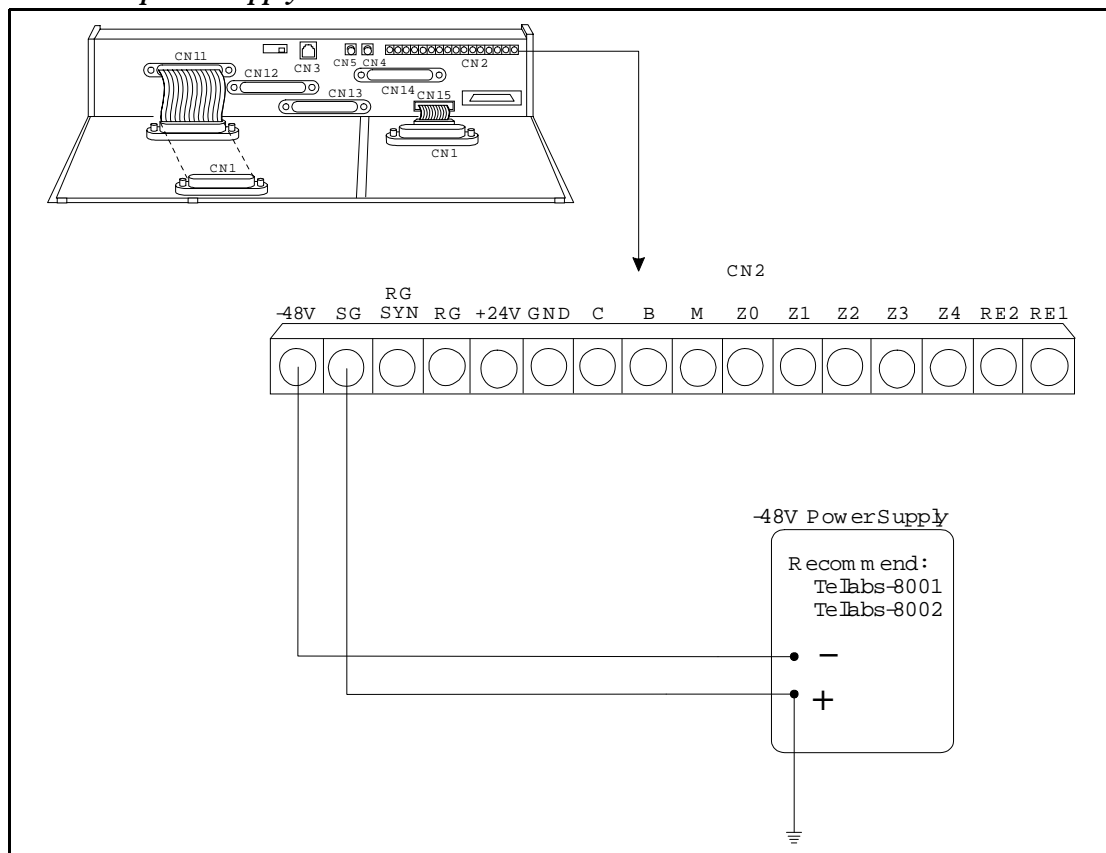
- The following “Installation” section includes details on installing the -48V power supply.

## Installation

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

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

**Figure 4-4. -48V power supply installation**



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

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

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

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

## T1 Interface

### Guidelines

Read the following guidelines before beginning T1 installation. Installation instructions begin on page 4-21.

### Hardware Requirements

- The T1 requires the following DBS hardware.

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

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

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

| <b>T1 Location</b>          | <b>CPC-B V4</b><br>(VB-43411)<br>(See Note 1.) | <b>SCC-B</b><br>(VB-43421)<br>(See Notes 2 and 3.) | <b>T1 Trunk Card</b><br>(VB-43561) | <b>T1 MDF Card</b><br>(VB-43562) | <b>Sync Card</b><br>(VB-43563) | <b>T1 Cable</b><br>(VB-43564) | <b>Cable Kit</b><br>(VB-43110)<br>(See Note 4.) |
|-----------------------------|--|--|------------------------------------|----------------------------------|--------------------------------|-------------------------------|---|
| T1 in the Master            | 1  | 1  | 1                                  | 1                                | 1                              | 0                             | 1   |
| T1 in the Slave             | 1  | 1  | 1                                  | 1                                | 1                              | 1                             | 1   |
| T1 in both Master and Slave | 1  | 1  | 2                                  | 2                                | 1                              | 1                             | 1   |

**Notes:**

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

- The T1 trunk card must be installed in the “EC/TRK” slot.
- The installer **must** provide a Channel Service Unit (CSU) that complies with FCC Part 15 and Part 68. The CSU is installed between the DBS and the public network. The CSU provides alarm, diagnostic, and monitoring functions, as well as network protection.

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

### Maximums

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

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

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

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

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

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

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

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

Tables 4-9 through 4-11 show the possible combinations of analog and digital trunks assignments based on system size.

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

- With CPC-B 5.00 and higher and the VB-43511A Loop Start Trunk Card, the number of analog trunks that can be used with Fractional T1 are decremented in quantities of 1.

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

### Trunk Assignments for Single-Cabinet Systems

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

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

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

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

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

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

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

### Trunk Assignments for Double-Cabinet Systems

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

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

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

| System Size     | Master                          | Slave                           |
|-----------------|---------------------------------|---------------------------------|
| DBS 40 + DBS 40 | 8 analog trunks                 | 16 T1 trunks                    |
| DBS 72 + DBS 72 | 16 analog trunks                | 24 T1 trunks                    |
| DBS 96 + DBS 40 | 24 T1 trunks<br>8 analog trunks | 16 T1 trunks                    |
| DBS 96 + DBS 72 | 24 T1 trunks<br>8 analog trunks | 24 T1 trunks                    |
| DBS 96 + DBS 96 | 24 T1 trunks<br>8 analog trunks | 24 T1 trunks<br>8 analog trunks |

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

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

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

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

**Table 4-14. T1 and analog trunk assignments, DBS 72 + DBS 72 (24-channel T1 in the slave)**

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



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

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

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

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

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

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

## ***Installation***

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

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

## Installing a T1 in a Single Cabinet

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

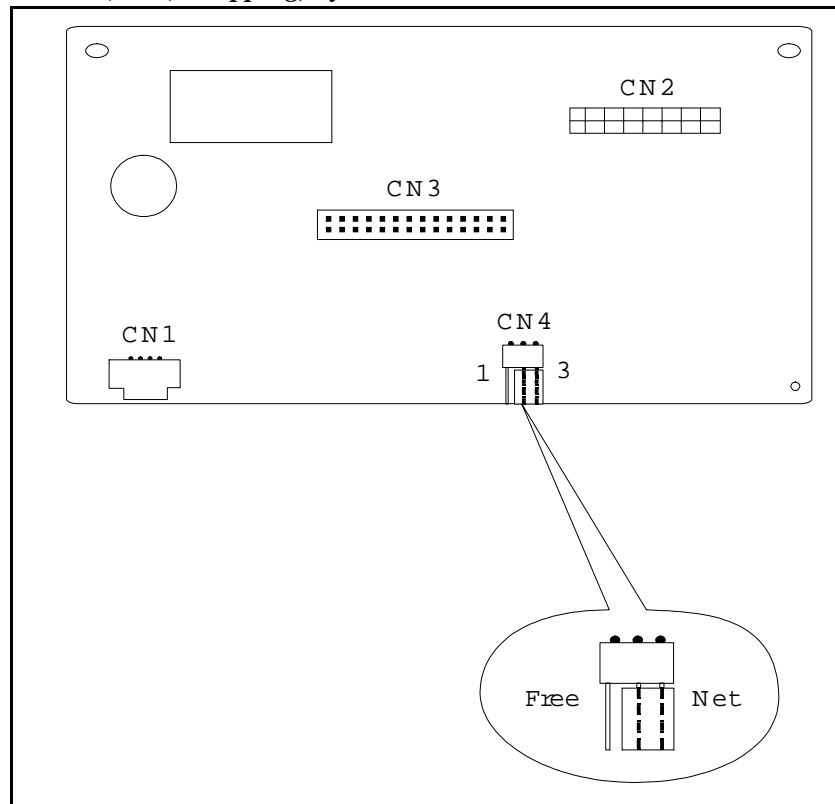
If only one T1 is installed in a two-cabinet system, it must be installed in the cabinet specified in Table 4-8 on page 4-13.

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

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

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

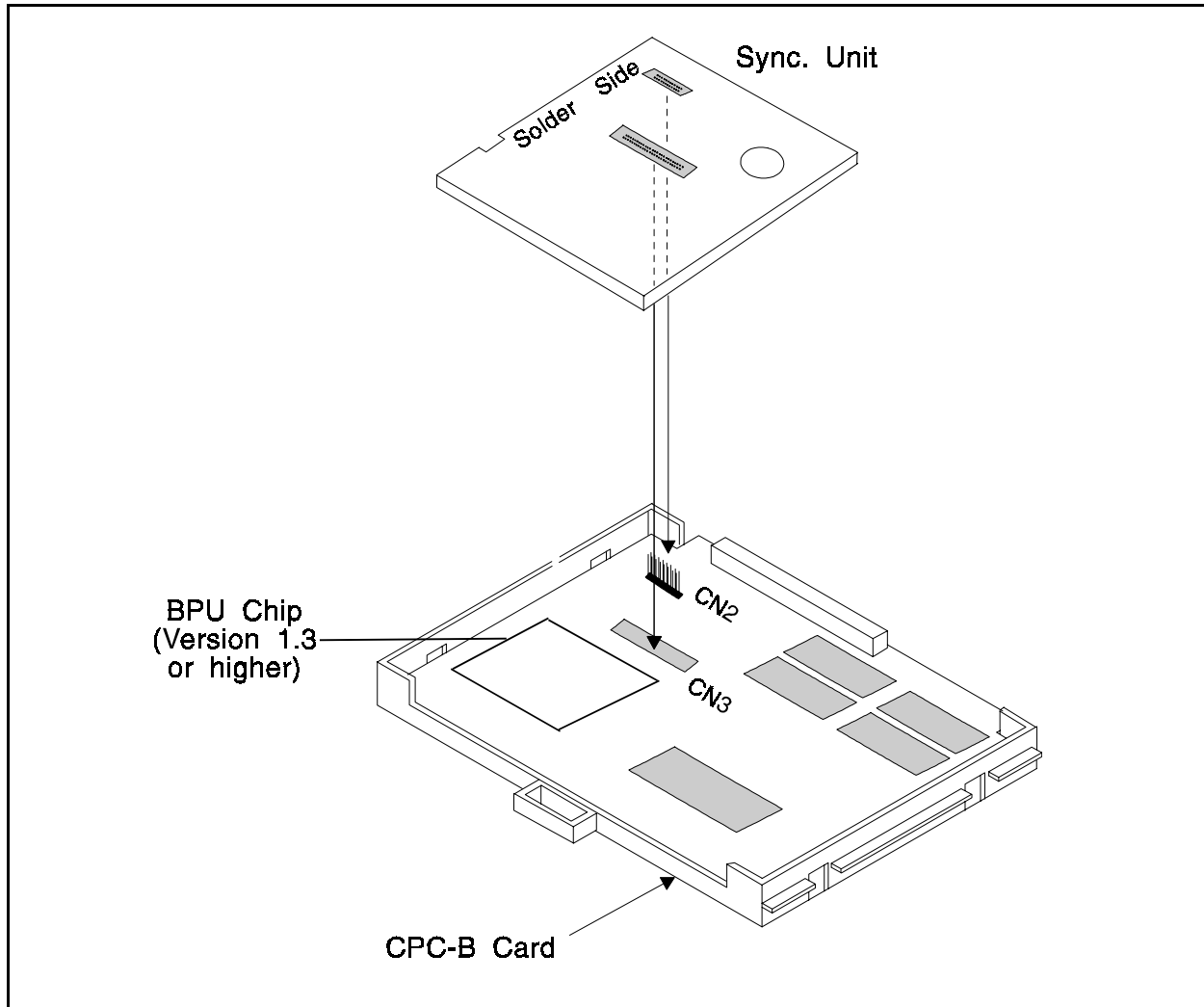
*Figure 4-5. Connector 4 (CN4) strapping, Sync Unit*



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

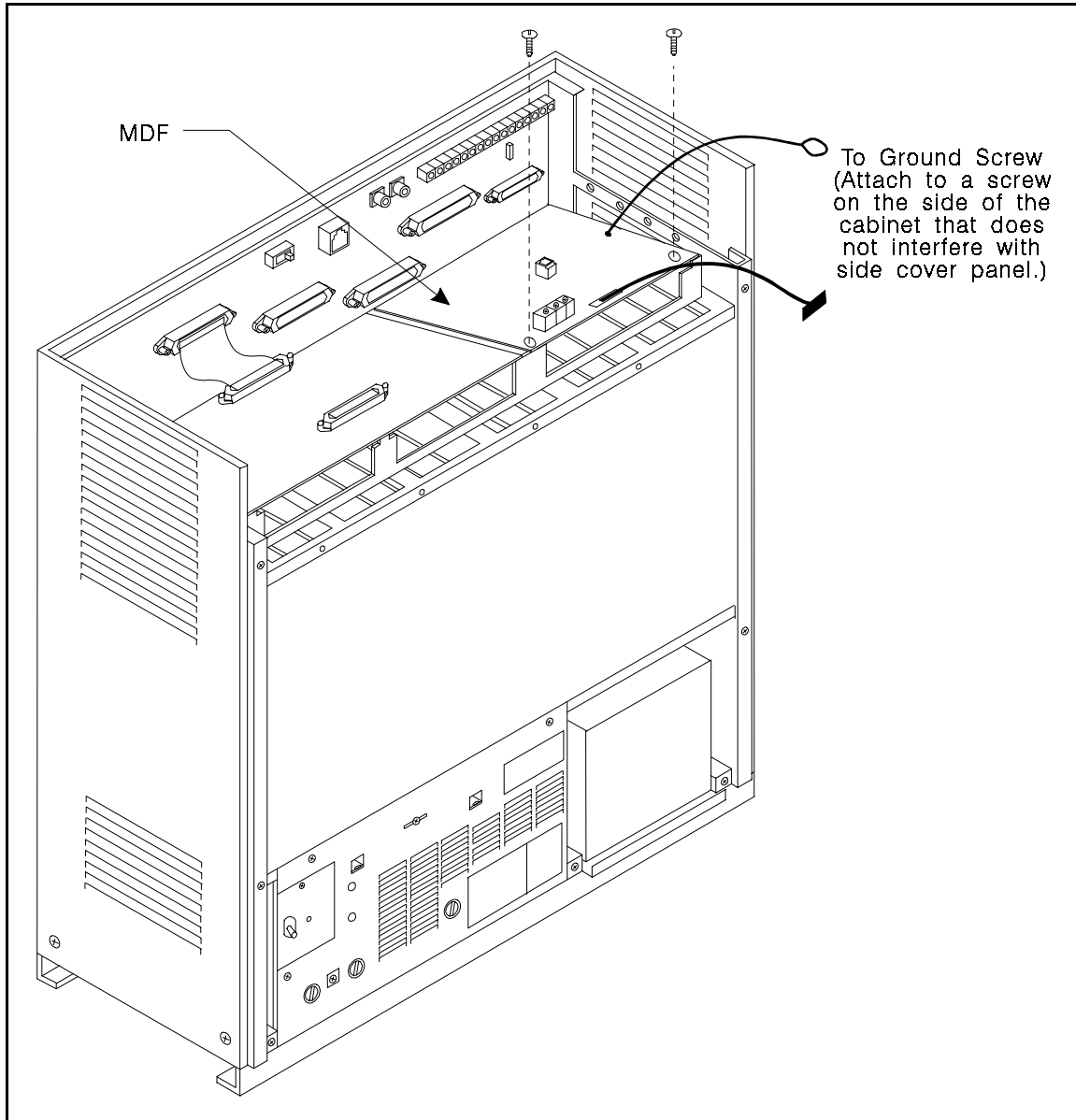
**Note:** Before attaching the Sync Unit, insert the three spacers provided with the unit and remove the jumpers from CN2 of the CPC-B card.

*Figure 4-6. T1 Sync Unit installation*



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

**Figure 4-7. T1 MDF card installation**



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

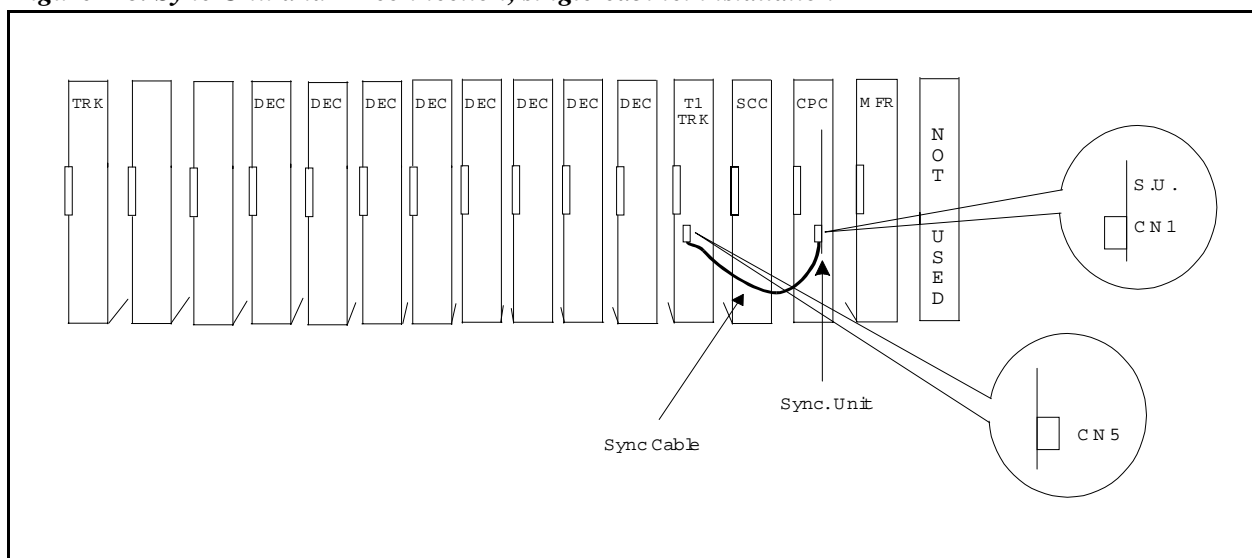
These switch settings correspond to the distance between the DBS and the CSU. To turn a switch on, flip it to the “up” position.

**Table 4-18. Switch settings for SW1 on the T1 card**

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

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

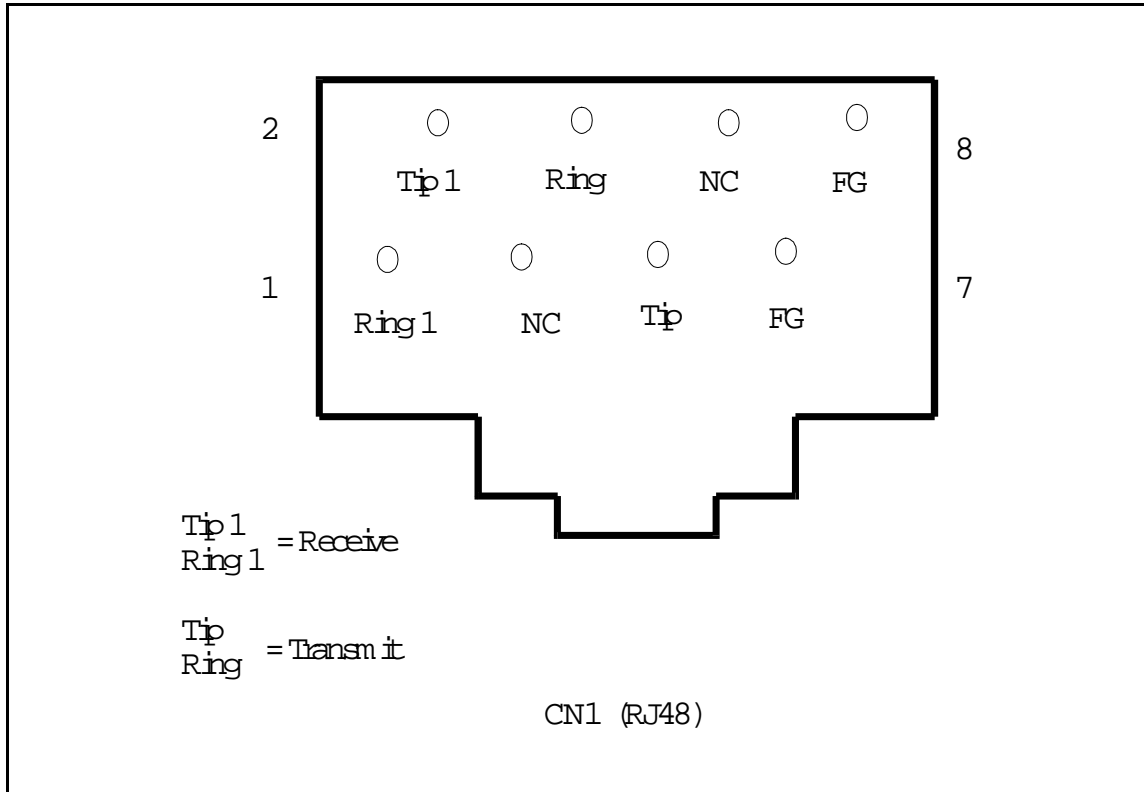
**Figure 4-8. Sync Unit and T1 connection, single-cabinet installation**



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

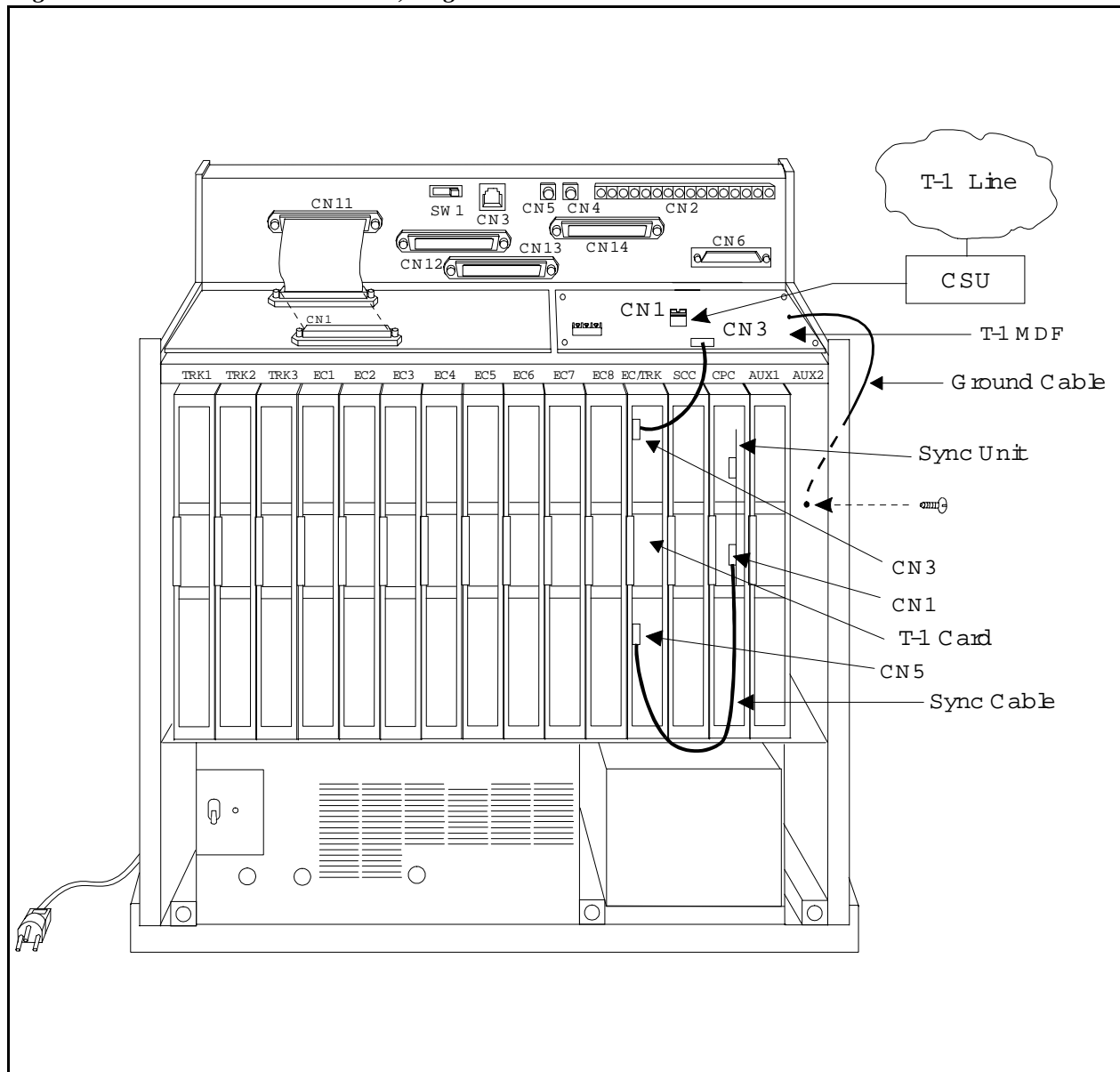


Figure 4-9. RJ48 pinouts, CN1 connector



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

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



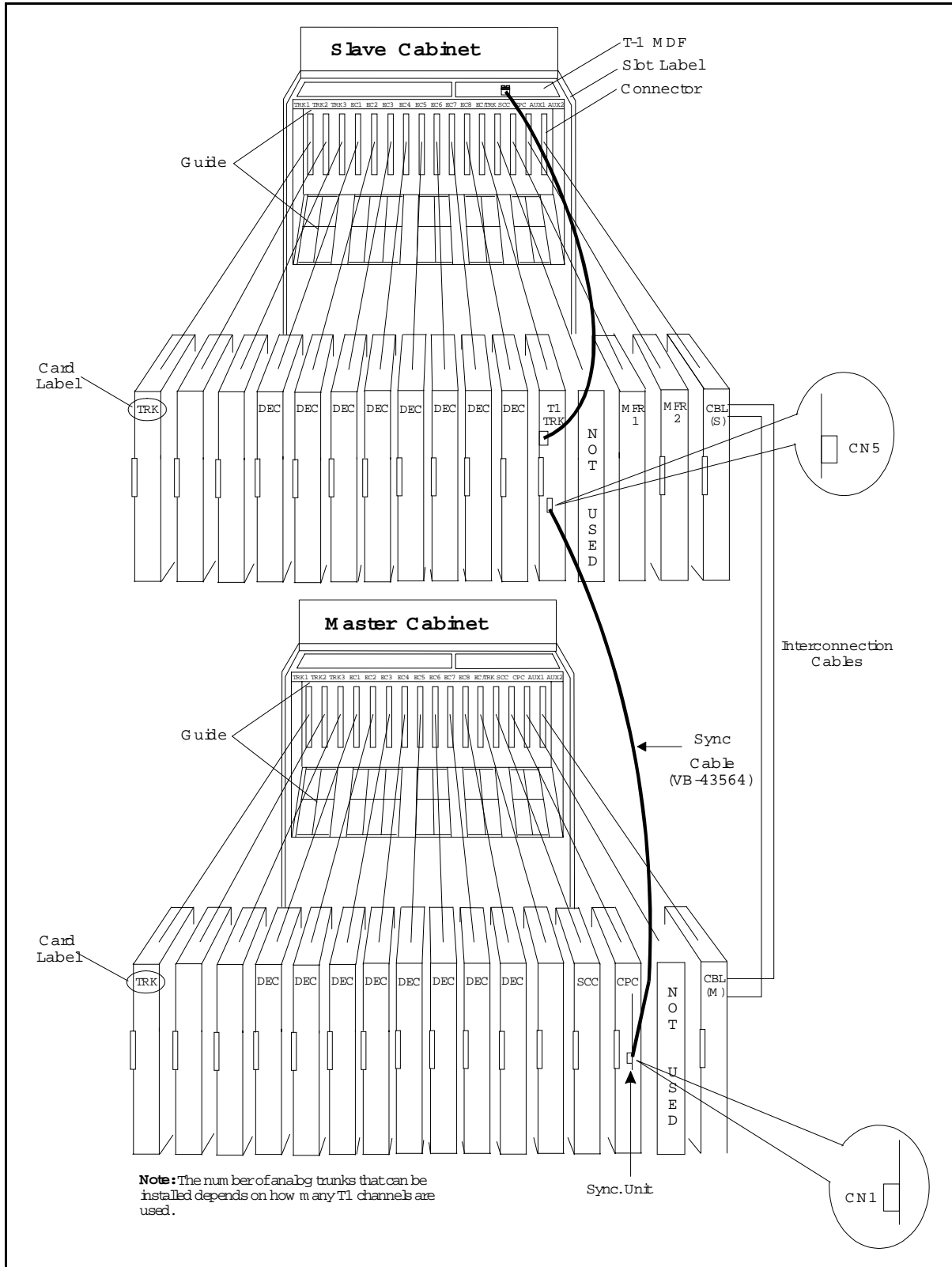
### Installing T1 in a Double Cabinet with the T1 in the Slave

1. Install the Sync Unit in the master cabinet as described in Steps 1 and 2 under “Installation for a Single T1.”
2. Install a T1 MDF card in the slave cabinet. (See Step 3 on page 4-23.)
3. Set Switch 1 on the T1 card. (See Step 4 on page 4-24.)
4. Install a T1 card in the “EC/TRK” slot of the slave cabinet.
5. Connect the Sync Cable from CN1 on the Sync Unit to CN5 on the T1 card (Figure 4-11).

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

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

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



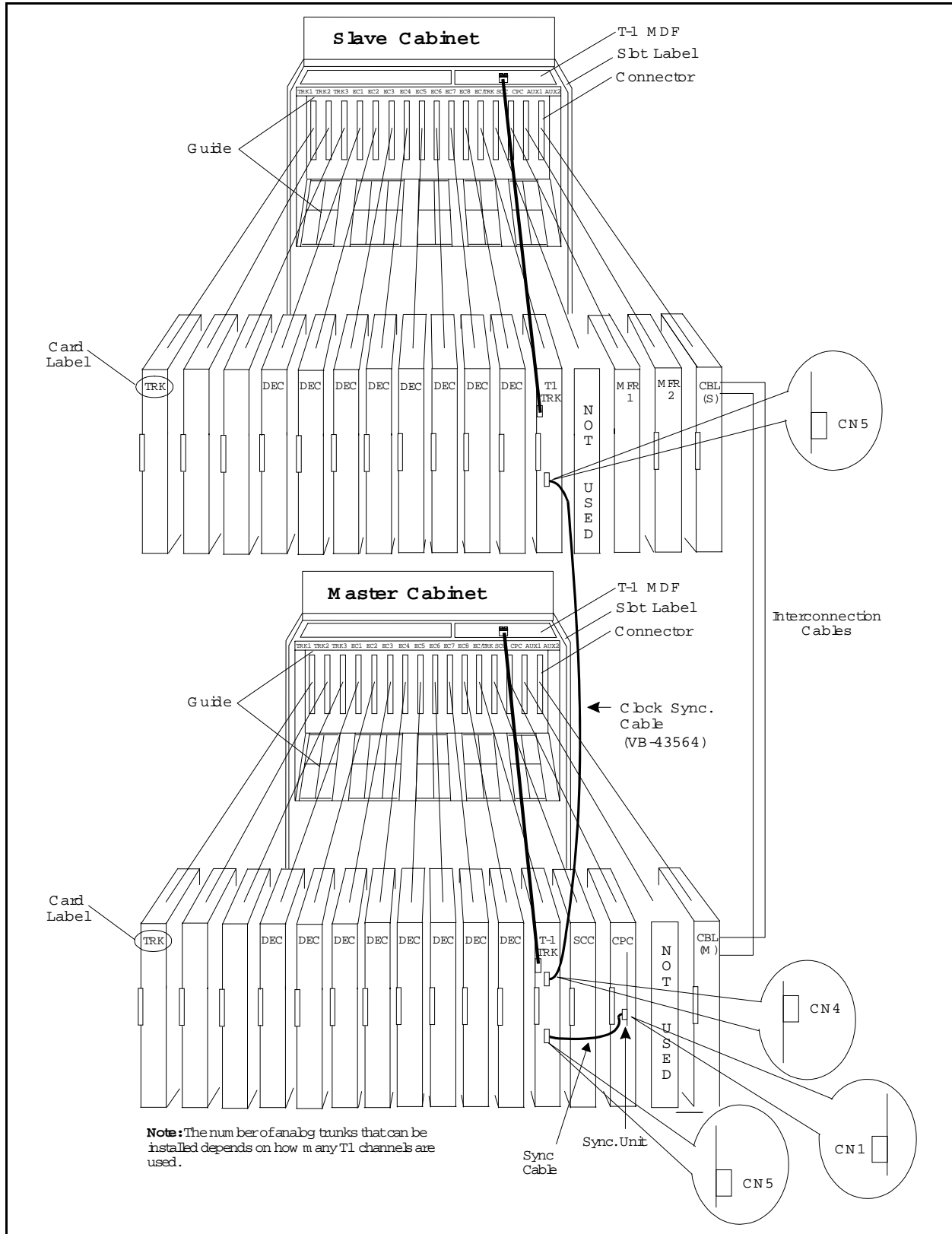
### Installing T1 in a Double Cabinet with T1s in the Master and Slave

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

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

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

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



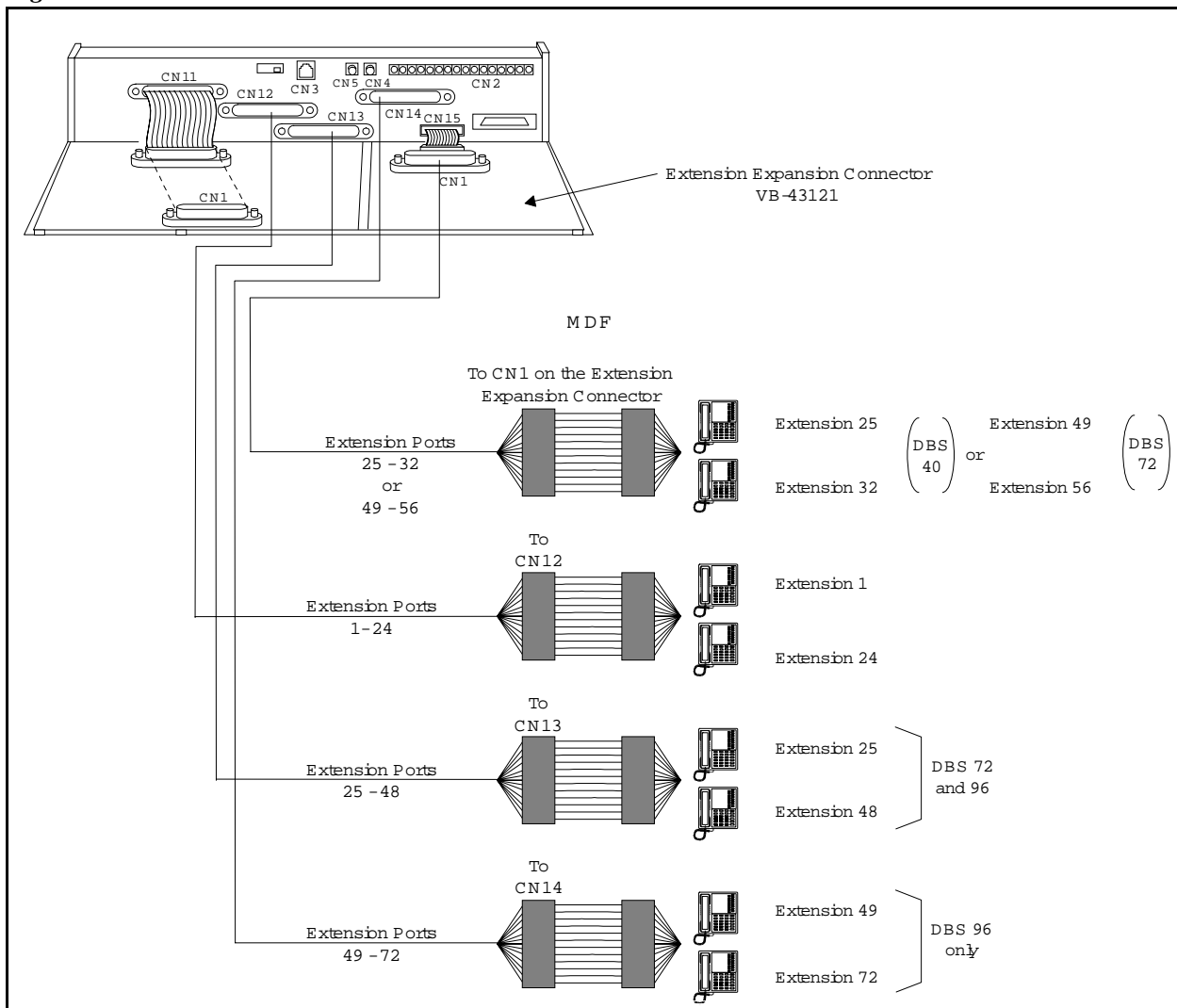
# Lines

## Extension Connectors

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

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

**Figure 4-13. DBS extension connections**



*Table 4-19. Extension ports provided with each system*

| <b>System Type</b>  | <b>Extension Ports<br/>(Not including the Expansion Connector*)</b> |
|---|---|
| DBS 40  | 1-24  |
| DBS 72  | 1-48  |
| DBS 96  | 1-72  |
| * <b>Note:</b> Extensions 65 to 72 on the DBS 96 use the EC/TRK slot, but they do not require the extension expansion connector. If extensions 65 to 72 are used, the trunk expansion connector cannot be used. |   |

## Extension Connector Pinouts

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

Instructions on installing the expansion connector begin on 4-44.



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

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

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

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

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

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

| Extension Slot          | Color Code | Pin No.  | Desig.            | Function          |
|-------------------------|------------|----------|-------------------|-------------------|
| EC7<br>(DBS 96 Only)    | WH-BL      | 26       | 1T                | Extension Port 49 |
|                         | BL-WH      | 1        | 1R                |                   |
|                         | WH-OR      | 27       | 2T                | Extension Port 50 |
|                         | OR-WH      | 2        | 2R                |                   |
|                         | WH-GN      | 28       | 3T                | Extension Port 51 |
|                         | GN-WH      | 3        | 3R                |                   |
|                         | WH-BR      | 29       | 4T                | Extension Port 52 |
|                         | BR-WH      | 4        | 4R                |                   |
| WH-SL                   | 30         | 5T       | Extension Port 53 |                   |
| SL-WH                   | 5          | 5R       |                   |                   |
| EC8<br>(DBS 96 Only)    | RD-BL      | 31       | 6T                | Extension Port 54 |
|                         | BL-RD      | 6        | 6R                |                   |
|                         | RD-OR      | 32       | 7T                | Extension Port 55 |
|                         | OR-RD      | 7        | 7R                |                   |
|                         | RD-GN      | 33       | 8T                | Extension Port 56 |
|                         | GN-RD      | 8        | 8R                |                   |
|                         | RD-BR      | 34       | 9T                | Extension Port 57 |
|                         | BR-RD      | 9        | 9R                |                   |
| RD-SL                   | 35         | 10T      | Extension Port 58 |                   |
| SL-RD                   | 10         | 10R      |                   |                   |
| BK-BL                   | 36         | 11T      | Extension Port 59 |                   |
| BL-BK                   | 11         | 11R      |                   |                   |
| BK-OR                   | 37         | 12T      | Extension Port 60 |                   |
| OR-BK                   | 12         | 12R      |                   |                   |
| BK-GN                   | 38         | 13T      | Extension Port 61 |                   |
| GN-BK                   | 13         | 13R      |                   |                   |
| BK-BR                   | 39         | 14T      | Extension Port 62 |                   |
| BR-BK                   | 14         | 14R      |                   |                   |
| BK-SL                   | 40         | 15T      | Extension Port 63 |                   |
| SL-BK                   | 15         | 15R      |                   |                   |
| YL-BL                   | 41         | 16T      | Extension Port 64 |                   |
| BL-YL                   | 16         | 16R      |                   |                   |
| EC/TRK<br>(DBS 96 only) | YL-OR      | 42       | 17T               | Extension Port 65 |
|                         | OR-YL      | 17       | 17R               |                   |
|                         | YL-GN      | 43       | 18T               | Extension Port 66 |
|                         | GN-YL      | 18       | 18R               |                   |
|                         | YL-BR      | 44       | 19T               | Extension Port 67 |
|                         | BR-YL      | 19       | 19R               |                   |
|                         | YL-SL      | 45       | 20T               | Extension Port 68 |
|                         | SL-YL      | 20       | 20R               |                   |
|                         | VI-BL      | 46       | 21T               | Extension Port 69 |
|                         | BL-VI      | 21       | 21R               |                   |
|                         | VI-OR      | 47       | 22T               | Extension Port 70 |
|                         | OR-VI      | 22       | 22R               |                   |
| VI-GN                   | 48         | 23T      | Extension Port 71 |                   |
| GN-VI                   | 23         | 23R      |                   |                   |
| VI-BR                   | 49         | 24T      | Extension Port 72 |                   |
| BR-VI                   | 24         | 24R      |                   |                   |
| VI-SL                   | 50         | Not used |                   |                   |
|                         | SL-VI      | 25       |                   |                   |

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

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

| Extension Slot | Color Code     | Pin No. | Desig.   | Extension Port Assignments According to System Type |                   |  |
|----------------|----------------|---------|----------|---|-------------------|--|
|                |                |         |          | DBS 40  | DBS 72            | DBS 96   |
| EC/TRK         | WH-BL<br>BL-WH | 26<br>1 | 1T<br>1R | Extension Port 25                                   | Extension Port 49 | No Extension Expansion Card Required (uses CN14 instead) |
|                | WH-OR<br>OR-WH | 27<br>2 | 2T<br>2R | Extension Port 26                                   | Extension Port 50 |  |
|                | WH-GN<br>GN-WH | 28<br>3 | 3T<br>3R | Extension Port 27                                   | Extension Port 51 |  |
|                | WH-BR<br>BR-WH | 29<br>4 | 4T<br>4R | Extension Port 28                                   | Extension Port 52 |  |
|                | WH-SL<br>SL-WH | 30<br>5 | 5T<br>5R | Extension Port 29                                   | Extension Port 53 |  |
|                | RD-BL<br>BL-RD | 31<br>6 | 6T<br>6R | Extension Port 30                                   | Extension Port 54 |  |
|                | RD-OR<br>OR-RD | 32<br>7 | 7T<br>7R | Extension Port 31                                   | Extension Port 55 |  |
|                | RD-GN<br>GN-RD | 33<br>8 | 8T<br>8R | Extension Port 32                                   | Extension Port 56 |  |

## Analog Extensions

**Note:** Normally analog extensions are supported using the AEC (VB-43621). Alternatively, a Single Line Telephone Adaptor (SLTA, VB-43709) may be used to support analog DTMF (2500 set) extensions. The SLTA converts up to 4 digital ports to analog ports. See “Single Line Telephone Adaptor” on page 5-34 for more information.

### *Guidelines*

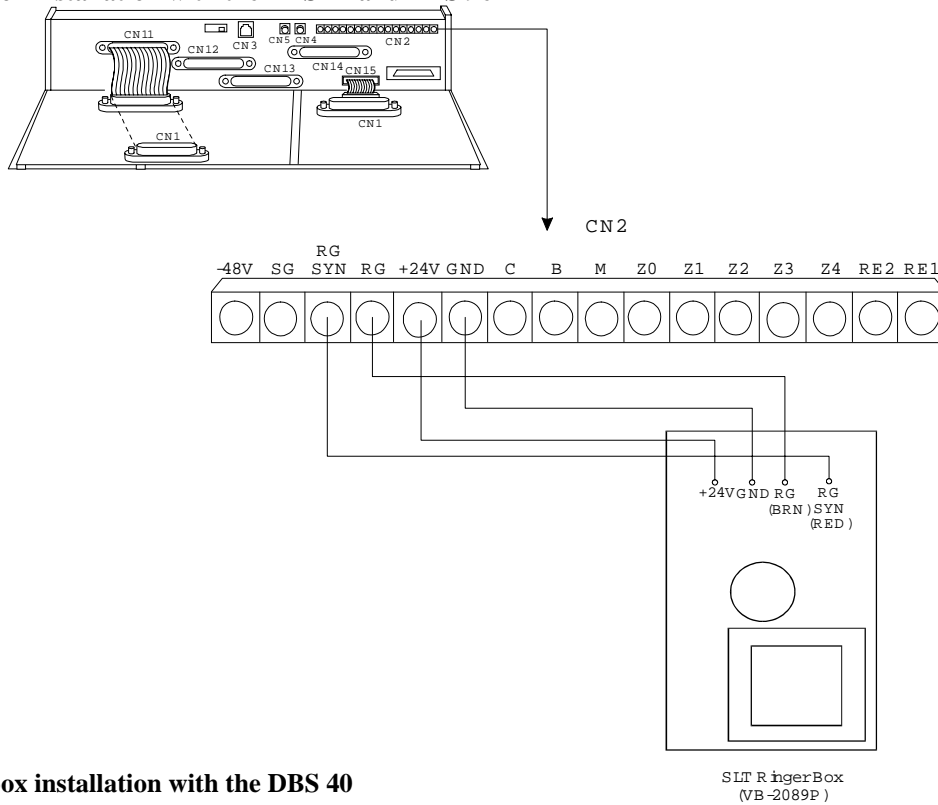
- An MFR card (VB-43431) is required when the AEC is used. The MFR card, which provides DTMF signals, includes eight circuits that are shared among the analog extensions.
- The AEC also requires the SLT ringer box (VB-2089P).

### *Installation*

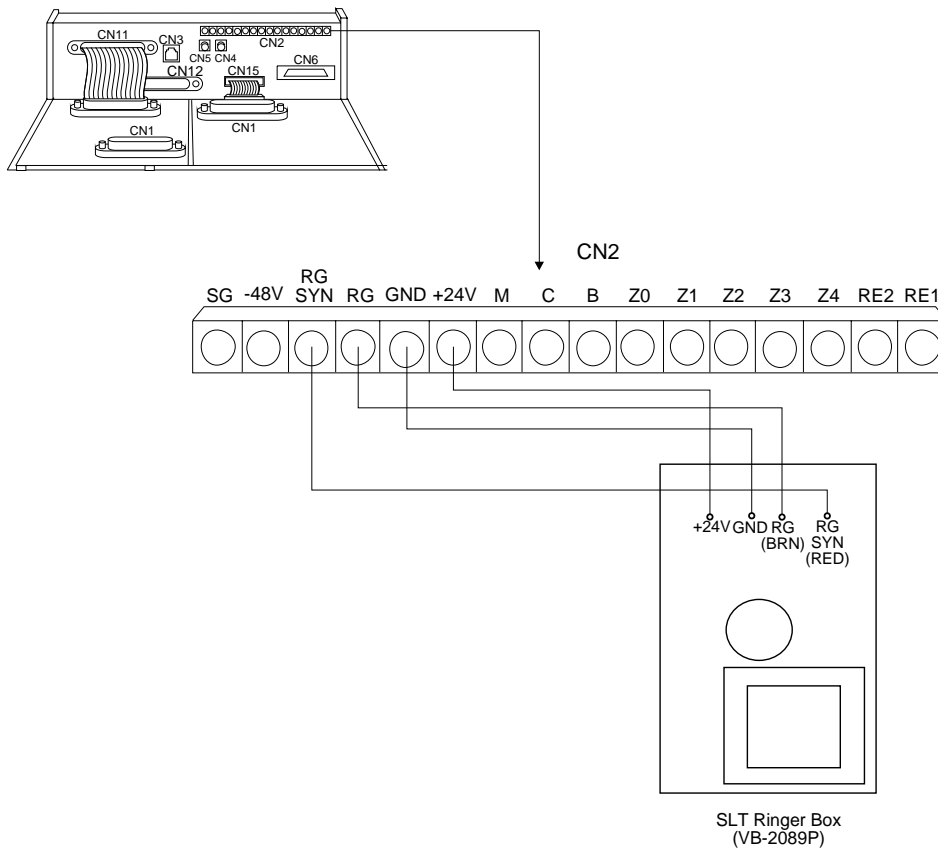
1. Install the AEC cards in extension slots.
2. Install the MFR card in AUX1 or AUX2. If installing in a two-cabinet system, see Chapter 6 for specific information for installing MFR card(s).
3. Install the SLT Ringer Box as shown in Figure 4-14. Be sure to note the differences between the DBS 40 Connector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

***Figure 4-14. SLT ringer box installation***

**Ringer box installation with the DBS 72 and DBS 96**

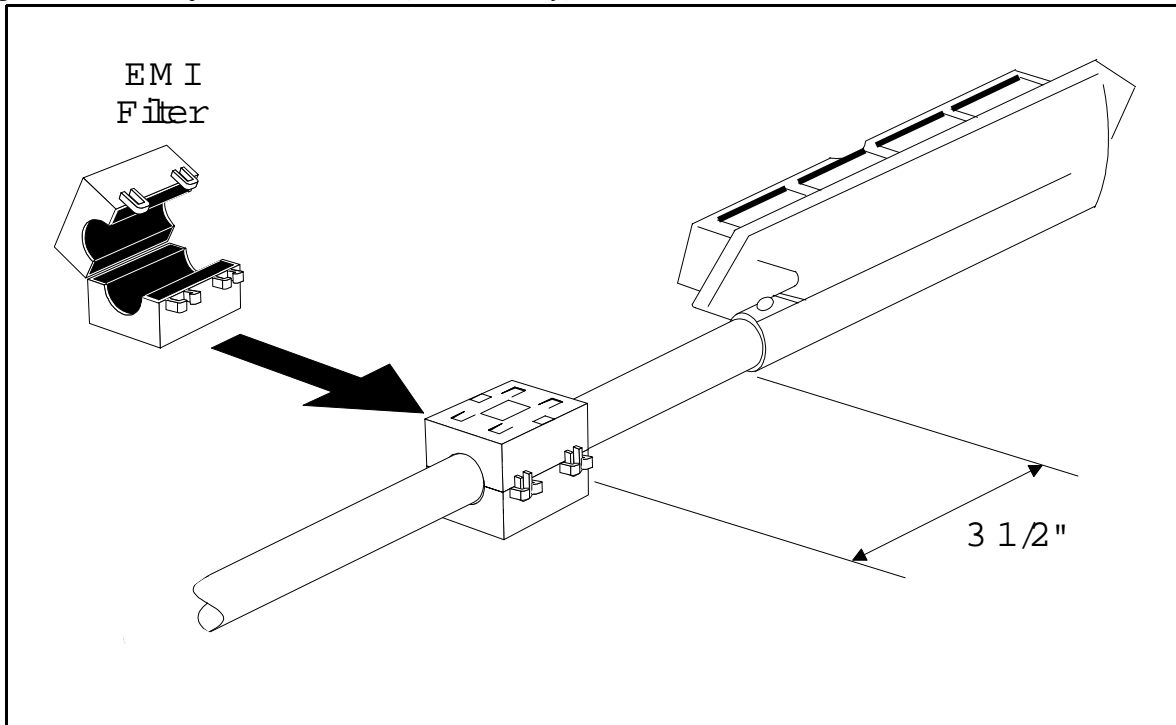


**Ringer box installation with the DBS 40**



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

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





## Digital Extensions

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

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

### DSS/72

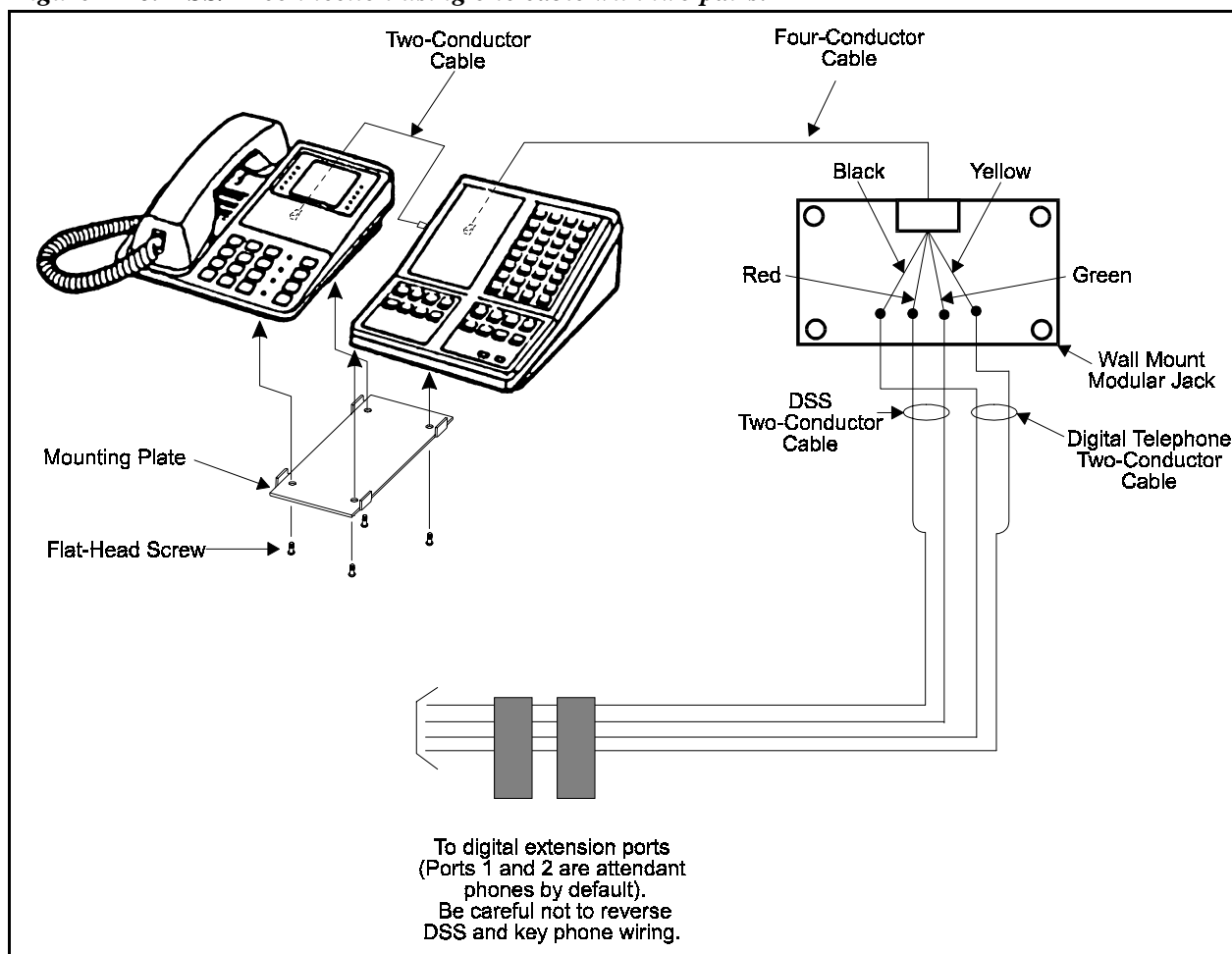
#### Guidelines

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

## Installation

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

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



## EM/24

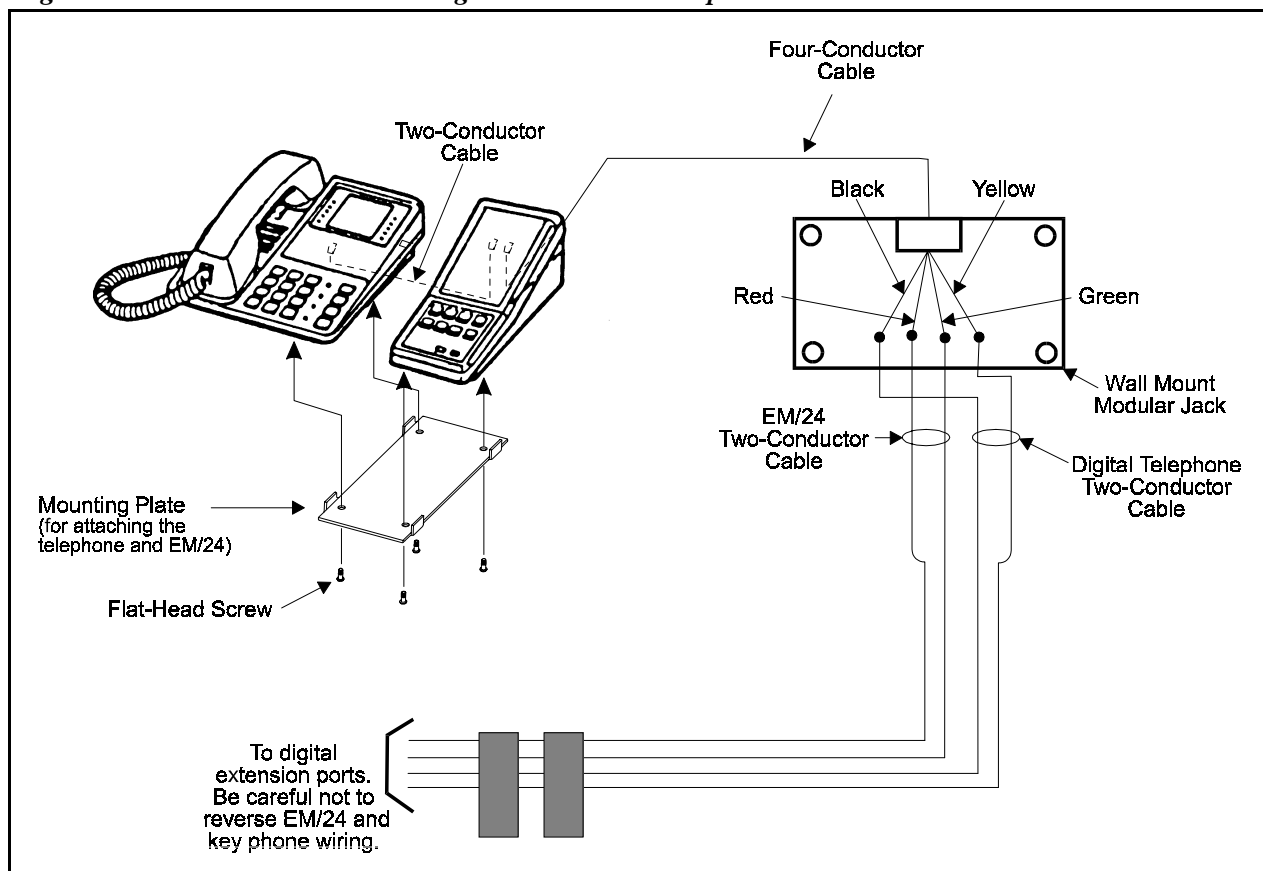
### Guidelines

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

### Installation

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

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



## Trunk and Line Expansion

### Guidelines

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

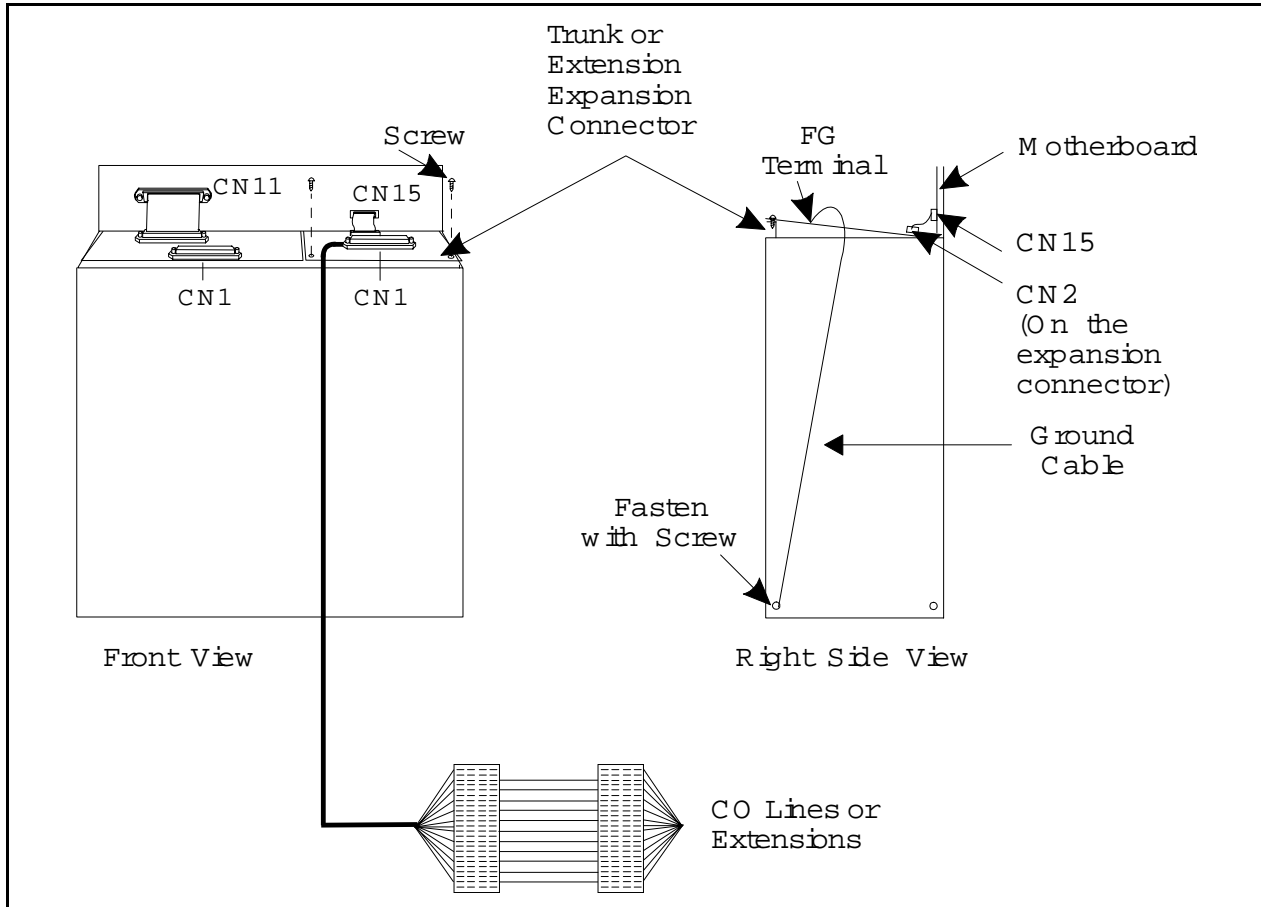
| Expansion connector           | Part No. |
|-------------------------------|----------|
| Trunk expansion connector     | VB-43120 |
| Extension expansion connector | VB-43121 |

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

### Installation

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

**Figure 4-18. Trunk or extension expansion**



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



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# Chapter 5. Peripheral Equipment

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

This chapter covers the following topics:

| <b>Topic</b>                          | <b>Page</b> |
|---------------------------------------|-------------|
| Local Terminal or SMDR Device         | 5-3         |
| Remote Administration Interface (RAI) | 5-6         |
| Background Music/Music-On-Hold        | 5-8         |
| Off-Premises Adaptor (OPX)            | 5-10        |
| Paging                                | 5-14        |
| External Ringer (UNA Device)          | 5-17        |
| Power Failure Unit                    | 5-19        |
| Voice Announce Unit (VAU)             | 5-22        |
| Door Box Adaptor (Trunk Port)         | 5-27        |
| Door Box Adaptor (Extension Port)     | 5-31        |
| Single Line Telephone Adaptor         | 5-34        |





# Local Terminal or SMDR Device

## Guidelines

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

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

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

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

# Installation

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

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

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

**Figure 5-1. RS-232C connection**

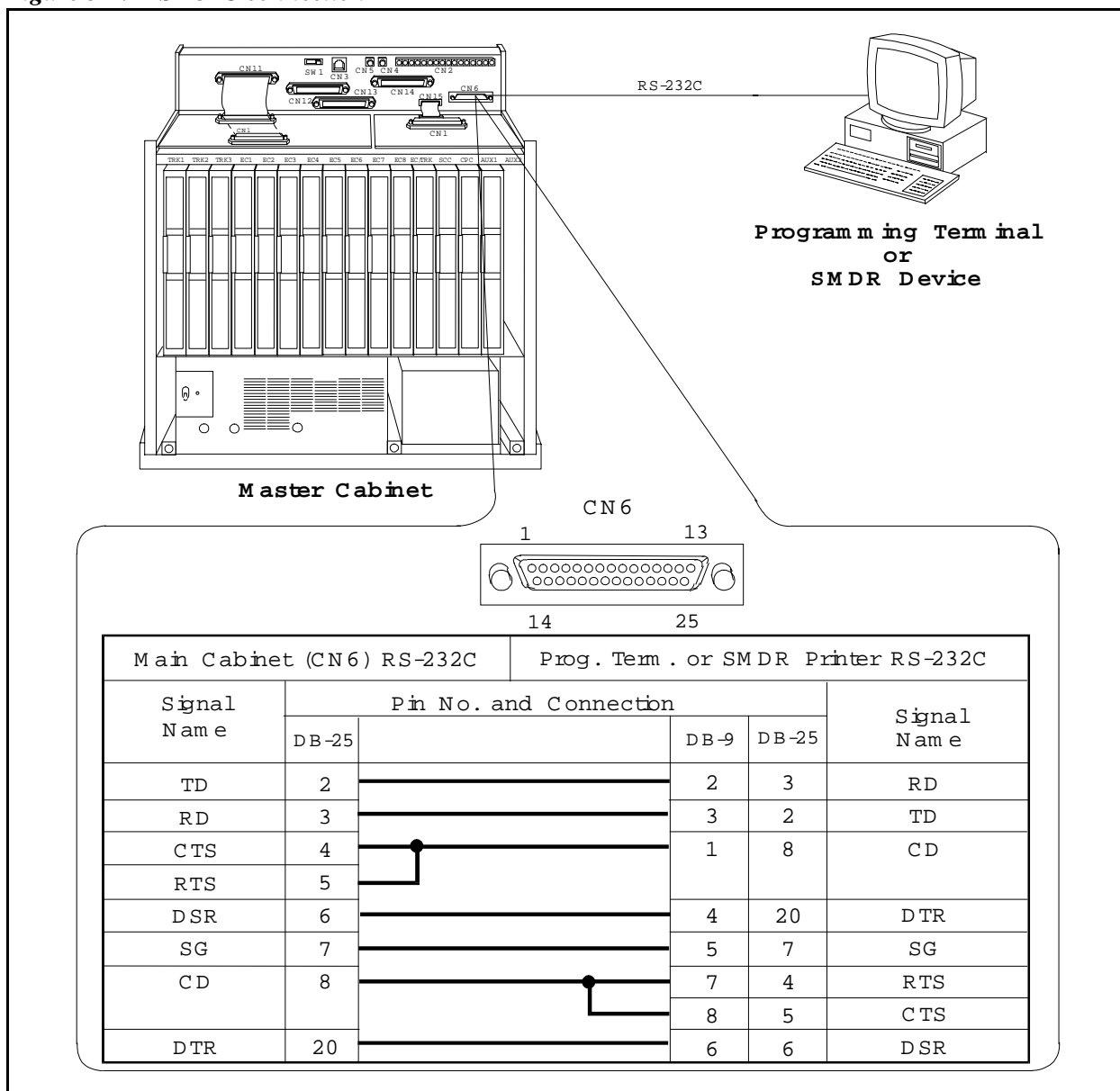


Figure 5-2. SMDR Format for CPC-AII and CPC-B Version 3.1 or higher

| 1   | 2          | 3          | 4          | 5          | 6                                  | 7          | 8      | 9          |
|---|------------|------------|------------|------------|------------------------------------|------------|--------|------------|
| 012345678901  | 2345678901 | 2345678901 | 2345678901 | 2345678901 | 2345678901                         | 2345678901 | 234567 | 8901234567 |
| T   | MM/DD      | HH:MM:SS   | HH:MM.SS   | NNN        | DDDDDDDDDDDDDDDDDDDDDDDDDDDD       | AAAAA      | VVVVV  | NN         |
| 1=Call type   |            |            |            |            | 5=Extension number                 |            |        |            |
| S=Inbound DISA  |            |            |            |            | 10-69, 100-699=extensions          |            |        |            |
| s=Outbound DISA   |            |            |            |            | CO number=DISA                     |            |        |            |
| I=Incoming  |            |            |            |            |                                    |            |        |            |
| O=Outgoing  |            |            |            |            | 6=Dialed digits or Caller ID       |            |        |            |
| T=Transfer (See Note 1.)  |            |            |            |            | DD=digits 0-9 or symbols * or #    |            |        |            |
| N=DNIS  |            |            |            |            | (See Note 2.)                      |            |        |            |
| D=DID   |            |            |            |            | 7=Account code                     |            |        |            |
|   |            |            |            |            | A=0-9999999999                     |            |        |            |
| 2=Date  |            |            |            |            | 8=Verified account code or walking |            |        |            |
| MM=month  |            |            |            |            | COS code                           |            |        |            |
| DD=day  |            |            |            |            | V0000-V9999=verified account codes |            |        |            |
|   |            |            |            |            | W0000-W9999=walking COS codes      |            |        |            |
| 3=Call start time   |            |            |            |            | 9=Trunk Number                     |            |        |            |
| HH=hours  |            |            |            |            | NN=number (01-64)                  |            |        |            |
| MM=minutes  |            |            |            |            |                                    |            |        |            |
| SS=seconds  |            |            |            |            |                                    |            |        |            |
| 4=Call duration   |            |            |            |            |                                    |            |        |            |
| HH=hours  |            |            |            |            |                                    |            |        |            |
| MM=minutes  |            |            |            |            |                                    |            |        |            |
| SS=seconds  |            |            |            |            |                                    |            |        |            |
| Notes:  |            |            |            |            |                                    |            |        |            |
| 1. Transferred calls include direct and group call pickups and conference calls.  |            |            |            |            |                                    |            |        |            |
| If a station call is transferred to an outside number, an SMDR record is also created for the station that is transferred.  |            |            |            |            |                                    |            |        |            |
| 2. The * symbol appears as a greater-than sign (>) on the SMDR printout; the # symbol appears as a less-than sign (<). Centrex and PBX codes, as well as LCR access codes, do not appear as dialed digits. If the Caller ID Feature is installed and enabled, "Private" appears with calls that have restricted Caller ID display and "Out of Area" with long distance calls that do not provide Caller ID information. |            |            |            |            |                                    |            |        |            |

# Remote Administration Interface (RAI)

## Guidelines

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

*Table 5-2. RAI compatibility*

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

## Installation

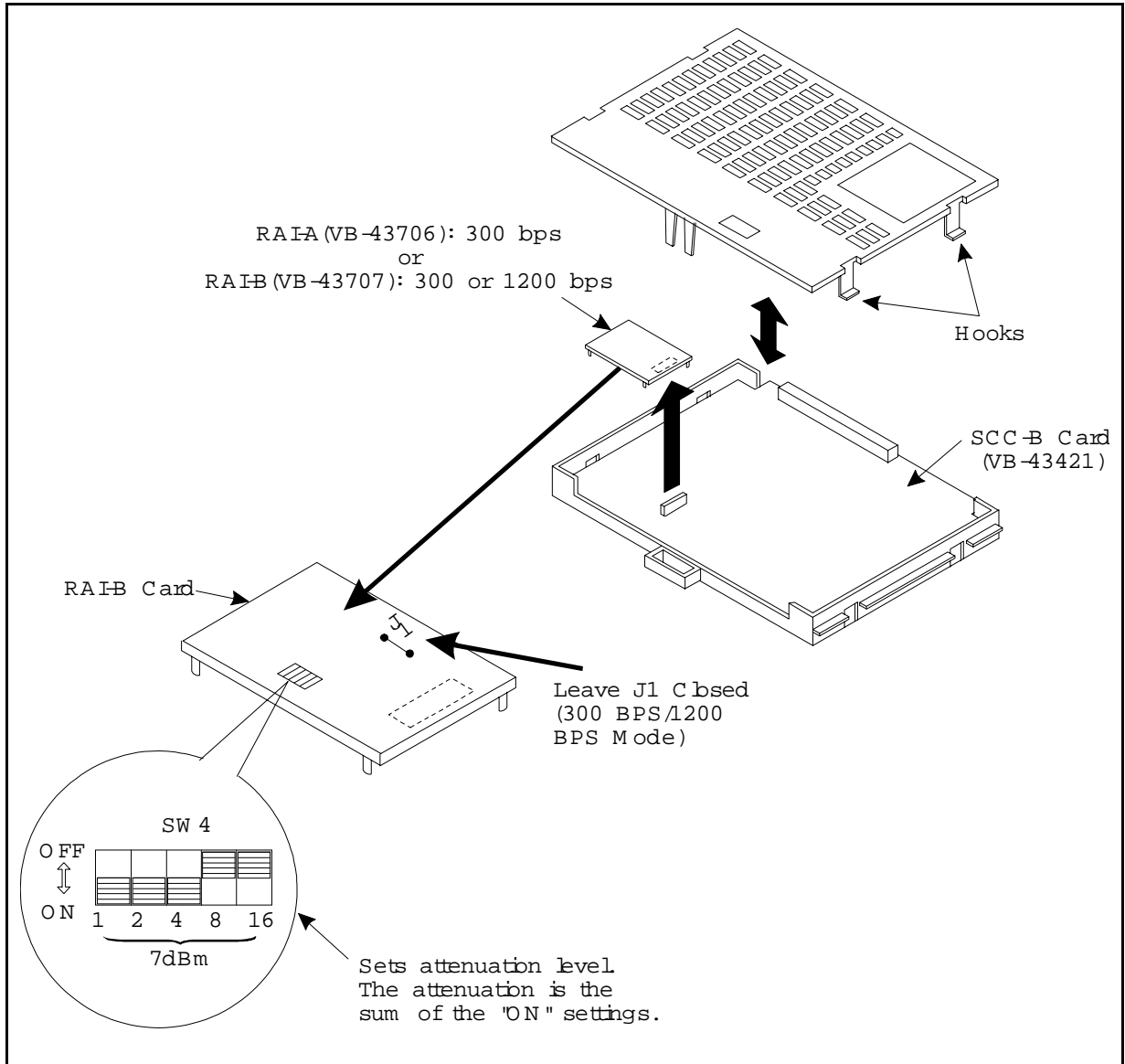
- Remove the upper cover of the SCC card.
 

Jumper 1 (J1) on the RAI-B controls the transmission rate. When closed, the transmission rate is switchable from 300 bps to 1200 bps through system programming. When open, the rate is fixed at 300 bps.
- Connect the RAI card to the connector on the SCC card.
 

The RAI-A connects to CN3. RAI-B connects to CN2 and CN3.
- Replace the upper cover of the SCC.
 

**Note:** To adjust the output level of the RAI, set switch 4 as shown in Figure 5-3.

**Figure 5-3. RAI connection**



# Background Music/Music-On-Hold

## Guidelines

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

## Installation

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

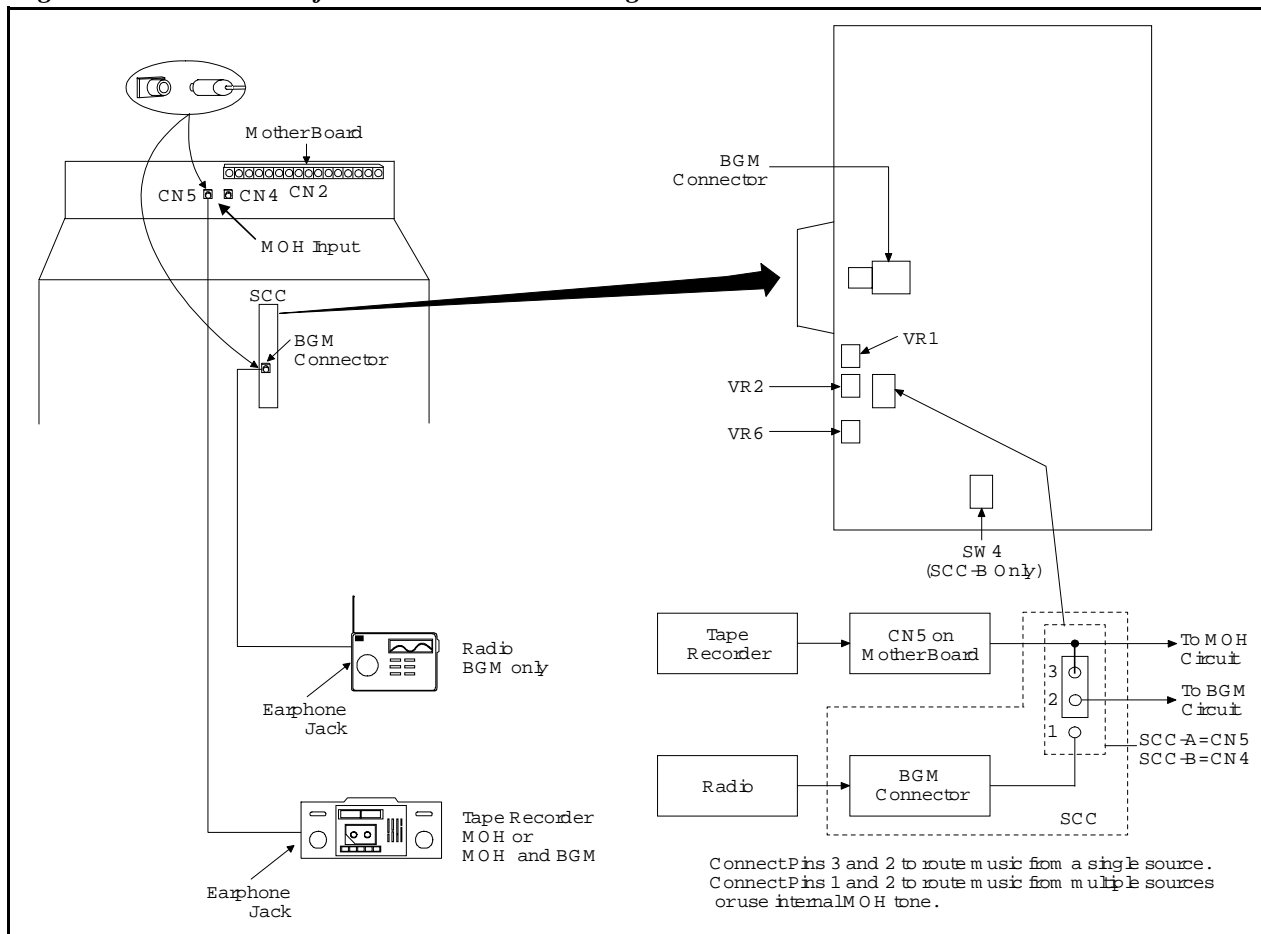
| To route the music from ... | Do this ...       |
|-----------------------------|-------------------|
| A single source             | Short pin 3 to 2. |
| Separate sources            | Short pin 1 to 2. |

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

Table 5-3. SCC variable resistors

| Variable Resistor | Purpose                         |
|-------------------|---------------------------------|
| <b>SCC-A</b>      |                                 |
| VR1               | Adjusts CO ringing tone volume. |
| VR5               | Adjust MOH and BGM volume.      |
| <b>SCC-B</b>      |                                 |
| VR1               | Adjusts MOH volume.             |
| VR2               | Adjust BGM volume.              |
| VR6               | Adjusts CO ringing tone volume. |

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



# Off-Premises Adaptor (OPX)

## Guidelines

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

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

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

| <b>Wiring gauge</b> | <b>Max. distance (in feet) between the OPX Adaptor and the OPX station</b> |
|---------------------|--|
| AWG 22              | 27877  |
| AWG 24              | 17532  |
| AWG 26              | 11025  |

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



## Installation

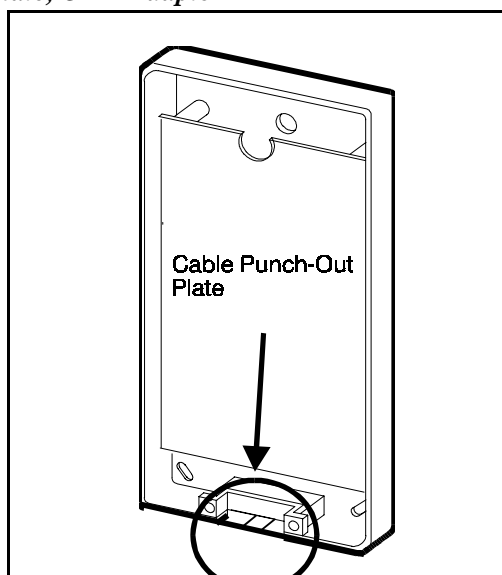
The following procedures describe direct OPX connection and OPX connection through a CO. Order an OL13C circuit for an OPX through a CO. Refer to Figure 5-6 on page 5-13 when installing the OPX.

### ***Installing an OPX Station Without Going Through a Central Office***

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

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

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



3. Mount the OPX Adaptor to the wall.

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

***Table 5-5. Maximum distances for OPX Adaptor installation***

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

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

### ***Installing an OPX Station Through a Central Office***

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

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

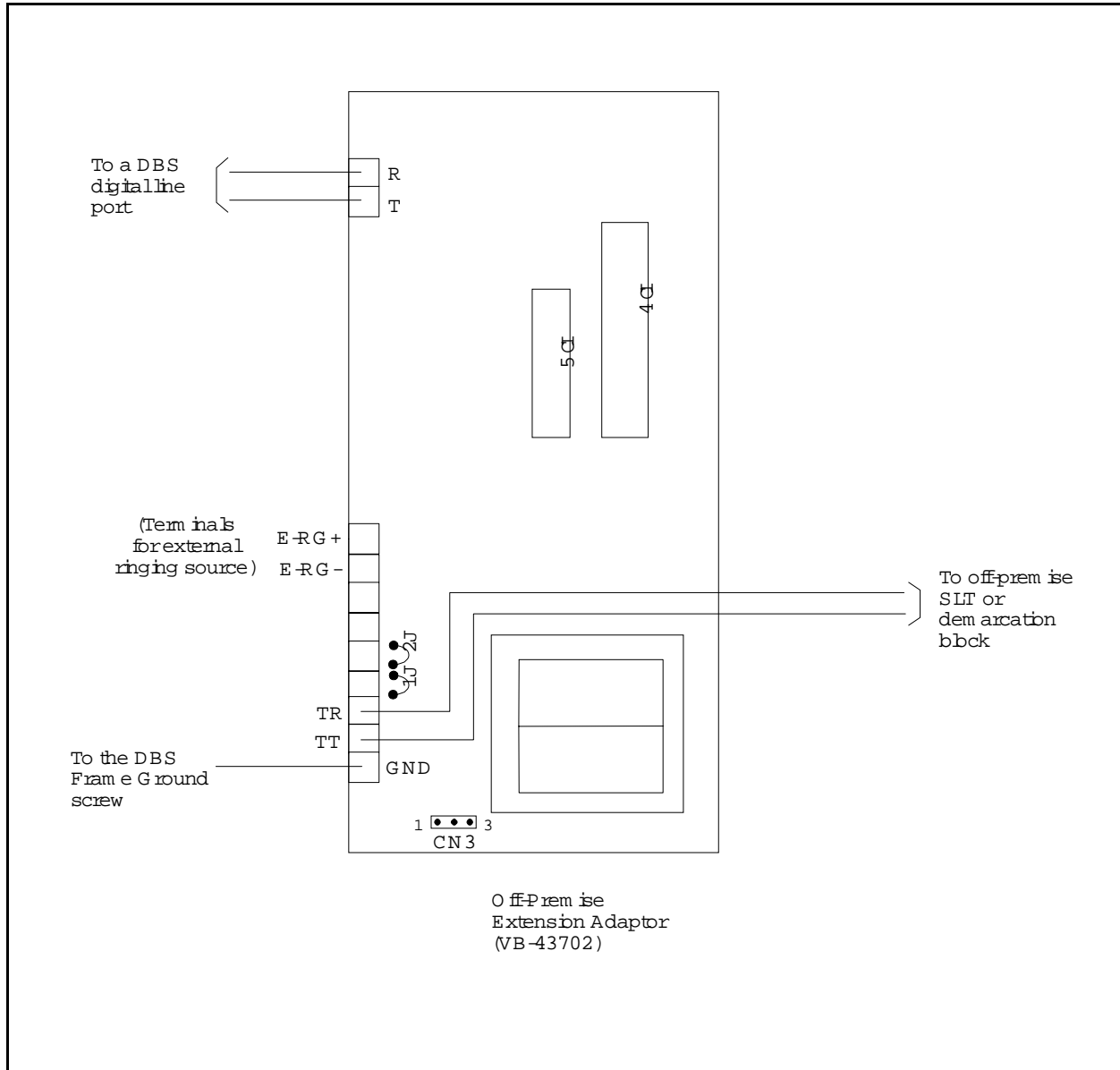
**Note:** If the central office requests a ground on the tip side of the OPX, strap Pins 1 to 2 on CN3.

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

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

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

**Figure 5-6. OPX installation**



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# Paging

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

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

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

## Guidelines

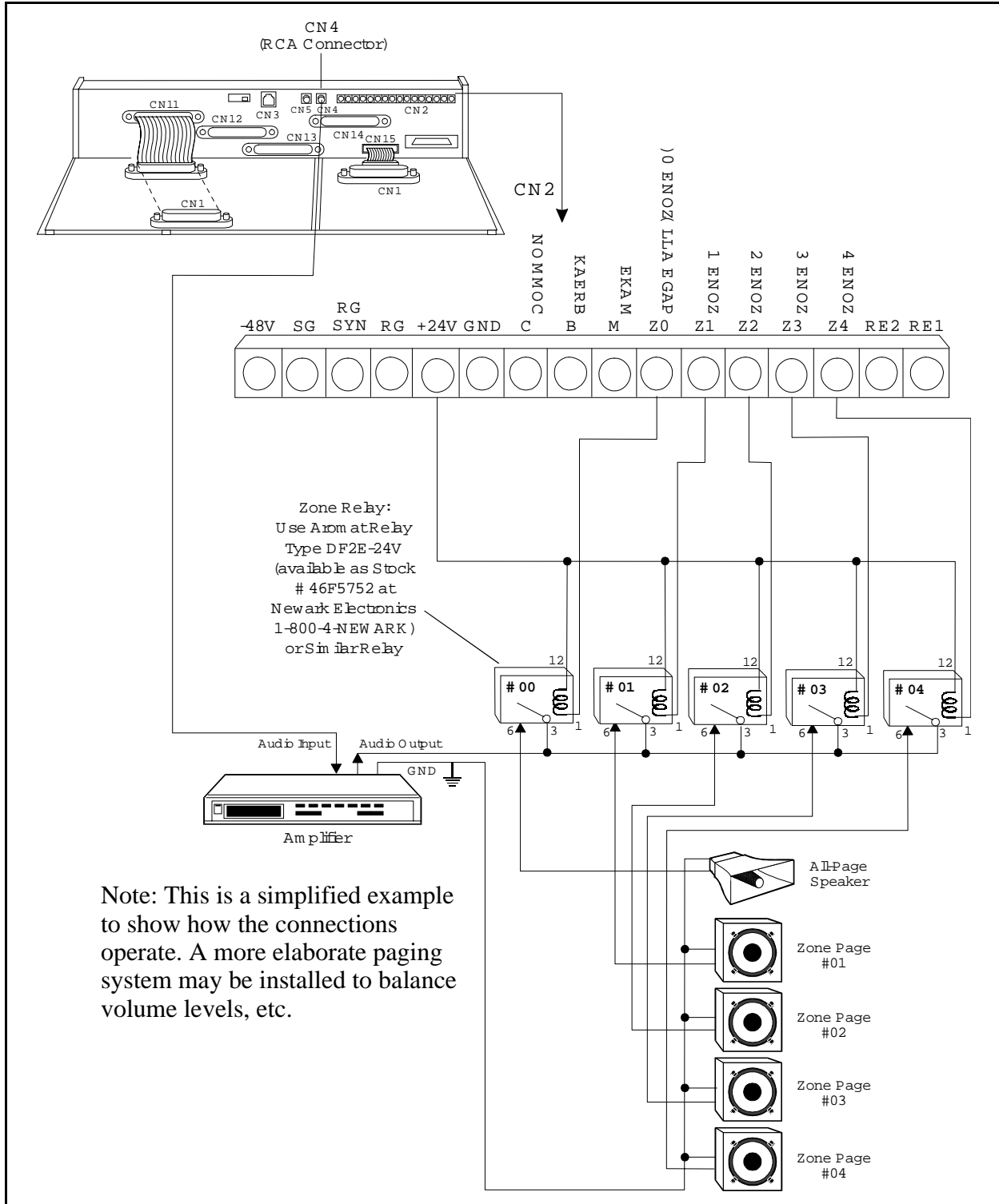
- The paging amplifier, zone relays, and speakers are not provided with the DBS. They must be purchased separately.
- The maximum current for each zone paging terminal on the Connector Panel (Z0-Z4) is 50 mA; the resistance of the relay used for each zone paging terminal must be 2600 to 2800 Ohms.
-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

## External Page Zone Installation

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

3. Connect the zone relays to the amplifier.
4. Connect the zone relays to the +24V and zone paging terminals (Z0-Z4) on the Connector Panel.

**Figure 5-7. External zone paging installation**

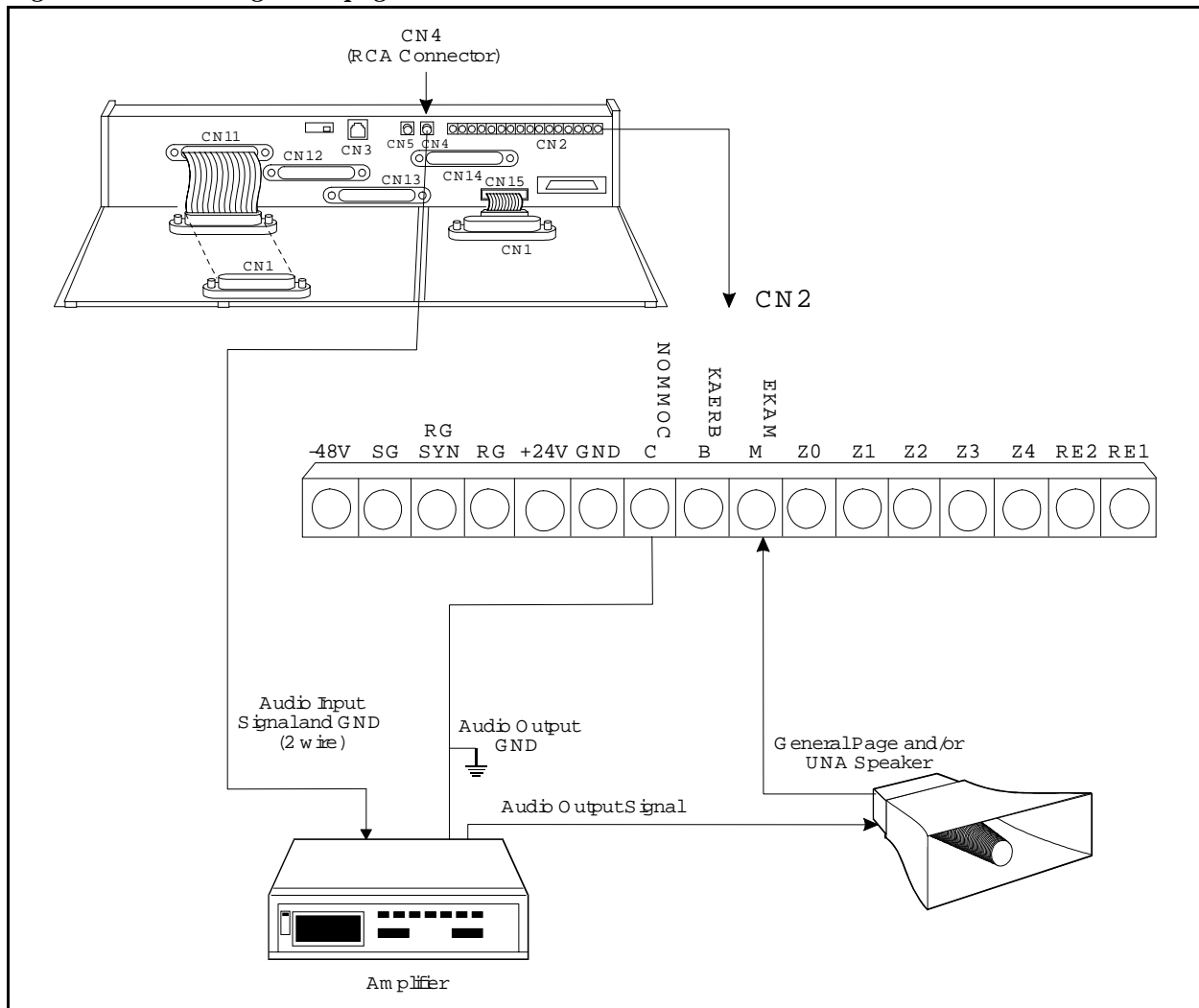


## External General Page/UNA Installation

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

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

**Figure 5-8. External general page/UNA installation**



### Notes:

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

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

---

## External Ringer (UNA Device)

### Guidelines

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

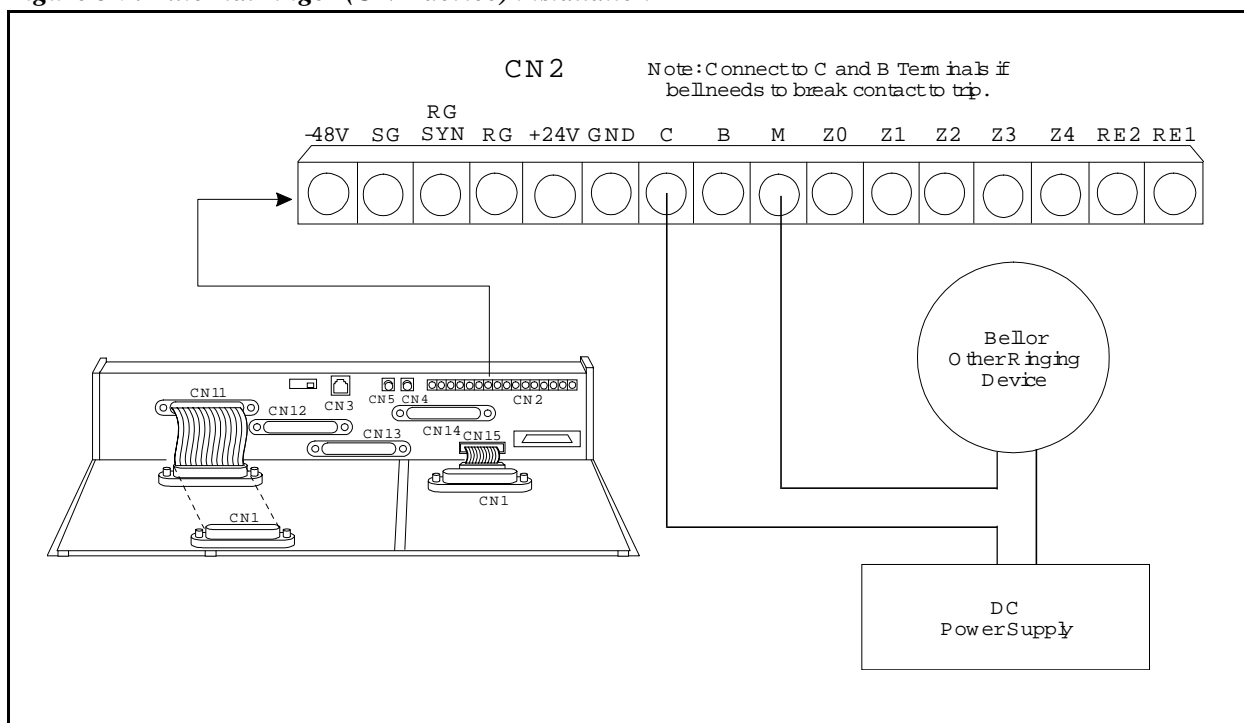
## Installation

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

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

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

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



### Notes:

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



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# Power Failure Unit

## Guidelines

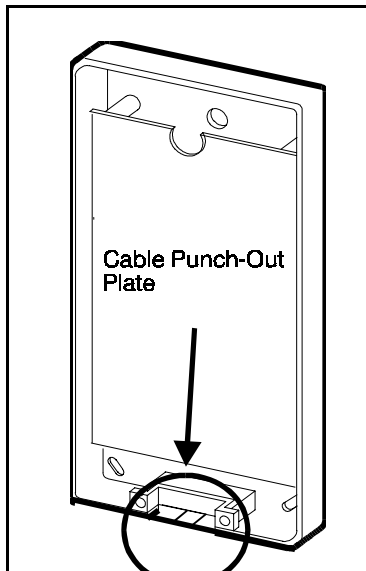
- Up to four SLTs can be connected to the Power Failure Unit (VA-43703). If a power failure occurs, the SLTs will automatically receive dial tone directly from the central office. DBS features and restrictions do not apply when the SLTs are receiving dial tone from the CO.
- If a call is in progress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

## Installation

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

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

**Figure 5-10. Cable punch-out plate, Power Failure Unit**

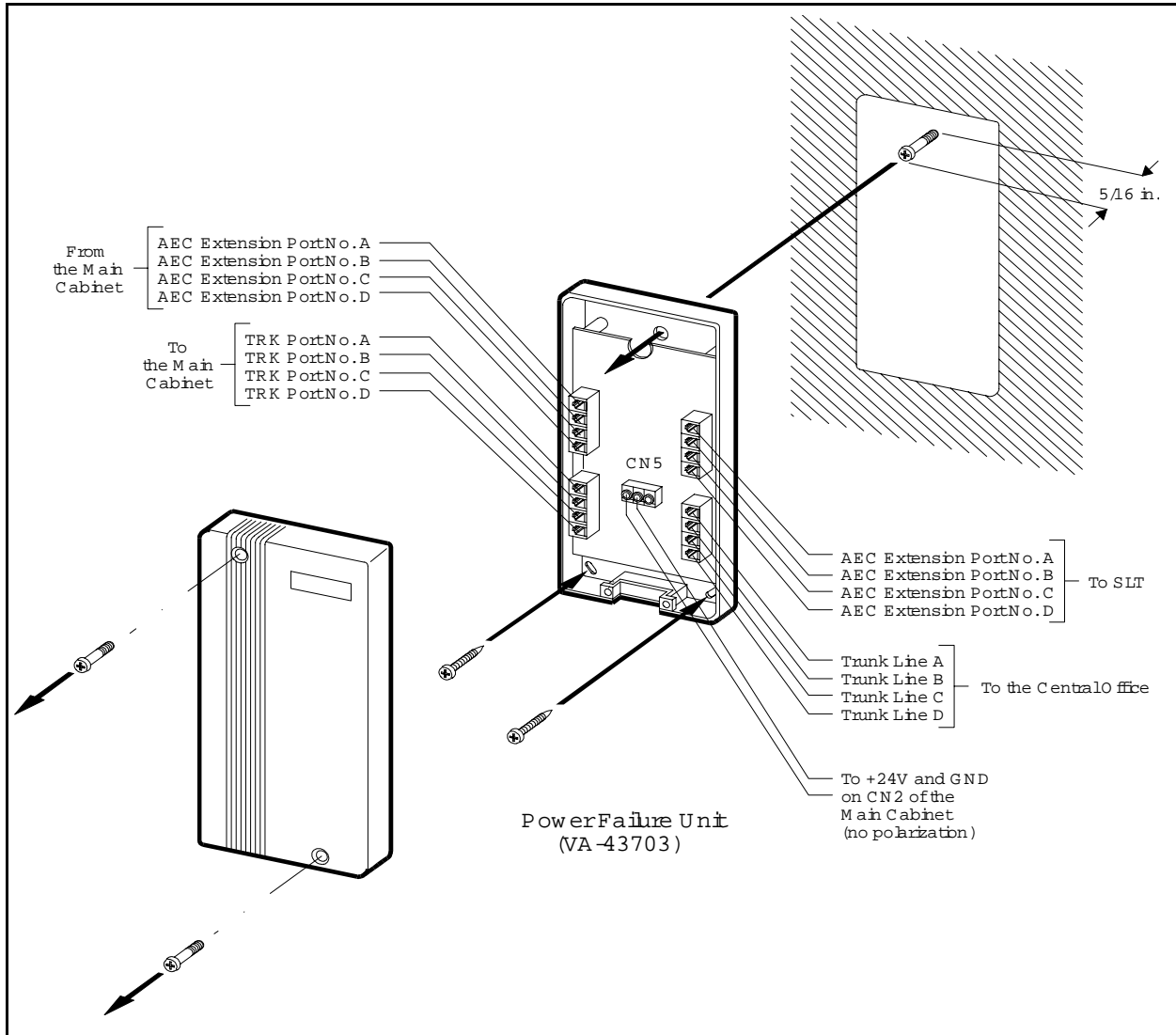


3. Mount the PFU on the wall using the three screws provided with the unit. (See Figure 5-11.)
4. Connect the trunks from the central office to the PFU.
5. Connect the SLTs to the AEC extension ports on the PFU.
6. Connect the trunks from the DBS to the PFU.
7. Connect the AEC ports from the DBS to the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

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

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

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



# Voice Announce Unit (VAU)

## Guidelines

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

## Installation

1. Remove the cover from the Voice Announce Unit.
2. Set SW1 and SW2 according to the following tables. (Default settings are italicized.)

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

*Table 5-6. Switch settings for SW1, VAU*

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

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

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

**Table 5-8. Switch settings for DTMF detection timing, VAU**

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

**Table 5-9. Switch settings for wait timing between dialed digits, VAU**

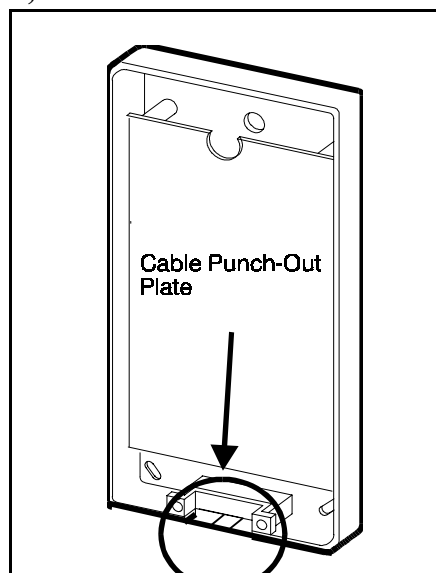
| <b>Switch Block 2 (SW2)<br/>Wait Time Between Dialed Digits (Switches 5-6)</b> |                          |     |            |    |
|--|--------------------------|-----|------------|----|
| <b>Switch</b>  | <b>Time (in seconds)</b> |     |            |    |
|  | 2                        | 6   | <b>10</b>  | 14 |
| 5  | OFF                      | OFF | <b>ON</b>  | ON |
| 6  | OFF                      | ON  | <b>OFF</b> | ON |

*Table 5-10. Switch settings for abbreviated dialing digit length, VAU*

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

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

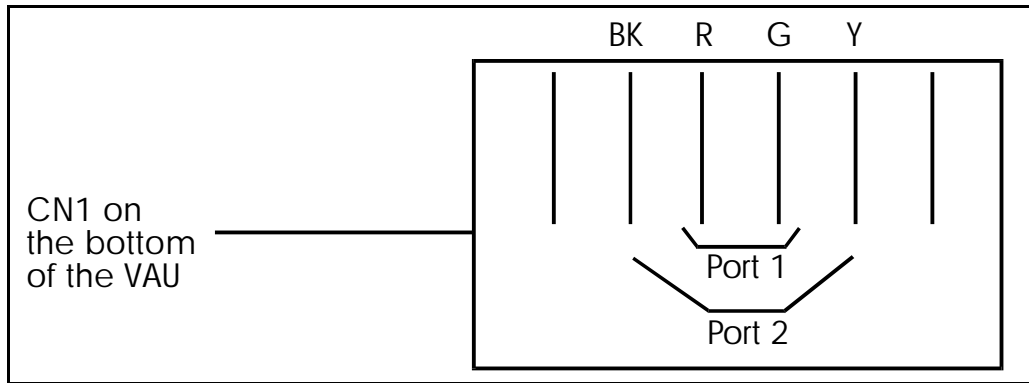
To remove the plate, cut the grooves on either side with diagonal shears. Then bend the plate back and forth with needle-nose pliers to remove it.

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

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

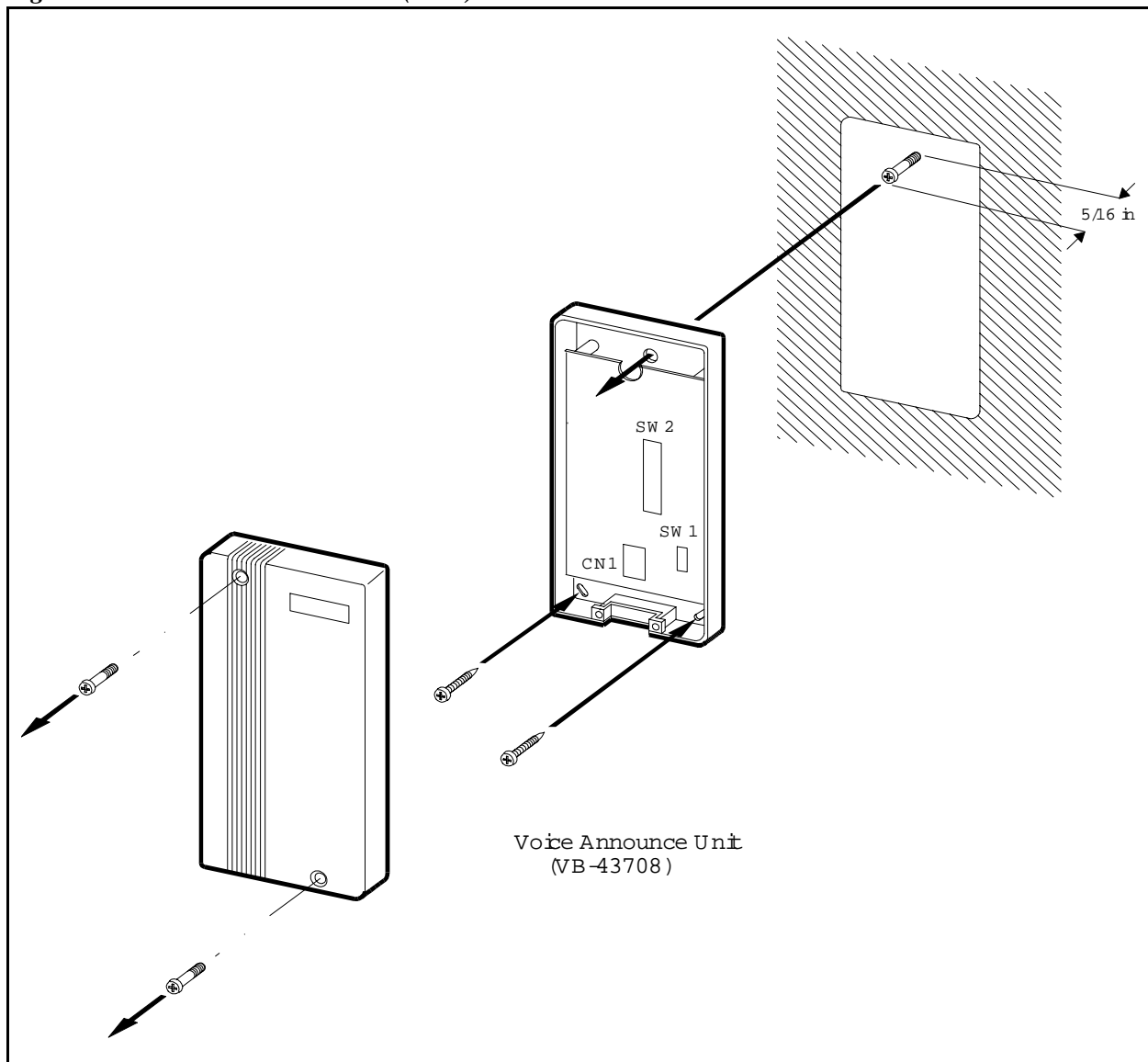
**Note:** The two inside pins on CN1 are port 1. The two pins on either side are port 2, as shown in Figure 5-13.

**Figure 5-13. Extension cord connection to the VAU**



6. Install the cover on the VAU.

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



## Recording and Playing Messages

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

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

To record and play messages, complete the following steps.

1. Do one of the following:

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

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

| <i>If...</i>                          | <i>Then...</i>   |
|---------------------------------------|--|
| You want to record the first message  | Dial * <b>98 1</b><br>Wait for a beep. After the beep, record the message. |
| You want to record the second message | Dial * <b>98 2</b><br>Wait for a beep. After the beep, record the message. |
| You want to play the first message    | Dial * <b>97 1</b><br>The VAU plays the message.                           |
| You want to play the second message   | Dial * <b>97 2</b><br>The VAU plays the message.                           |

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

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

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



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# Door Box Adaptor (Trunk Port)

## Guidelines

There are two types of door phone adaptors available for the DBS. The first type (VB-43701) utilizes a trunk connection to connect to the door box and is described below. The second type (VB-43711) utilizes a digital port extension to connect to the door box and door opener. See “Door Box Adaptor (Extension Port)” on page 5-31 for more information.

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

### *Door Sensors*

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

### *Door Boxes with Door Openers*

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

## Requirements

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

| <b>If you use . . .</b>           | <b>The adaptor uses</b> |
|-----------------------------------|-------------------------|
| 1 sensor and 1 Door Box/opener    | 2 trunks                |
| 1 sensor and 2 Door Boxes/openers | 2 trunks                |
| 1 sensor                          | 1 trunk                 |
| 1 Door Box/opener                 | 1 trunk                 |

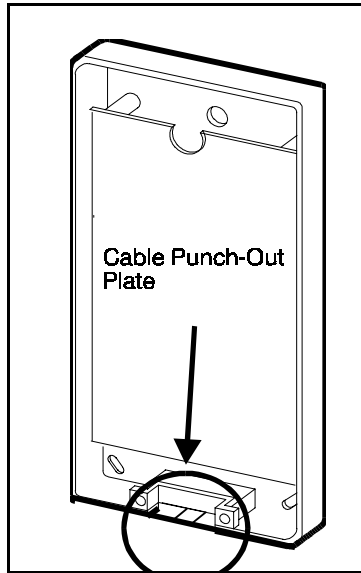
- The following tools are required to install the Door Box Adaptor:
  - Phillips screwdriver
  - Needle-nose pliers
  - Diagonal shears.

## Installation

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

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

**Figure 5-15. Cable punch-out plate, Door Box Adaptor**

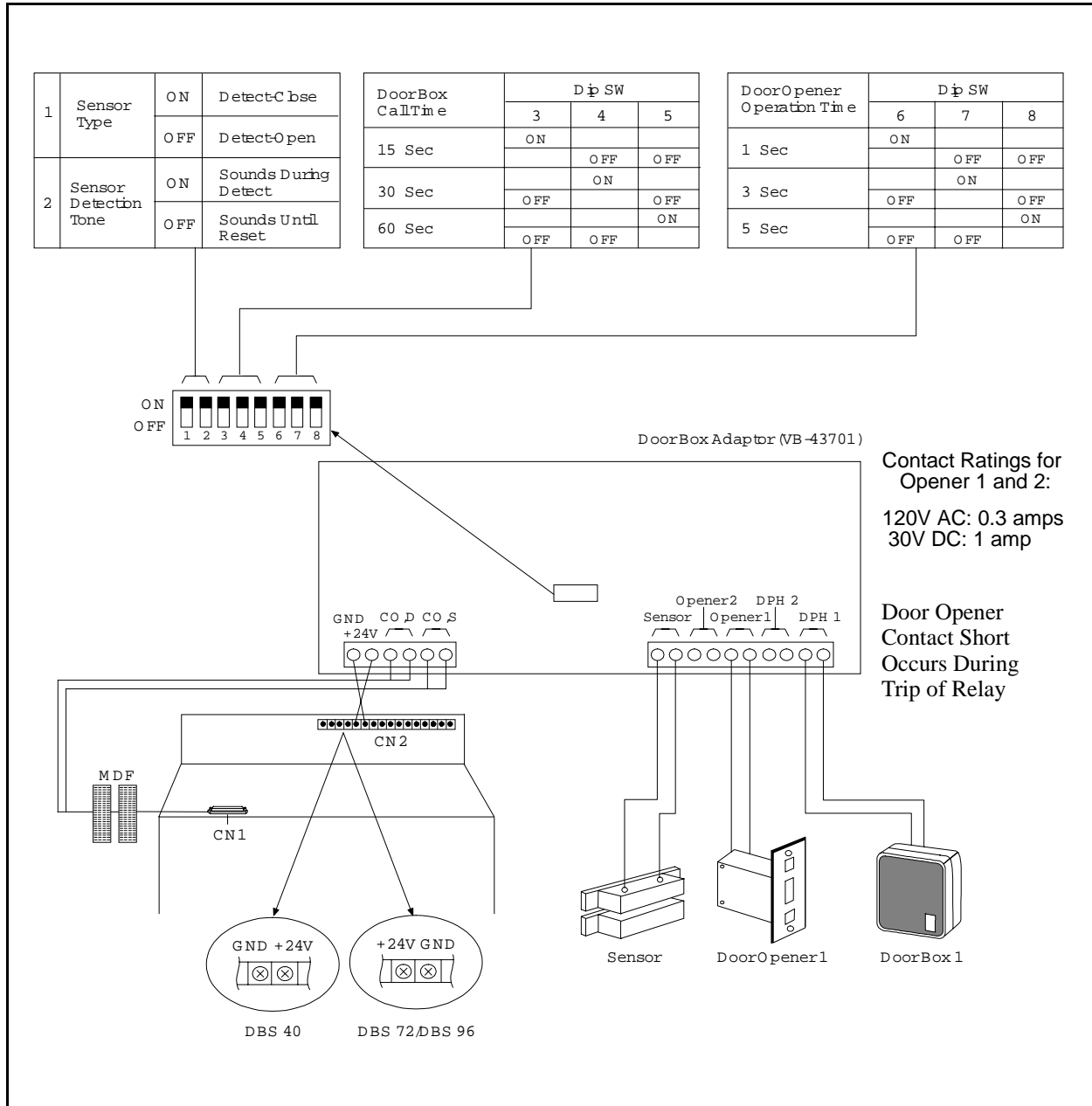


4. Mount the Door Box Adaptor on the wall using the three screws provided with the unit.
5. Connect the trunk line(s) to the Door Box Adaptor, as shown in Figure 5-16.

The “CO.D” connector is used for the Door Box and opener. The “CO.S” connector is used for the sensor.

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

Figure 5-16. Installation of the door box, door opener, and door sensor



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# Door Box Adaptor (Extension Port)

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

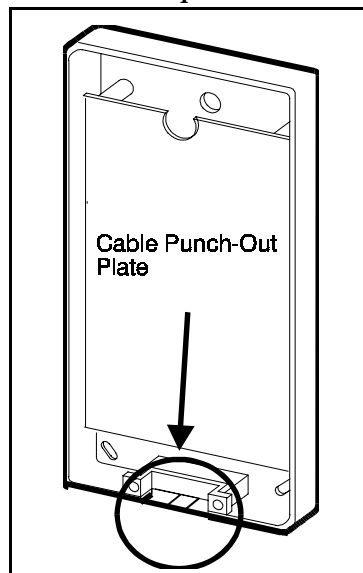
## Guidelines

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

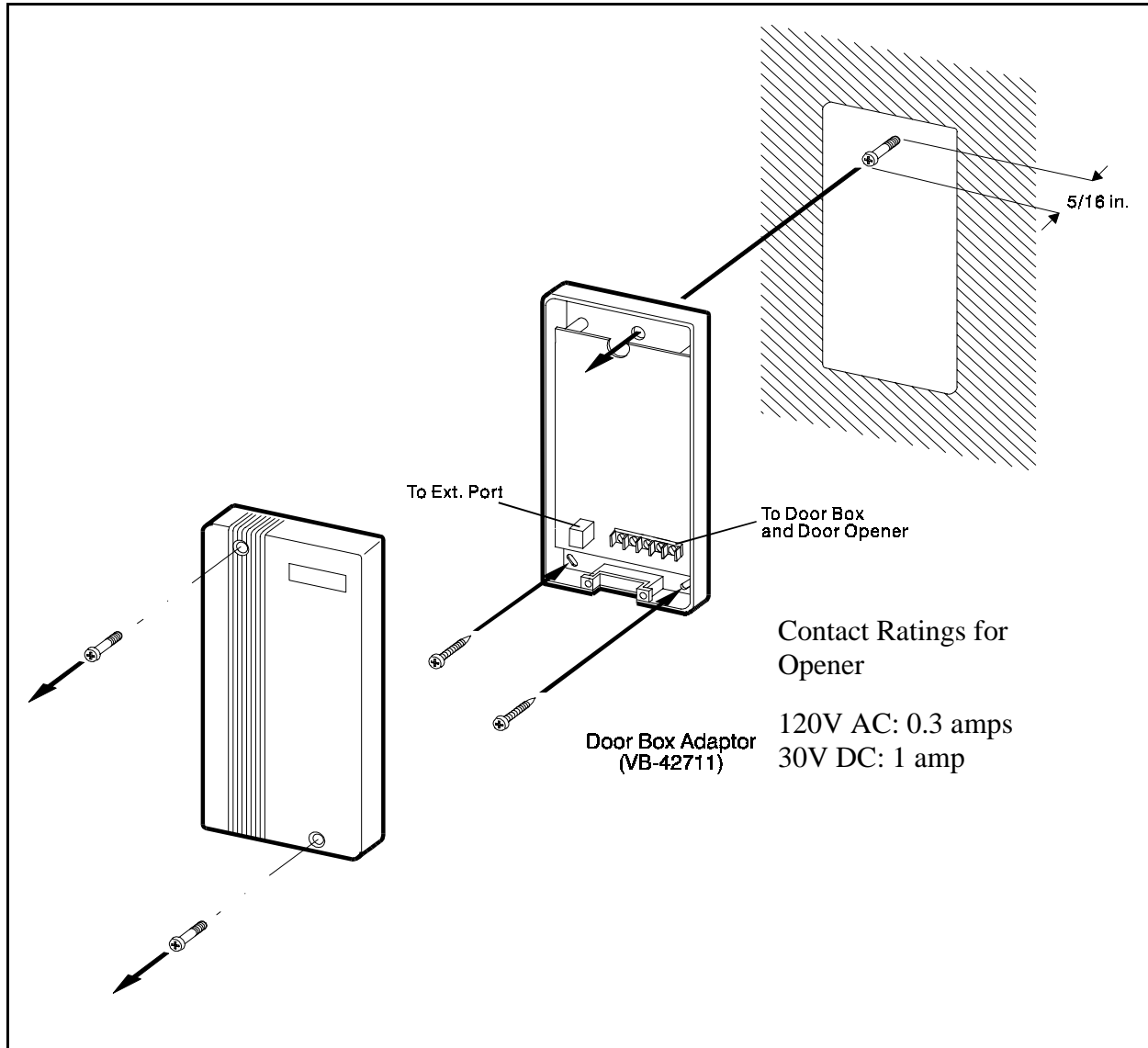
## Installation

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

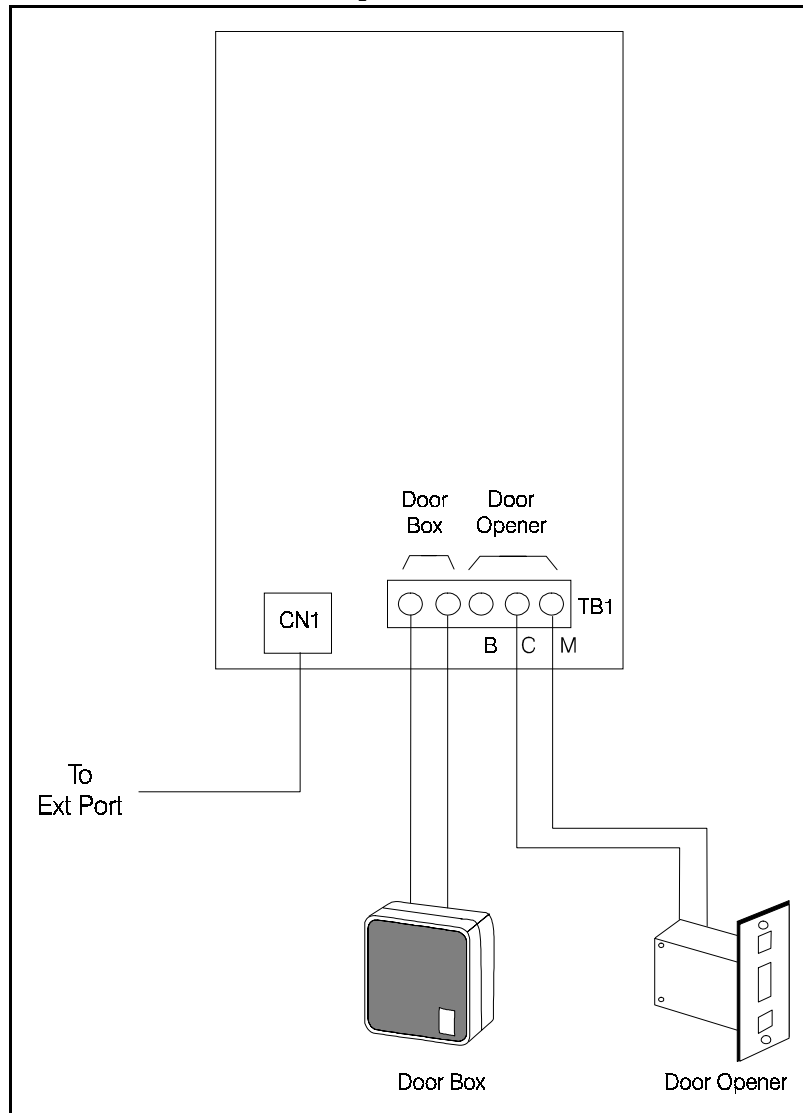
*Figure 5-17. Cable punch-out plate, Door Box Adaptor*



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

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

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

**Figure 5-19. Connections to the Door Box Adaptor**

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

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# Single Line Telephone Adaptor

## Guidelines

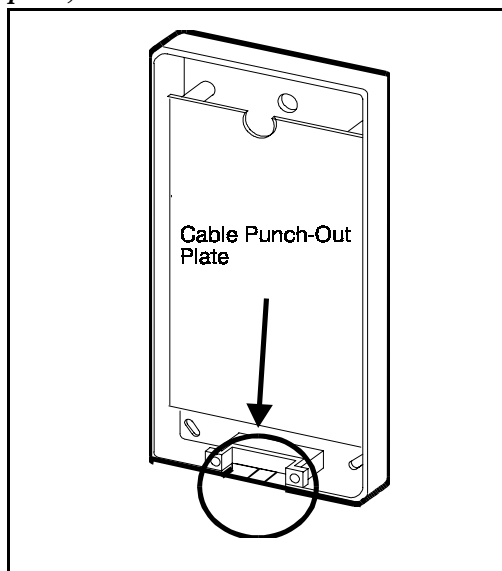
- The Single Line Telephone Adaptor (SLTA, VB-43709) provides an alternative way of connecting analog DTMF telephones (2500 sets). One SLTA supports up to 4 Single Line Telephones.
- Each SLT extension requires a digital extension port connection to the SLTA.

## Installation

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

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

*Figure 5-20. Cable punch-out plate, SLTA*



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

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

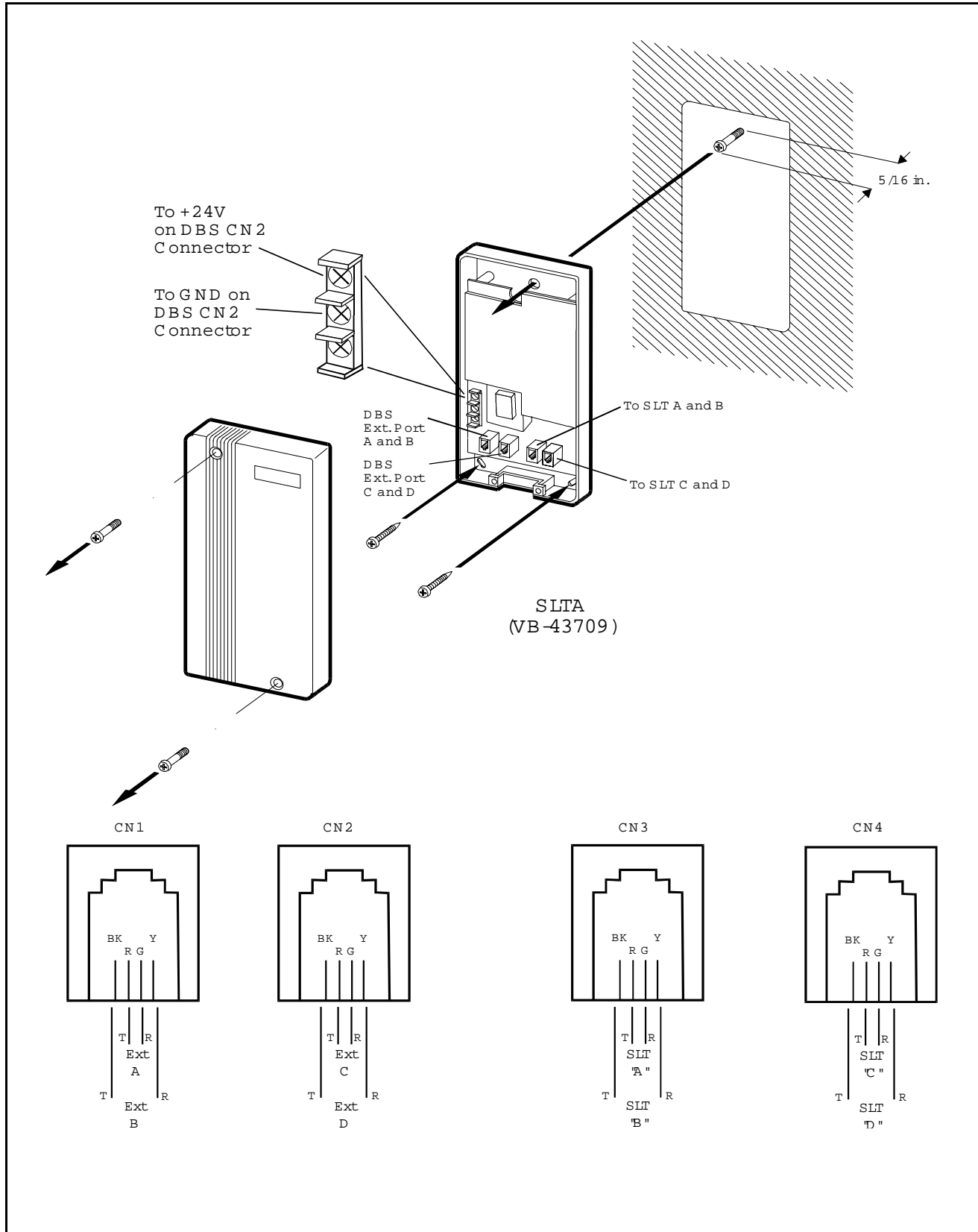


**Table 5-11. Maximum distances for SLTA installation**

| <b>Wiring gauge</b> | <b>Max. distance (in feet) between the DBS and SLTA</b> | <b>Max. distance (in feet) between the SLTA and the SLT</b> |
|---------------------|---|---|
| AWG 22              | 300' or 10 W  | 3000' or 100 W  |
| AWG 24              | 190' or 10 W  | 1900' or 100 W  |
| AWG 26              | 120' or 10 W  | 1200' or 100 W  |

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

Figure 5-21. SLTA installation



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# Chapter 6. Double-Cabinet Systems

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

See Chapter 4 for instructions on installing T1s in two-cabinet systems.

This chapter covers the following topics:

| <b>Topic</b> | <b>Page</b> |
|--------------|-------------|
| Guidelines   | 6-3         |
| Installation | 6-10        |



# Guidelines

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

*Table 6-1. Trunk and extension port maximums for double-cabinet systems*

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

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

**Figure 6-1. Slot usage for two-cabinet systems, DBS 40 + DBS 40**

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

**Notes:**

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

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

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

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

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

**Notes:**

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

**Figure 6-3. Slot usage for two-cabinet systems, DBS 72 + DBS 72**

| <b>DBS 72 (Slave)</b> |           |           |           |           |           |           |           |                             |     |      |       |       |
|-----------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------------------------|-----|------|-------|-------|
| TRK 1                 | TRK 2     | EC1       | EC2       | EC3       | EC4       | EC5       | EC6       | EC/TRK                      | SCC | CPC  | AUX 1 | AUX 2 |
| TRK 17-24             | TRK 33-40 | EXT 49-56 | EXT 57-64 | EXT 65-72 | EXT 73-80 | EXT 81-88 | EXT 89-96 | TRK 41-48* or<br>EXT 97-104 | N/A | MFR# | MFR#  | CBL-S |

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

**Notes:**

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

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

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



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

| <b>DBS 40 (Slave)</b> |           |           |           |                             |     |      |          |          |  |
|-----------------------|-----------|-----------|-----------|-----------------------------|-----|------|----------|----------|--|
| TRK<br>1              | EC1       | EC2       | EC3       | EC/<br>TRK                  | SCC | CPC  | AUX<br>1 | AUX<br>2 |  |
| TRK 33-40             | EXT 73-80 | EXT 81-88 | EXT 89-96 | TRK 41-48* or<br>EXT 97-104 | N/A | MFR# | MFR#     | CBL-S    |  |

| <b>DBS 96 (Master)</b> |          |           |         |          |           |           |           |           |           |           |                            |       |       |             |          |
|------------------------|----------|-----------|---------|----------|-----------|-----------|-----------|-----------|-----------|-----------|----------------------------|-------|-------|-------------|----------|
| TRK<br>1               | TRK<br>2 | TRK<br>3  | EC1     | EC2      | EC3       | EC4       | EC5       | EC6       | EC7       | EC8       | EC/<br>TRK                 | SCC   | CPC   | AUX<br>1    | AUX<br>2 |
| TRK 1-8                | TRK 9-16 | TRK 17-24 | EXT 1-8 | EXT 9-16 | EXT 17-24 | EXT 25-32 | EXT 33-40 | EXT 41-48 | EXT 49-56 | EXT 57-64 | TRK 25-32* or<br>EXT 65-72 | SCC-B | CPC-B | MFR# or API | CBL-M    |

**Notes:**

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

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

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

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

**Notes:**

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

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

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

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

**Notes:**

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

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

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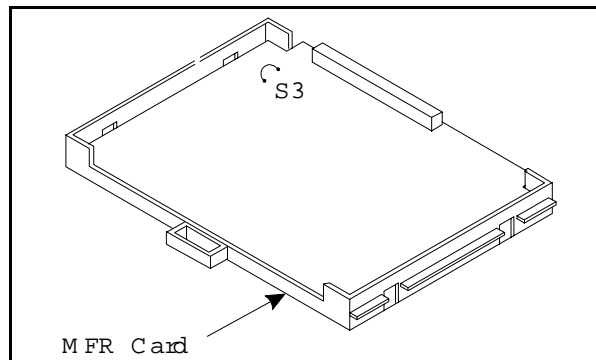
# Installation

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

**Note:** The port numbers for each slot are fixed.

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

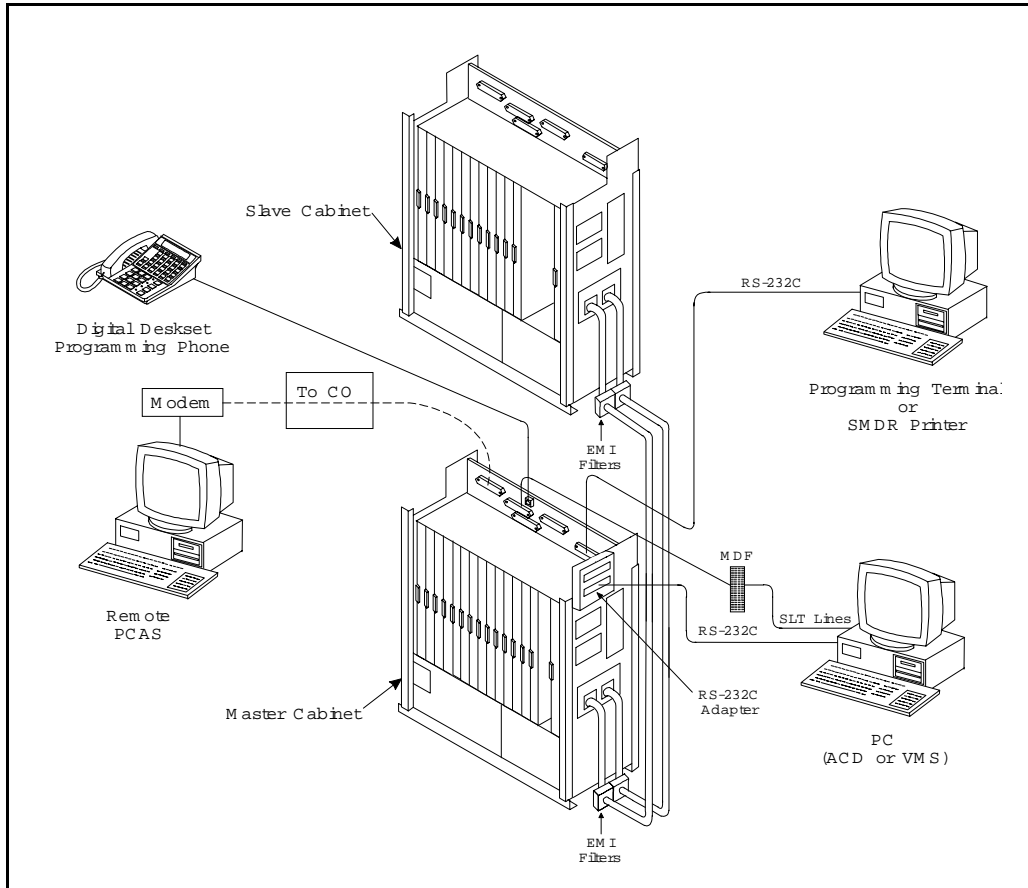
*Figure 6-7. Strap 3, MFR card*



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

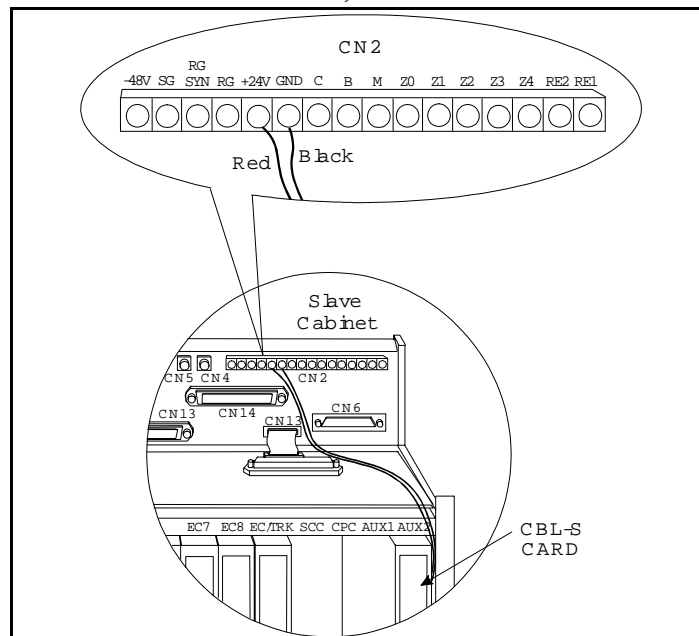
**Note:** The EMI filter must be installed as close to the cabinet as possible, as shown in Figure 6-8 on page 6-11.

**Figure 6-8. Double-cabinet installation**



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

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



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

*Table 6-2. CBL-M switch settings*

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

---

# Chapter 7. Specifications

This chapter contains frequently referenced DBS specifications.

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

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

This chapter covers the following topics::

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





# Electrical Characteristics

*Table 7-1. Input power*

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

*Table 7-2. Power consumption and heat generation*

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

*Table 7-3. Battery backup capacity*

| System | Battery Pack | Capacity (with maximum traffic) |
|--------|--------------|---------------------------------|
| DBS 40 | VB-43130     | 40 minutes                      |
| DBS 72 | VB-43130     | 40 minutes                      |
| DBS 96 | VB-43130     | 30 minutes                      |

# Environmental Requirements

*Table 7-4. Temperature and humidity requirements*

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

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

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

*Table 7-6. Dimensions for two-cabinet systems*

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

# Resource Maximums

*Table 7-7. Trunk and line capacities*

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

*Table 7-8. Feature-related capacities*

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

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

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

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

| Part No.      | Description   | Quantity |        |        |
|---------------|---|----------|--------|--------|
|               |   | DBS 40   | DBS 72 | DBS 96 |
| <b>Phones</b> |   |          |        |        |
| VB-43210      | 16-key standard telephone with handsfree answerback | 32       | 56     | 72     |
| VB-43220      | 22-key standard telephone with handsfree answerback |          |        |        |
| VB-43221      | 22-key speakerphone                                 |          |        |        |
| VB-43223      | 22-key speakerphone with LCD display                |          |        |        |
| VB-43225      | 22-key speakerphone with large LCD display          |          |        |        |
| VB-43230      | 34-key telephone with handsfree answerback          |          |        |        |
| VB-43231      | 34-key speakerphone                                 |          |        |        |
| VB-43233      | 34-key speakerphone with LCD display                |          |        |        |

| Part No.                     | Description                                  | Quantity   |        |        |
|------------------------------|--|--|--------|--------|
|                              |  | DBS 40   | DBS 72 | DBS 96 |
| <b>Phone Options</b>         |  |  |        |        |
| VB-43310                     | 24-key expansion module (EM24)               | 16   | 28     | 36     |
| VB-43320                     | 72-key DSS/BLF module (DSS/72)               | CPC-A and CPC-AII: 4<br>CPC-B: 8 (up to 4 can be assigned as DSS/72s; up to 4 can be assigned as Attendant Consoles) |        |        |
| VB-43884                     | 7 ft. handset cord                           | 32   | 56     | 72     |
| VB-43885                     | 15 ft. handset cord                          |  |        |        |
| VB-43886                     | 25 ft. handset cord                          |  |        |        |
| VB-43890                     | K-type handset                               |  |        |        |
| <b>Printed Circuit Cards</b> |  |  |        |        |
| VB-43110                     | Cable kit for 2-system connection            | N/A  | N/A    | N/A    |
| VB-43410                     | Call processor card (CPC-A)                  | 1  | 1      | 1      |
| VB-43411                     | Call processor card (CPC-B)                  |  |        |        |
| VB-43412                     | Call processor card (CPC-AII)                |  |        |        |
| VB-43420                     | Service circuit card (SCC-A)                 | 1  | 1      | 1      |
| VB-43421                     | Service circuit card (SCC-B)                 |  |        |        |
| VB-43431                     | DTMF signal receiver for 8 SLT lines (MFR/8) | 1  | 1      | 1      |
| VB-43510                     | 4-port loop-start trunk card (L-TRK/4)       | 2  | 3      | 4      |
| VB-43511                     | 8-port loop-start trunk card (L-TRK/8)       |  |        |        |
| VB-43541                     | Direct-inward-dialing trunk card (DID)       |  |        |        |
| VB-43531                     | 8-port ground-start trunk card (G-TRK/8)     |  |        |        |
| VB-43561                     | T1 Interface                                 | 1  | 1      | 1      |
| VB-43562                     | T1 MDF card                                  | 1  | 1      | 1      |
| VB-43563                     | T1 Sync Unit                                 | 1  | 1      | 1      |
| VB-43611                     | 8-port digital extension card (DEC)          | 4  | 7      | 9      |
| VB-43621                     | 8-port analog extension card (AEC)           | 3  | 4      | 4      |

| Part No.  | Description                             | Quantity                  |                           |                           |
|---|---|---------------------------|---------------------------|---------------------------|
|   |   | DBS 40                    | DBS 72                    | DBS 96                    |
| <b>Expansion Connectors</b>   |   |                           |                           |                           |
| VB-43120  | Trunk expansion connector               | 1                         | 1                         | 1                         |
| VB-43121  | Extension expansion connector           |                           |                           |                           |
| <b>Doorbox Equipment (Trunk)</b>  |   |                           |                           |                           |
| VB-43701  | Door box adaptor                        | 8*                        | 12*                       | 16*                       |
| VB-43705  | Door box                                | 16*                       | 24*                       | 32*                       |
| <b>Doorbox Equipment (Extension)</b>  |   |                           |                           |                           |
| VB-43711  | Extension-Based Door box adaptor        | 4                         | 4                         | 4                         |
| VB-43705  | Door box                                | 4                         | 4                         | 4                         |
| <b>Optional Equipment</b>   |   |                           |                           |                           |
| VB-43706  | Remote Administration Interface (RAI-A) | 1                         | 1                         | 1                         |
| VB-43707  | Remote Administration Interface (RAI-B) |                           |                           |                           |
| VB-43551  | 8-circuit Caller ID daughter board      | 1 per<br>VB-43511A<br>AEC | 1 per<br>VB-43511A<br>AEC | 1 per<br>VB-43511A<br>AEC |
| VB-43130  | Built-in system backup batteries        | 1                         | 1                         | 1                         |
| VB-43709  | Single Line Telephone Adaptor           | 8                         | 14                        | 18                        |
| VB-2089P  | SLT ringer box                          | 1                         | 1                         | 1                         |
| VA-43703  | 4-line power failure unit               | 6                         | 8                         | 8                         |
| VB-43702  | Off-premise extension adaptor           | 8                         | 8                         | 8                         |
| VB-43940  | Application processor interface (API)   | 1                         | 1                         | 1                         |
| VB-43991  | PCAS software                           | 1                         |                           |                           |
| VB-43993  | DBS Manager software                    |                           |                           |                           |
| * <b>Note:</b> These maximums are based on overall trunk capacities and do not allow for trunks used for outside lines. |   |                           |                           |                           |

**Table 7-10. Hardware maximums for double-cabinet systems**

| Part No.             | Description                                 | Quantity   |                    |                    |                    |                    |                    |
|----------------------|---|--|--------------------|--------------------|--------------------|--------------------|--------------------|
|                      |   | DBS 40 +<br>DBS 40   | DBS 72 +<br>DBS 40 | DBS 72 +<br>DBS 72 | DBS 96 +<br>DBS 40 | DBS 96 +<br>DBS 72 | DBS 96 +<br>DBS 96 |
| <b>Phones</b>        |   |  |                    |                    |                    |                    |                    |
| VB-43210             | 16-key keyphone<br>w/ handsfree answerback  | 56   | 72                 | 104                | 104                | 128                | 144                |
| VB-43220             | 22-key keyphone<br>w/ handsfree answerback  |  |                    |                    |                    |                    |                    |
| VB-43221             | 22-key speakerphone                         |  |                    |                    |                    |                    |                    |
| VB-43223             | 22-key speakerphone<br>w/ LCD display       |  |                    |                    |                    |                    |                    |
| VB-43225             | 22-key speakerphone<br>w/ large LCD display |  |                    |                    |                    |                    |                    |
| VB-43230             | 34-key keyphone<br>w/ handsfree answerback  |  |                    |                    |                    |                    |                    |
| VB-43231             | 34-key keyphone                             |  |                    |                    |                    |                    |                    |
| VB-43233             | 34-key keyphone w/ LCD display              |  |                    |                    |                    |                    |                    |
| <b>Phone Options</b> |   |  |                    |                    |                    |                    |                    |
| VB-43310             | 24-key expansion<br>module (EM24)           | 32   | 44                 | 56                 | 52                 | 64                 | 72                 |
| VB-43320             | 72-key DSS/BLF module (DSS/72)              | CPC-A and CPC-AII: 4<br>CPC-B (Version 2.0 to 4.0 only): 8 (up to 4<br>can be assigned as DSS/72s; up to 4 can be<br>assigned as Attendant Consoles) |                    |                    |                    |                    |                    |
| VB-43884             | 7 ft. handset cord                          | 56   | 72                 | 104                | 104                | 128                | 144                |
| VB-43885             | 15 ft. handset cord                         |  |                    |                    |                    |                    |                    |
| VB-43886             | 25 ft. handset cord                         |  |                    |                    |                    |                    |                    |
| VB-43890             | K-type handset                              |  |                    |                    |                    |                    |                    |



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

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

# Cabling Specifications

*Table 7-11. Maximum cabling distances*

| Loop Type and Resistance   | Resistance                         | Cable Gauge (AWG) | Maximum Cabling Length in Feet (Distance from the DBS) |
|--|------------------------------------|-------------------|--|
| Key phone, EM/24   | 40 Ohms                            | 22                | 1239   |
|  |                                    | 24                | 779  |
|  |                                    | 26                | 490  |
| DSS/72   | 20 Ohms                            | 22                | 619  |
|  |                                    | 24                | 388  |
|  |                                    | 26                | 244  |
| SLT  | 100 Ohms                           | 22                | 3097   |
|  |                                    | 24                | 1948   |
|  |                                    | 26                | 1225   |
| OPX (Loop between the DBS and the OPX Adaptor)                   | 10 Ohms                            | 22                | 309  |
|  |                                    | 24                | 194  |
|  |                                    | 26                | 122  |
| OPX (Loop between the OPX Adaptor and a pushbutton SLT)          | 900 Ohms (excluding end impedance) | 22                | 27877  |
|  |                                    | 24                | 17532  |
|  |                                    | 26                | 11025  |
| Doorphone (Loop between the DBS and the Doorphone Adaptor)       | 10 Ohms                            | 22                | 309  |
|  |                                    | 24                | 194  |
|  |                                    | 26                | 122  |
| Doorphone (Loop between the Doorphone Adaptor and the Doorphone) | 40 Ohms                            | 22                | 1239   |
|  |                                    | 24                | 779  |
|  |                                    | 26                | 490  |
| Voice Announce Unit  | 10 Ohms                            | 22                | 309  |
|  |                                    | 24                | 194  |
|  |                                    | 26                | 122  |

# Communication Parameters

*Table 7-12. Voice path from KTELEs to DBS*

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

*Table 7-13. Data communications ports*

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

# Signaling Characteristics

*Table 7-14. Signaling to CO*

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

*Table 7-15. Signaling levels*

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

*Table 7-16. Transmission specifications*

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

# Tone Characteristics

*Table 7-17. Tone Plan*

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

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

*Table 7-18. DTMF frequencies*

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





---

# Appendix A: CPC-EX 1.0 Updates

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

---

## Compatibility

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

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

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

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

---

## 44-Series Phone Support

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

*Table A-1. 44-Series Phones*

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

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

## Directory Mode

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

## Variable Mode

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

## Handset Mute

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

## Off-Hook Monitoring

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

## Analog Adapter

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

## MSG (Message) Key

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

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

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

---

## FF-Key Programming

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

---

## Speed Dial Enhancements

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

---

## Additional Serial Port

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

---

## T1 Networking Capability

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

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

---

## Modification to Toll Restriction Service

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

---

## Maximum Time Priority Route Tables

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

---

## SMDR Modifications

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

---

## ISDN Support

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

---

## Modification to T1 Signaling Types

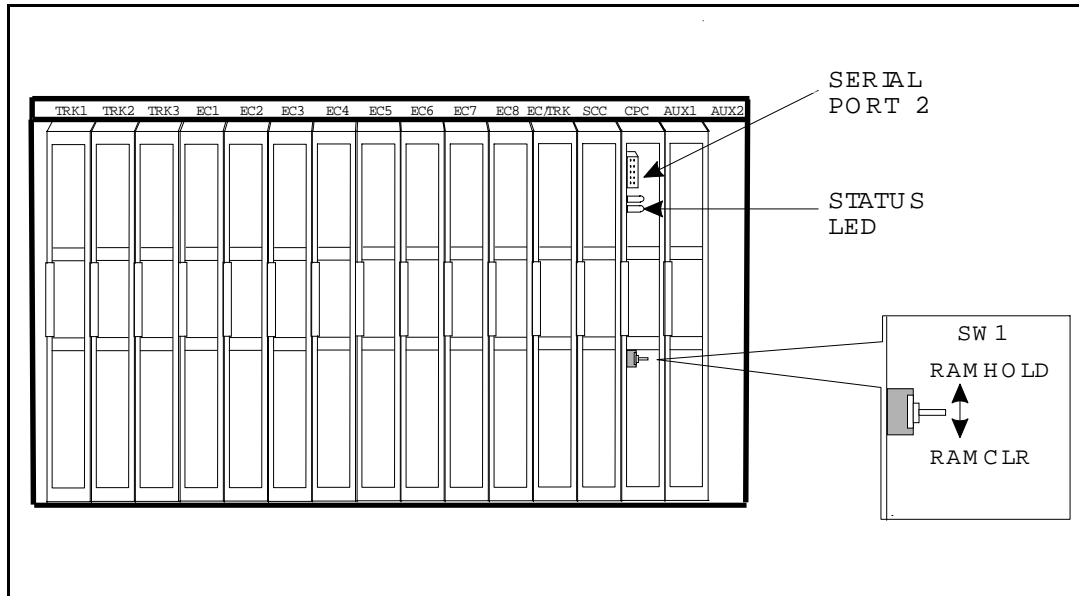
To allow easier programming of E&M trunks, CPC-EX uses “Wink Start” (not “Immediate Start”) as the default for T1 Incoming and Outgoing Signal Types.

---

## Installation Notes

### CPC-EX Installation

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

*Figure A-1 CPC-EX*

## Key Telephone Installation

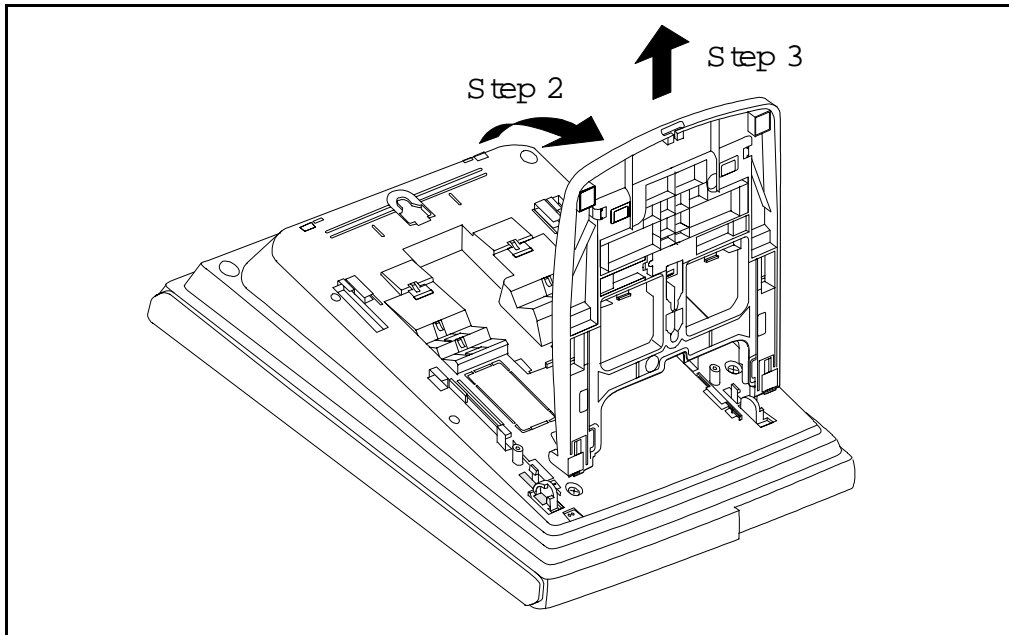
### Desi Strip Cover

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

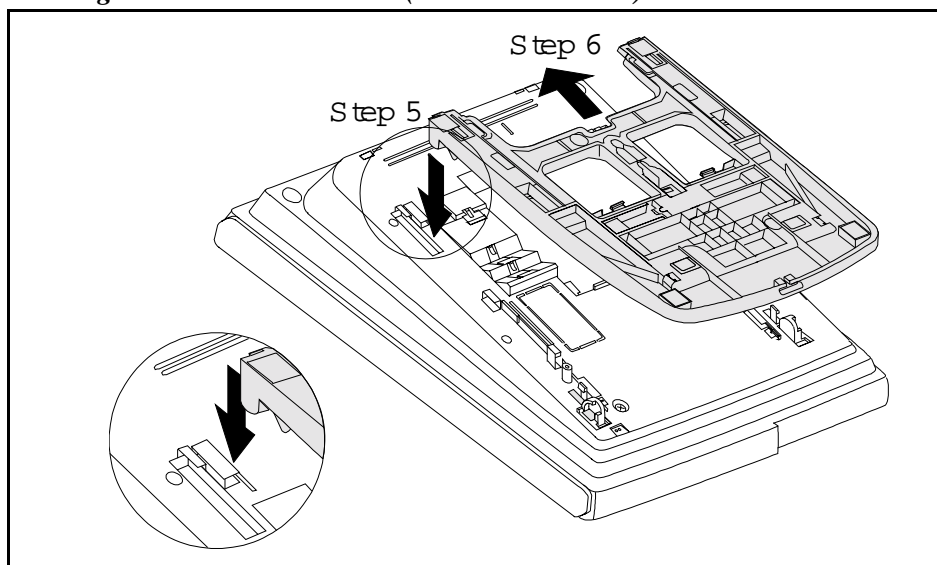
### Key Telephone Wall Mounting Instructions

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

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

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

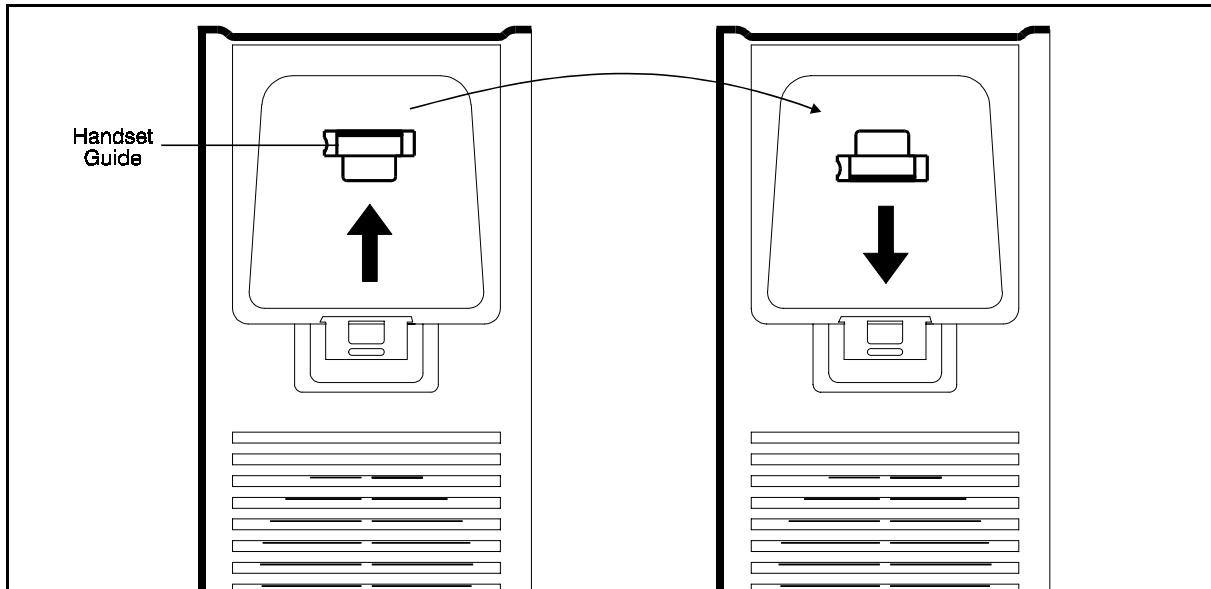
4. Rotate the desk stand 180°. In this position it doubles as a wall mount bracket.
5. Insert the wall mount bracket into the mounting guides as shown in Figure A-3.
6. Slide the wall mount bracket onto the telephone.

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

7. While viewing the front of the telephone, find the handset guide located just below the hookswitch (see Figure A-4).

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

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



---

## 44-Series Enhanced Phone Features

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

Figure A-5.44-Series Small-Display Phone

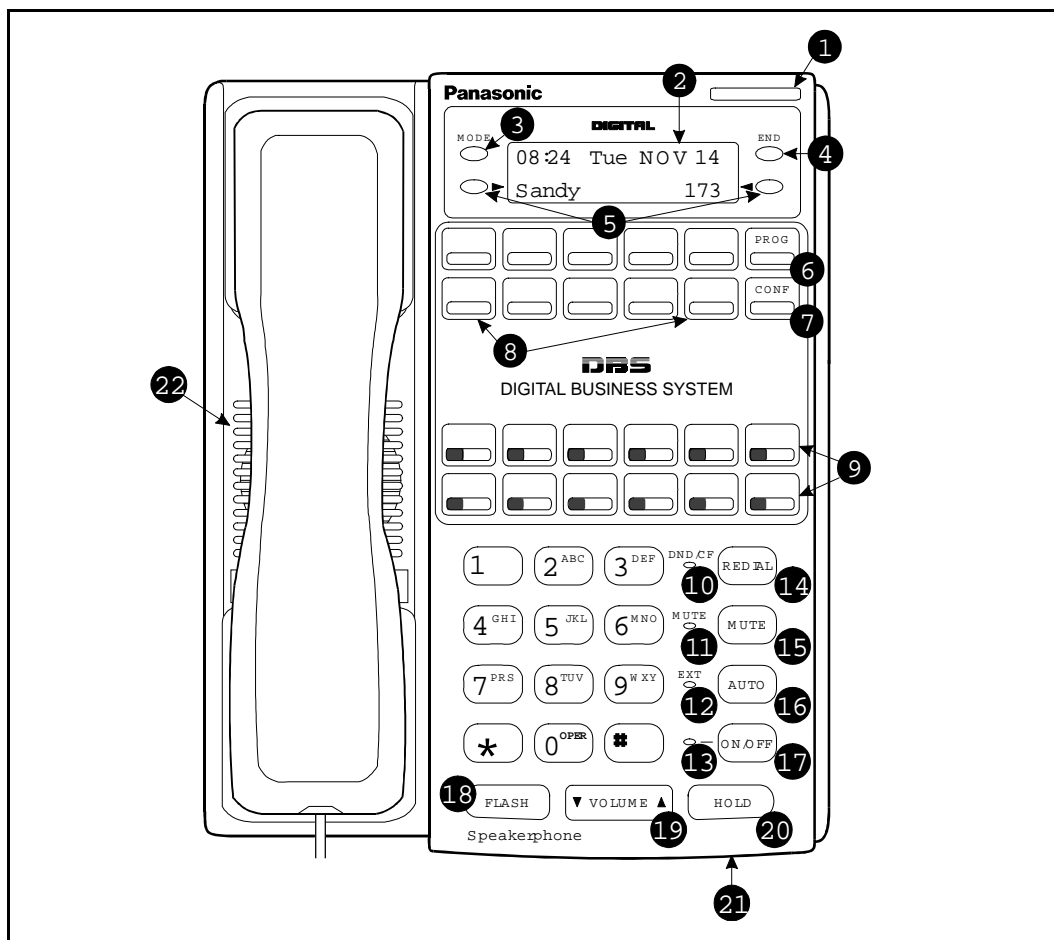


Table A-2. Small-Display Phone Features

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



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

Figure A-6.44-Series Large-Display Phone

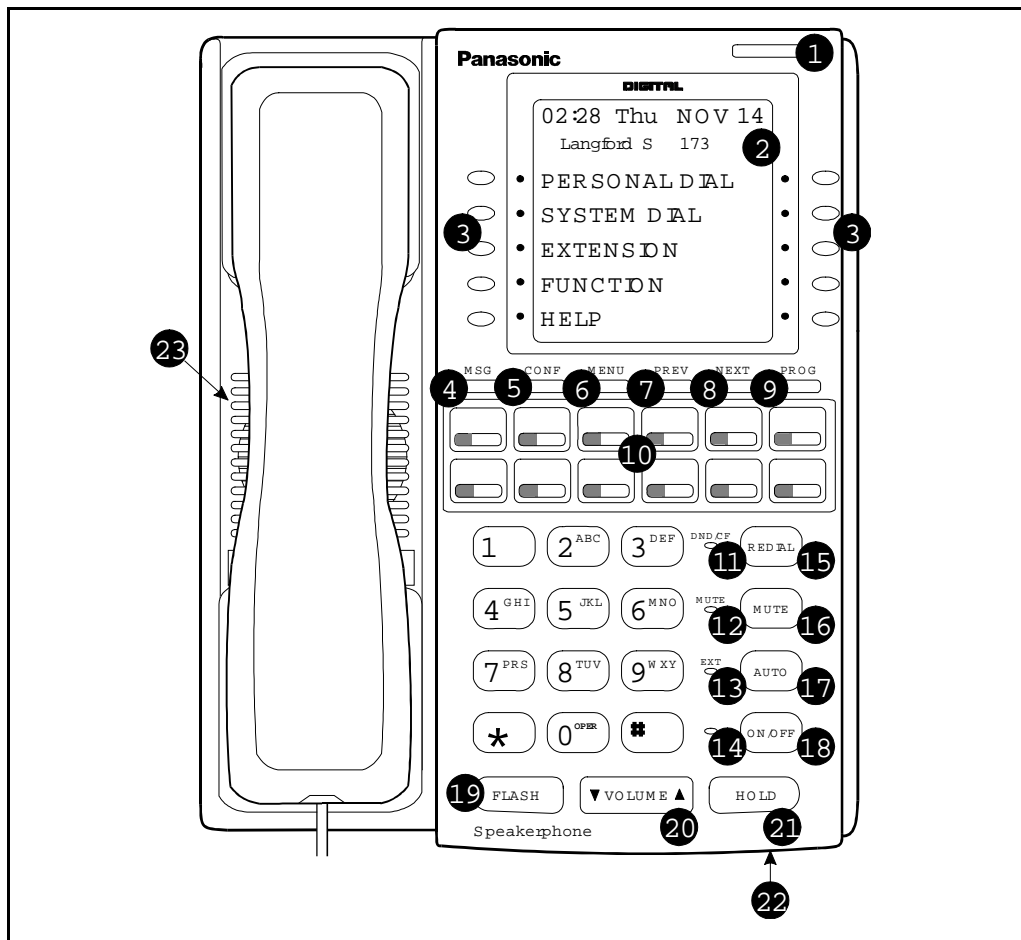


Table A-3. Large-Display Phone Features

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

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

## Analog Adapter

### Description

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

### Operation

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

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

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

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

### Notes

#### *Phone Restrictions*

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

#### *Incoming Calls*

- You cannot program both devices to ring simultaneously.
- The "\*71" code will not work if the other device is in use.

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

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

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

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

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

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

## MSG (Message) Key

### Description

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

- **Auto-Callback.** If a callback message has been left by another extension, you can press the MSG key to place an automatic callback to the extension that sent the message. If more than one callback message

has been received, pressing the MSG key will perform auto-callback in the order received.

- **Auto-Answer Voice Message.** You can press the MSG key to automatically access your voice mailbox. The phone will dial your voice mailbox and send access codes (if programmed) for retrieving messages.

## Operation

### To Program Voice Mailbox Access Codes into the MSG Key:

Press PROG MSG [16-digit number] HOLD

The display will reflect “Regist Data”.

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

Press CONF MSG.

The programmed access code will be displayed.

## Notes

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

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

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

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

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

**Reprogramming the MSG key if Extension Number Digits is changed.** If the DBS is reprogrammed to use a different extension numbering plan (i.e., changed from 2-digit to 3-digit extensions, 3-digit to 4-digit extensions,

etc.), the Voice Mailbox Access Code must be reprogrammed into the MSG key.

## DSS/72 Console - Key Arrangement

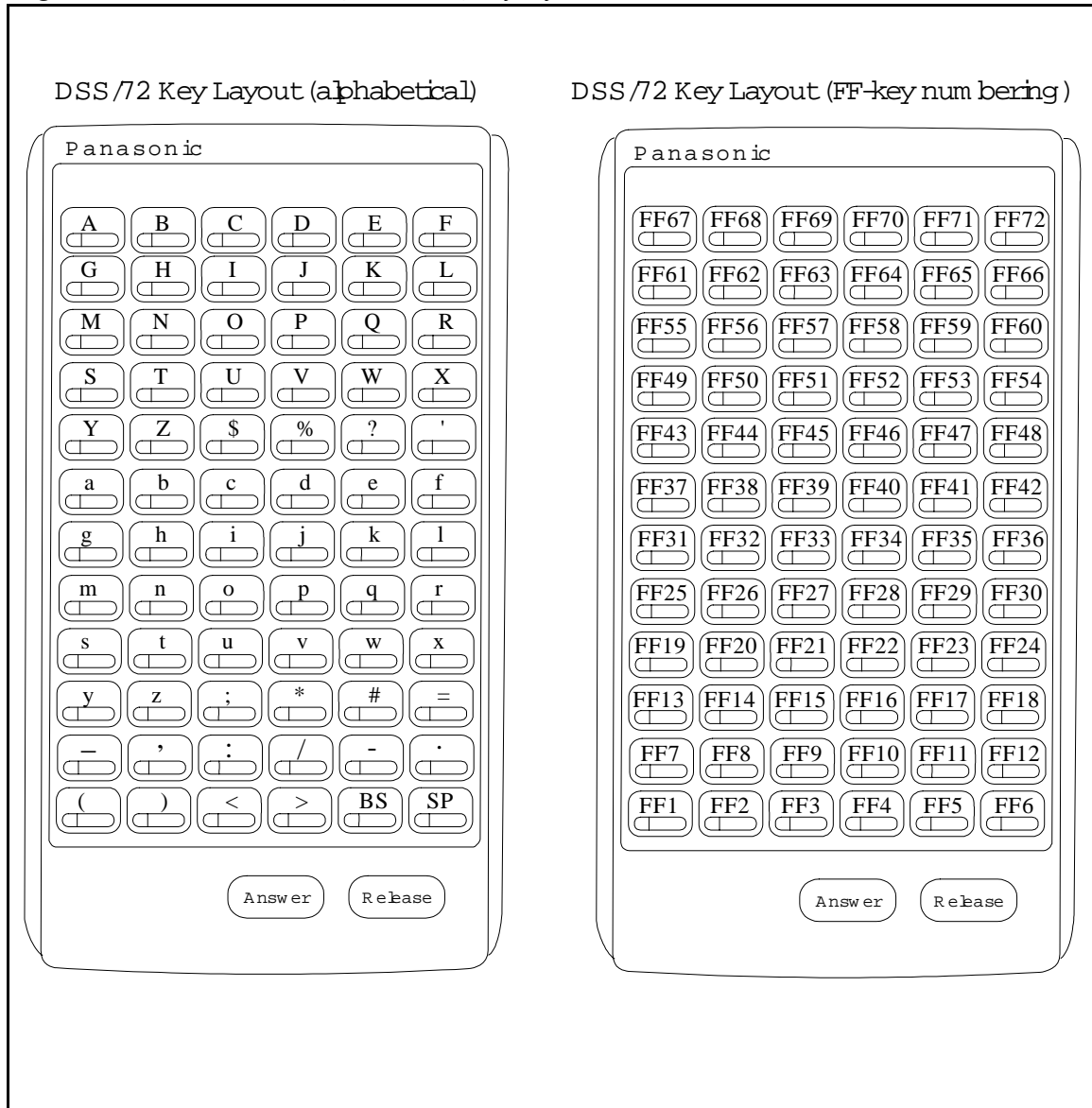
### Description

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

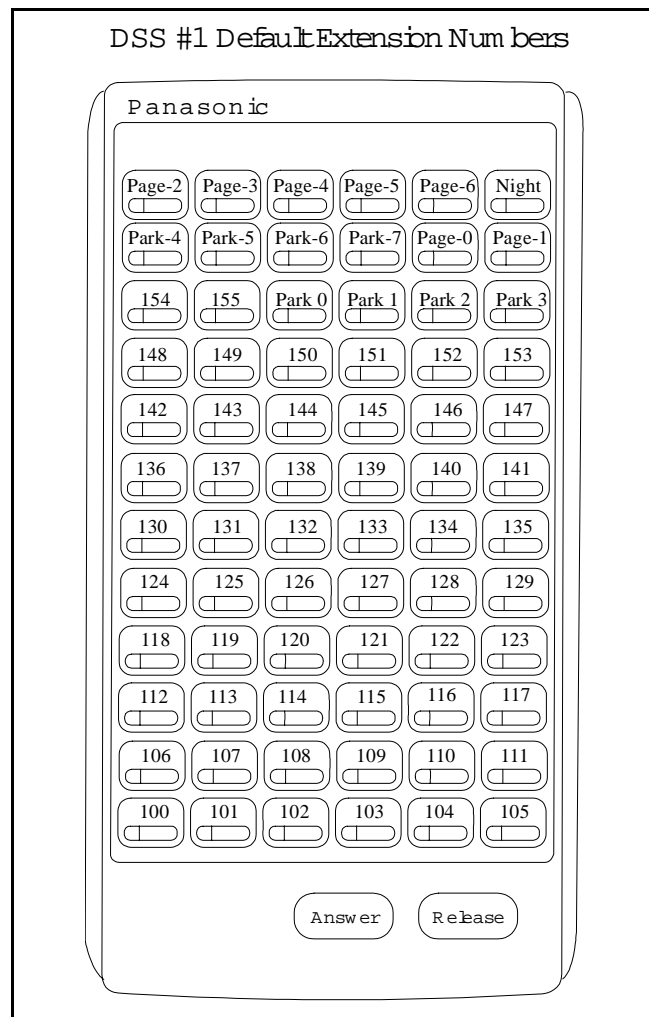
- ***Name and Message Assignments (FF6 addresses).*** The alphabetical arrangement of the keys is different.
- ***FF-Keys.*** The FF-keys on the DSS/72 console are numbered left-to-right, bottom row first.
- ***DSS #1 Defaults.*** The default extension number assignments on DSS #1 are different.

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

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





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

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

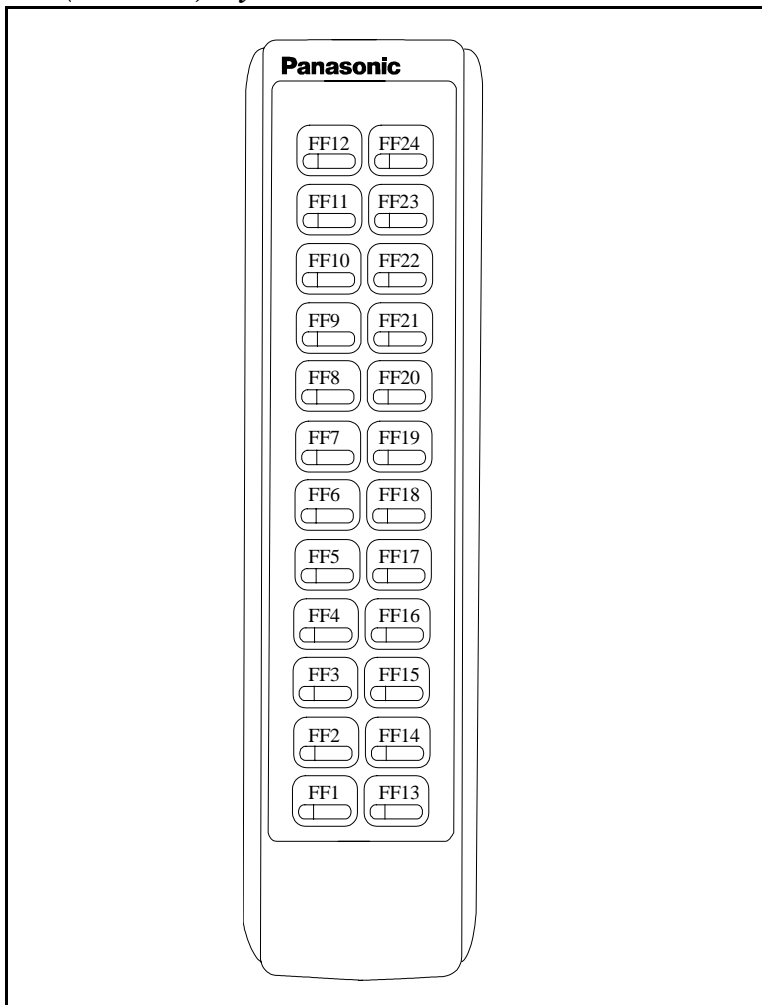
## EM/24 - Key Arrangement

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

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

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

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



## Operation

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

# Additional Serial Port on CPC Card

## Description

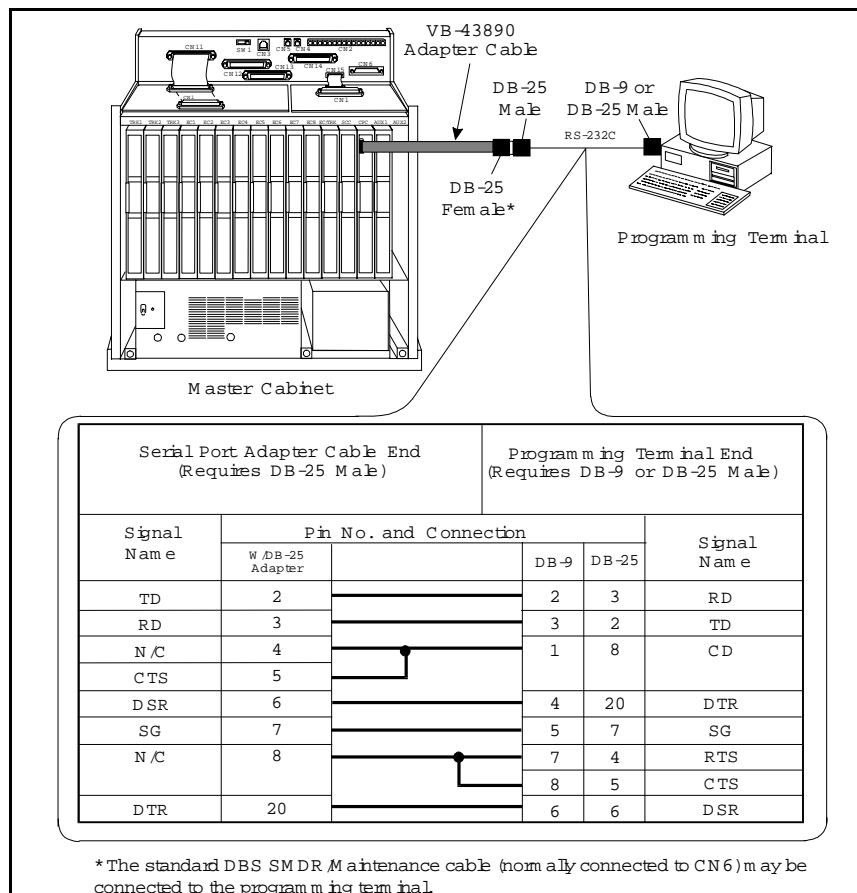
The CPC-EX card contains an on-board serial port (Serial Port 2) which can be used for Bus Monitor/ Remote Maintenance. This serial port (labeled CN5) is located just above the LEDs on the front of the card (see the illustration on Appendix A:-4). This additional serial port allows you to dial directly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

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

## Installation

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

Figure A-10.CPC-EX Serial Port 2



## Notes

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

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

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

---

## Appendix B: CPC-AII/B 8.0 Updates

CPC-AII/B Version 8.0 offers support for the Panasonic 44-Series telephones (VB-44xxx), as well as Computer Telephony Integration (CTI) through the Windows™ Telephony Applications Processing Interface (TAPI).

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## 44-Series Phone Support

CPC-AII/B Version 8.0 provides full support for Panasonic's 44-Series phones (VB-44xxx). Table D-1, below, lists all 44-Series phone models and their part numbers. Most models are available in two colors: gray and black.

*Table B-1.44-Series Phones*

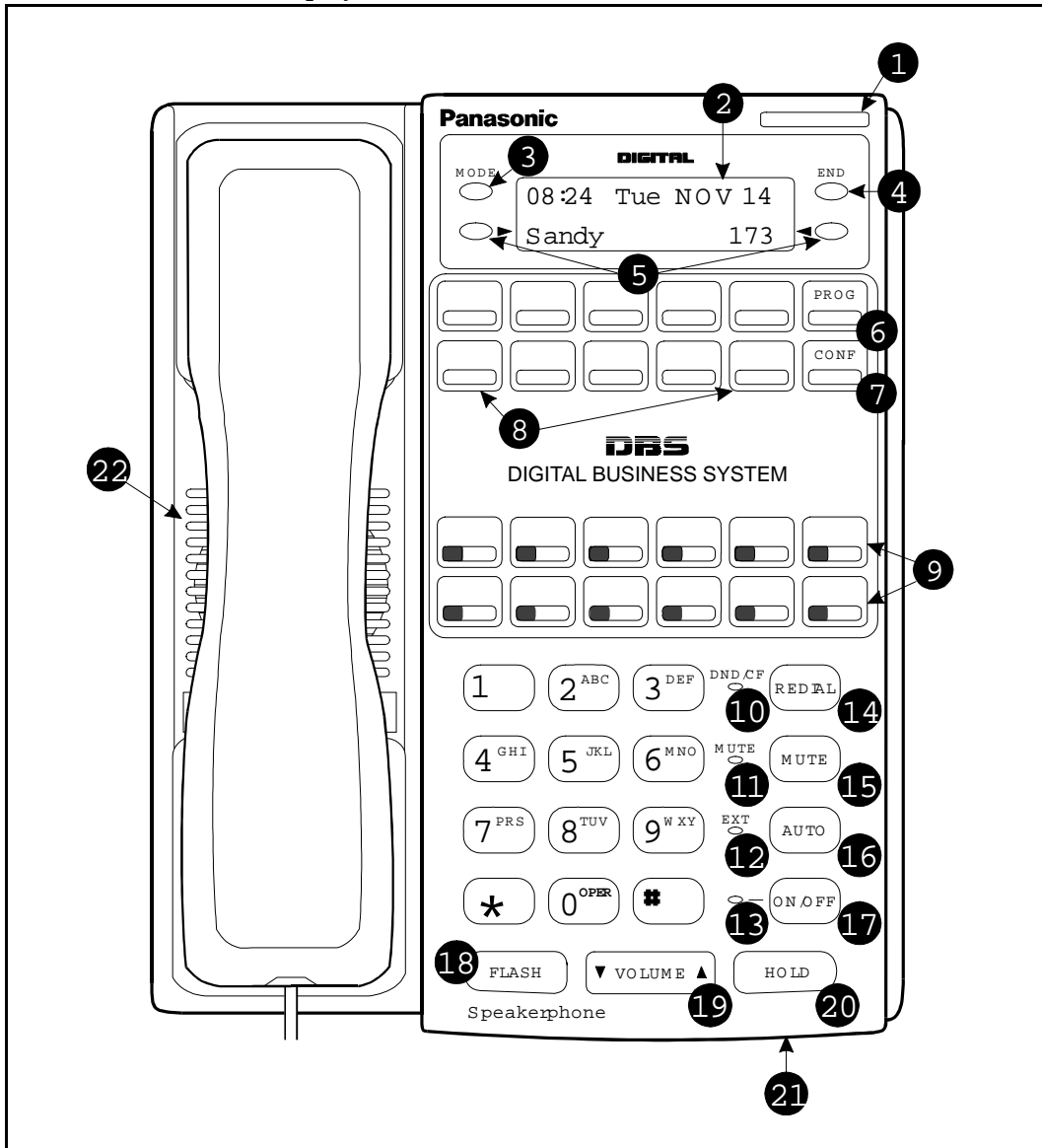
|   |           |
|---|-----------|
| 16-Key Phone (gray)                       | VB-44210G |
| 16-Key Phone (black)                      | VB-44210B |
| 16-Key Speakerphone (gray only)           | VB-44211G |
| 22-Key Phone (gray only)                  | VB-44220G |
| 22-Key Small-Display Speakerphone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

# Enhanced Phone Features

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

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

*Figure B-11.44-Series Small-Display Phone*





**Table B-2. Key to 44-Series Small-Display Phone**

| #  | Feature                     | Description  |
|----|-----------------------------|--|
| 1  | Message Indicator           | Indicates that you have a message.   |
| 2  | Display                     | Displays information about phone's status, menus, dialing directories, and text message information.   |
| 3  | Mode Key                    | Used to change display modes from default to directory mode.   |
| 4  | End Key                     | Used to exit directory mode and return display to default mode.  |
| 5  | Select Keys                 | Used to select and dial a System Speed Dial, Personal Speed Dial, or Extension number from a directory.  |
| 6  | PROG Key                    | Used to program FF and one-touch keys and to adjust ringer volume. Depending on the setup of your system, may also be used to transfer calls.                                    |
| 7  | CONF Key                    | Used to establish conference calls, check FF key and one-touch features, and scroll through messages.  |
| 8  | One-Touch Keys              | Used to make outside calls or to access call-handling features.  |
| 9  | Flexible Function (FF) Keys | Used to access outside lines or to access call-handling features.  |
| 10 | DND/CF Indicator            | Indicates that Do-Not-Disturb, Call Forwarding, or Absence Message is set.   |
| 11 | MUTE Indicator              | Indicates that your voice is muted - i.e., party on the other end cannot hear you. Lights solid when your hands-free microphone is muted and flashes when your handset is muted. |
| 12 | EXT Indicator               | Lights when you are on a call; flashes when you hold a call.   |
| 13 | ON/OFF Indicator            | Lights when ON/OFF key has been pressed.   |
| 14 | REDIAL Key                  | Used to redial last outside number dialed.   |
| 15 | MUTE Key                    | Used to activate/deactivate MUTE function. When activated, the party on the other end cannot hear you. (See item 11, MUTE Indicator.)  |
| 16 | AUTO Key                    | Used to access speed dialing, enter account codes, or for message waiting answer/cancel.   |
| 17 | ON/OFF Key                  | Used to make a call without lifting handset.   |
| 18 | FLASH Key                   | Used to end an outside call and to restore dial tone without hanging up receiver.  |
| 19 | VOLUME Key                  | Used to adjust level of tones, background music, ringing, receiver volume, and display contrast.   |
| 20 | HOLD Key                    | Used to hold calls, to retrieve held calls, and to complete FF key programming.  |
| 21 | Microphone                  | Used to talk with other party without using the handset.   |
| 22 | Speaker                     | Outputs tones and voice at your extension.   |

Figure B-12.44-Series Large-Display Phone

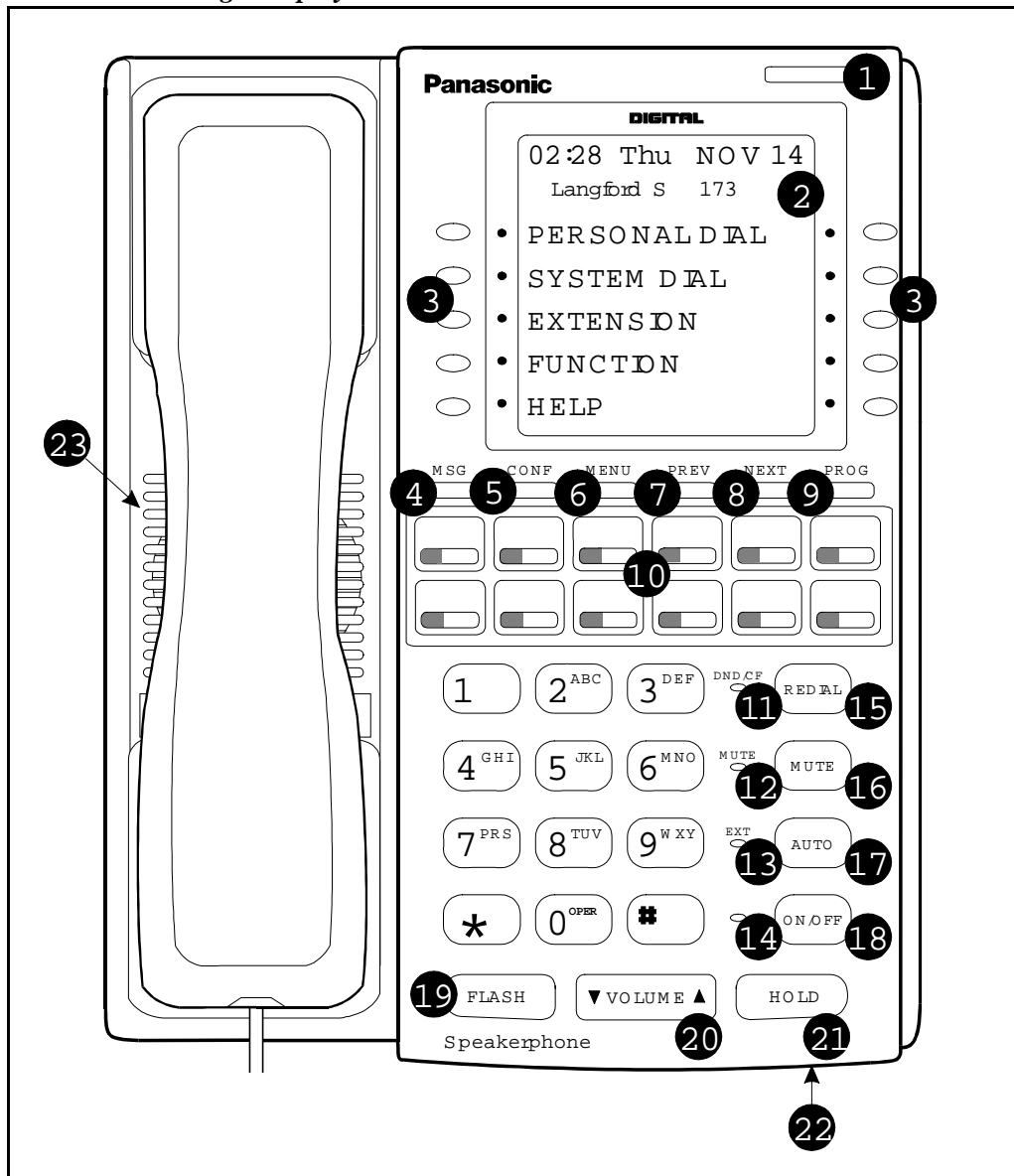


Table B-3.Key to 44-Series Large-Display Phone

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

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

## Analog Adapter

**44-Series phones only**

**CPC-AII/B Version 8.0, CPC-S/M Version 2.0, or CPC-EX Version 1.0 only**

### Description

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

### Operation

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

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

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

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

### Notes

#### **Phone Restrictions**

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

#### **Incoming Calls**

- You cannot program both devices to ring simultaneously.

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

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

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

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

## MSG (Message) Key

**44-Series phones only**

**CPC-All/B Version 8.0, CPC-S/M Version 2.0, or CPC-EX Version 1.0 only**

### Description

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

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

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

Press PROG MSG [16-digit number] HOLD

The display will reflect “Regist Data”.

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

Press CONF MSG.

The programmed access code will be displayed.

**Notes**

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

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

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

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

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

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

**DSS/72 Console - Key Arrangement**

**44-Series phones only**

**CPC-AII/B Version 8.0, CPC-S/M Version 2.0, or CPC-EX Version 1.0 only**

**Description**

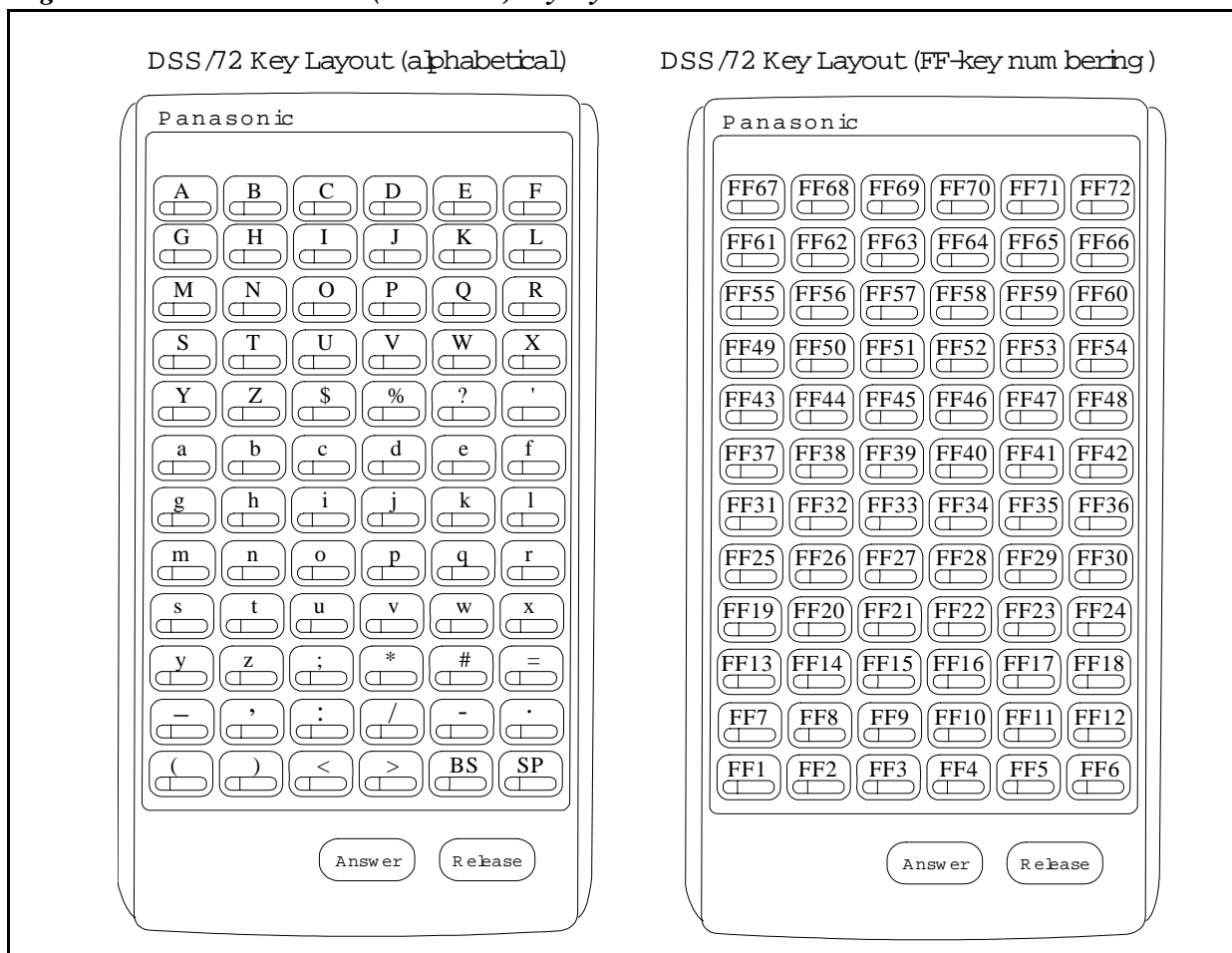
The keys on the enhanced DSS/72 Console (VB-44320) are arranged differently from the VB-43320 model. The enhanced DSS console has 6

columns x 12 rows of keys (not 8 columns x 9 rows as in the previous version). This affects the following:

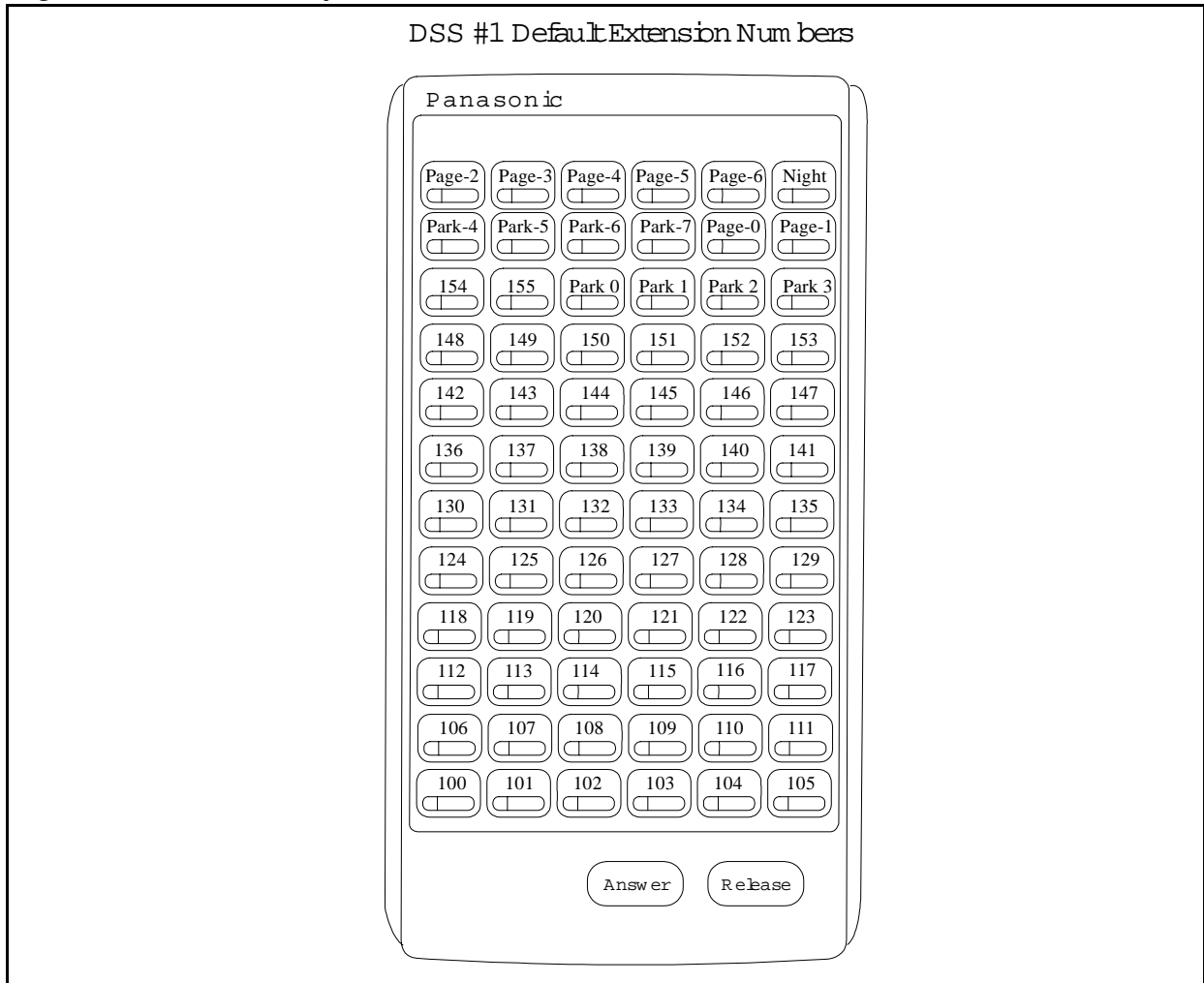
- **Name and Message Assignments (FF6 addresses).** The alphabetical arrangement of the keys is different.
- **FF-Keys.** The FF-keys on the DSS/72 console are numbered left-to-right, bottom row first.
- **DSS #1 Defaults.** The default extension number assignments on DSS #1 are different.

The newer arrangement for the DSS keys is shown in Figures 13 & 14.

**Figure B-13.DSS/72 Console (VB-44320) key layout**



**Figure B-14.DSS/72 #1 Default Extension Numbers**



**Operation**

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



## EM/24 - Key Arrangement

44-Series phones only

CPC-AII/B Version 8.0, CPC-S/M Version 2.0, or CPC-EX Version 1.0 only

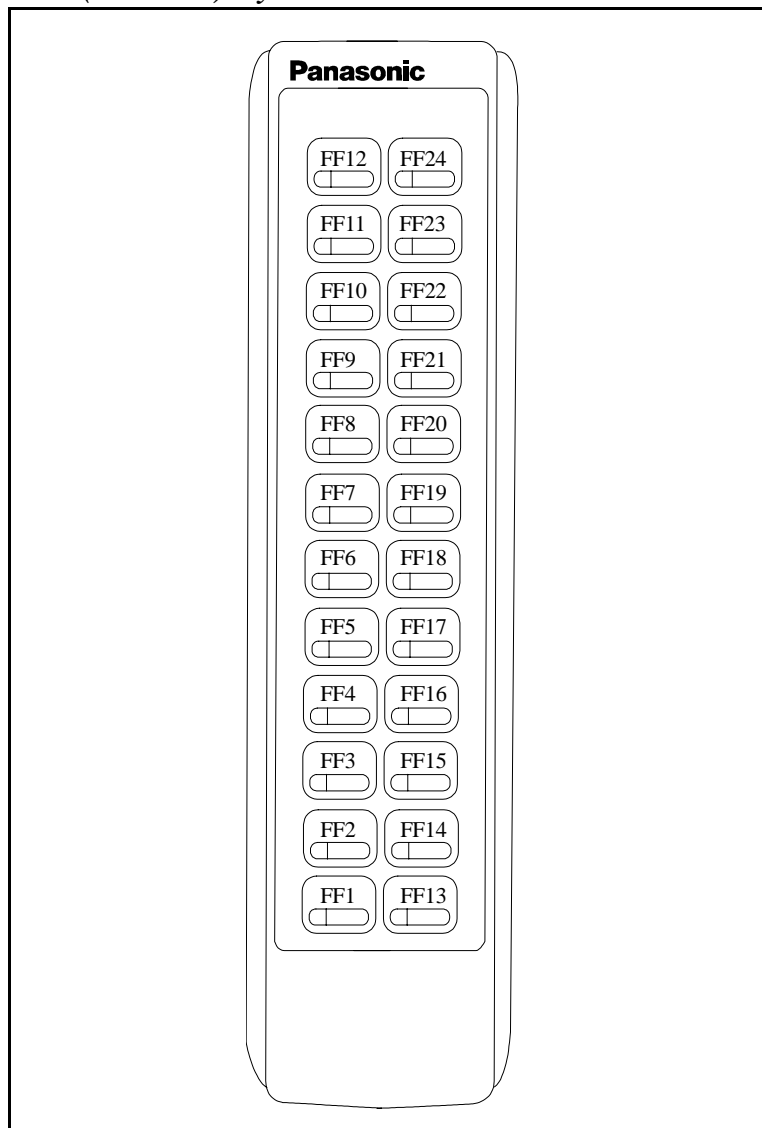
### Description

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

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

The newer arrangement for the EM/24 keys is shown in Figure 15.

Figure B-15. EM/24 Unit (VB-44310) keys



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

---

## TAPI Support

CPC-AII/B offers full support for the Panasonic Telephony Applications Processing Interface (TAPI). TAPI is a Windows™ application which allows a PC to be connected to a telephone extension and used to control incoming and outgoing calls through that extension. Typical PC applications that might be used with TAPI include Contact Managers and Personal Organizers.

The Panasonic TAPI product (VB-43720) provides the necessary interface between a DBS and a PC-based TAPI application. This product consists of a TAPI Adapter and the Panasonic TAPI Service Provider (SP) software which resides on the PC. The TAPI Adapter provides the physical connection between a PC, a DBS extension, and the DBS itself. Its purpose is to intercept telephone and call control signaling messages from the DBS and telephone extension and then forward a copy of those messages to the Service Provider software on the PC. After interpreting the messages, the Service Provider software passes them on to the TAPI application.

No special programming of the DBS is required for TAPI. For detailed information, see the *TAPI Installation Guide, Part Number 575X00201, Section 570*.

---

## Key Telephone Installation Notes

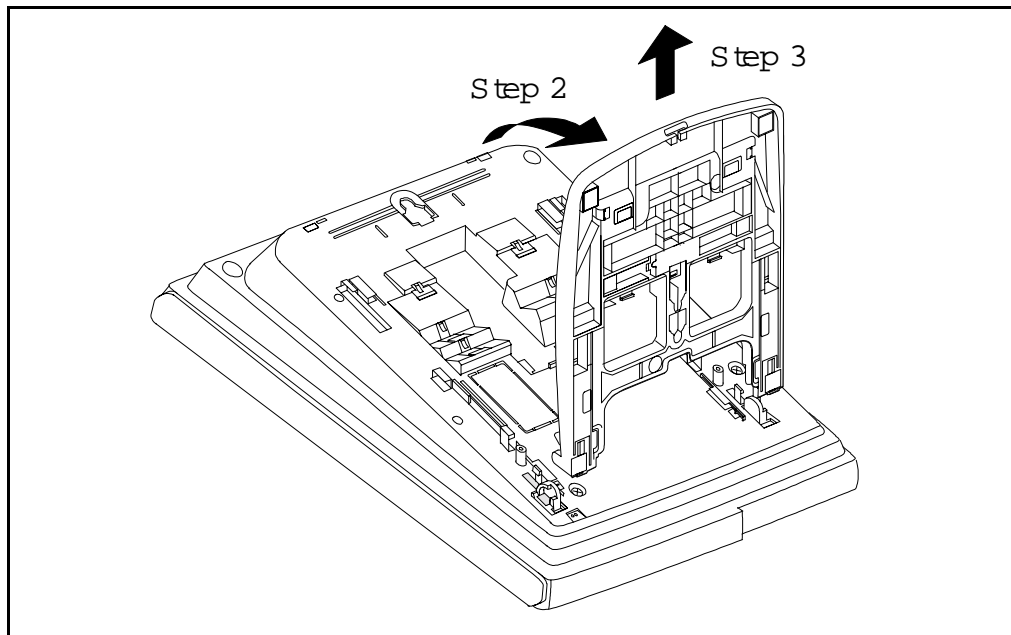
### *Desi Strip Cover*

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

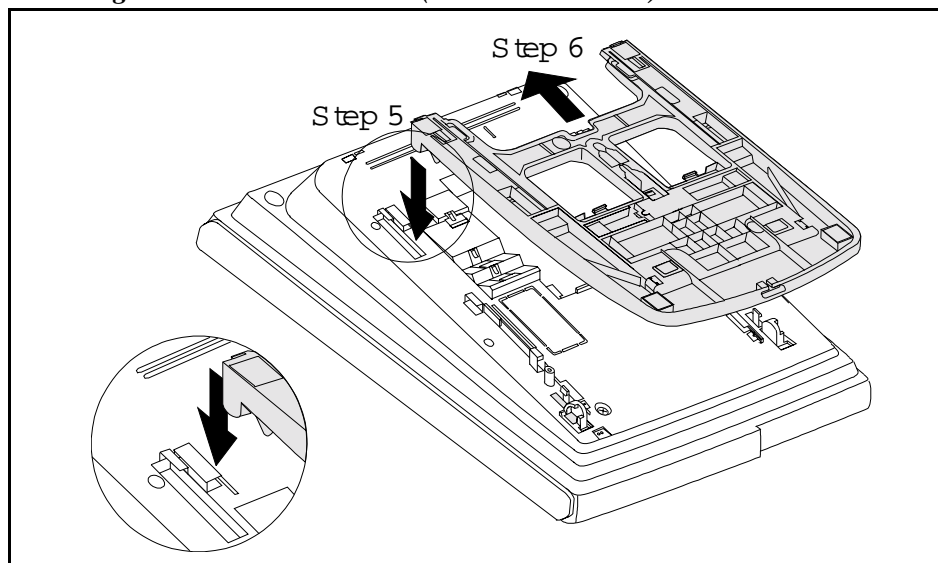
### *Key Telephone Wall Mounting Instructions*

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

1. Place the telephone face down on a flat surface.
2. Grasp the top of the desk stand (at the >**ABS**< label) and pull up the end to 90° vertical (refer to Step 2 in Figure D-16). The stand will click as it releases from the plastic securing latches.
3. Lift the desk stand as shown in Step 3 of Figure D-16.

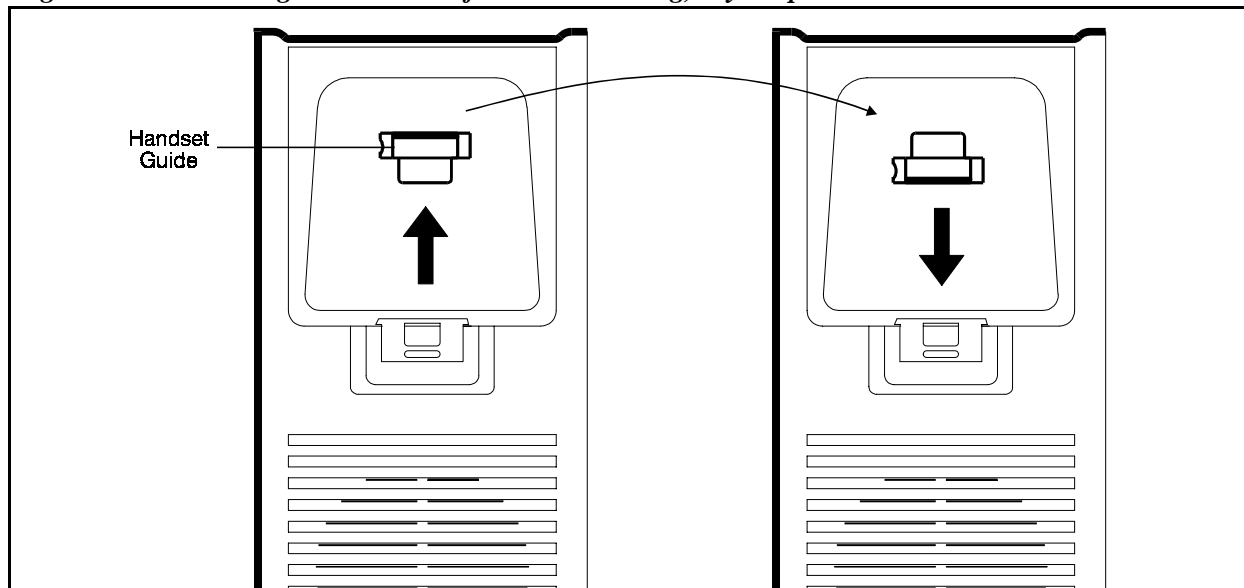
**Figure B-16.Desk Stand Removal.**

4. Rotate the desk stand 180°. In this position it doubles as a wall mount bracket.
5. Insert the wall mount bracket into the mounting guides as shown in Figure D-17.
6. Slide the wall mount bracket onto the telephone.

**Figure B-17.Inserting the wall mount bracket (rotated desk stand)**

7. While viewing the front of the telephone, find the handset guide located just below the hookswitch (see Figure D-8).
8. Slide the handset guide out, rotate 180° so that the holding clip is exposed, and reinsert.

*Figure B-18. Handset guide insertion for wall mounting, key telephone*



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