CHAPTER 3

Voice Digital Feature Card

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This chapter describes the voice digital feature card and includes the following sections:

- Overview, page 3-1
- Online Insertion and Removal of the Voice Digital Feature Card, page 3-2
- Replacing PVDM2 Modules in the Voice Digital Feature Card, page 3-8
- Getting Help, page 3-10
- Where to Go Next, page 3-10

Overview

High-density packet voice digital signal processor (DSP) modules (PVDM2) installed on the voice digital feature card convert voice and fax calls into IP packets or frames that can be transmitted as voice over IP (VoIP) over a variety of transport technologies on the Cisco VGD 1T3 Voice Gateway. The number of calls supported depends on the number of PVDM2 modules installed on the voice digital feature card, and the number of voice digital feature cards installed in the chassis.

The voice digital feature card supports a 64-channel PVDM2 module. You can install up to six PVDM2 modules on each voice digital feature card. Table 3-1 describes the maximum number of channels supported by each module and the maximum number of channels supported by a voice digital feature card with six modules installed.

Table 3-1 Maximum Number of Channels Available on a Voice Digital Feature Card with VGD-PVMD2-64 Modules

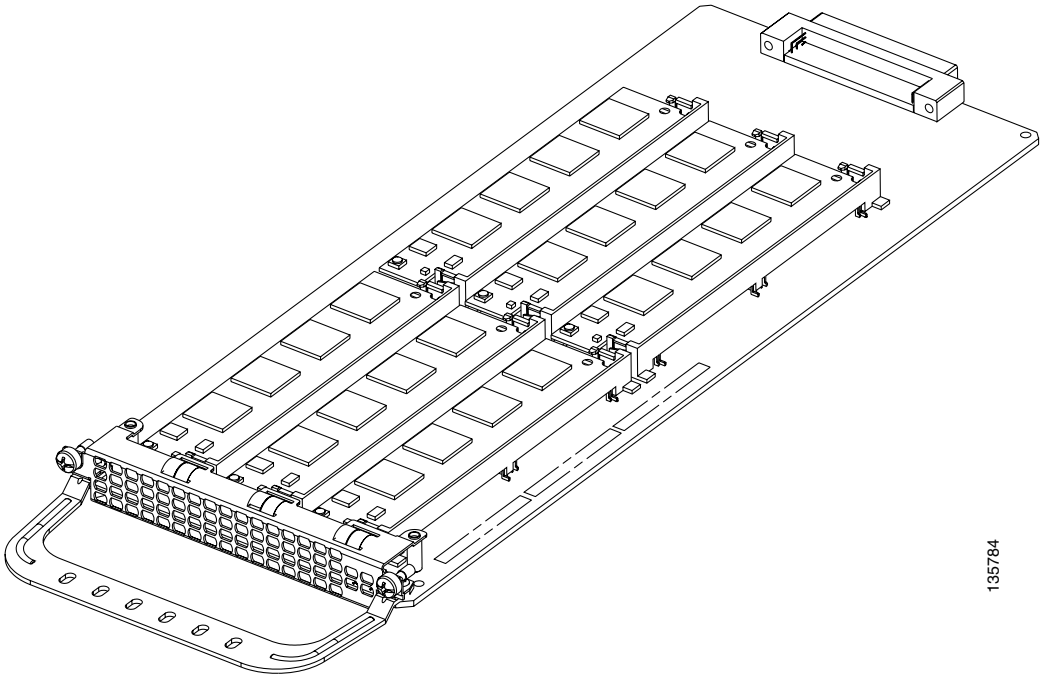
Codec Type	Maximum Number of Channels per VGD-PVMD2-64 Module	Maximum Number of Channels per Voice Digital Feature Card
Low complexity (G.711)	64	384
Medium complexity (G.726, G.729a, G.729ab, T.38 fax relay)	32	192
High complexity (G.729, G.729b, G.723.1, GSM-AMR, modem relay)	24	144

Note A Cisco VGD 1T3 Voice Gateway with the maximum number of PVDM2 modules installed can take up to 6 minutes to boot from power-on to system ready.

For configuration details, see the *Cisco VGD 1T3 Voice Gateways Software Configuration Guide*. For information on voice and fax commands, see the *Cisco IOS Voice Configuration Library* for your Cisco IOS software release at Cisco.com.

You can install a voice digital feature card in any card slot of the Cisco VGD 1T3 Voice Gateway chassis. The voice digital feature card does not require external connections. (See Figure 3-1.)

Figure 3-1 Voice Digital Feature Card



Online Insertion and Removal of the Voice Digital Feature Card

To remove a feature card without dropping any calls or connections, you will need to take the feature card out of service by using the **busyout** command to disable the feature card. The **busyout** command is executed on a per-feature card basis and will disable the card after waiting for the active services to terminate.

If there are active calls on the feature card after you execute the **busyout** command, wait for the calls to drop. To view the status of the termination process, use the **show busyout** command.

Caution The online installation and removal (OIR) of new cards should be done *only* during times of low CPU utilization, such as during maintenance.

Caution To avoid erroneous failure messages, remove or insert only one feature card at a time.

When you replace a feature card with a new feature card of the same type in the same slot, the system software recognizes the new feature card and brings up the interface automatically.

If you replace the existing feature card with a new feature card of a different type, you must reconfigure the system. For configuration details, see the *Cisco VGD 1T3 Voice Gateways Software Configuration Guide*. For information on voice and fax commands, see the *Cisco IOS Voice Configuration Library* for your Cisco IOS software release at Cisco.com.

Note To use the voice digital feature card, at least one voice digital feature card must be present when the Cisco VGD 1T3 Voice Gateway is powered on. More voice digital feature cards can be inserted later.

Removing the Voice Digital Feature Card

To remove the voice digital feature card, follow these steps.

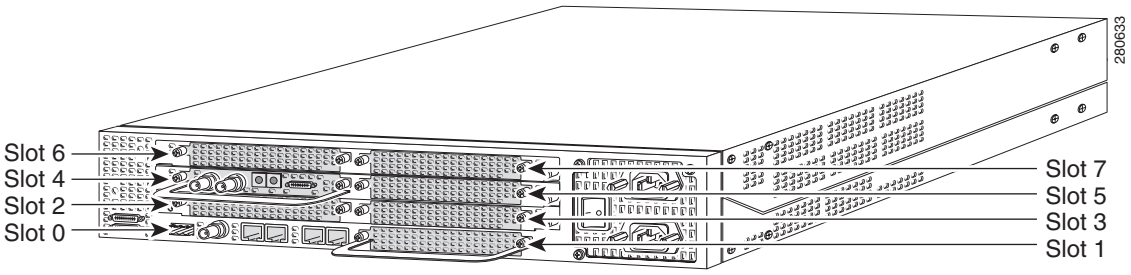
Note An example showing the output from each command is provided after the procedure. See the "Online Insertion and Removal for the Voice Digital Feature Card Example" section on page 3-5.

Step 1 Determine which slot the feature card is in (see Figure 3-2) by entering the **show chassis slot** command in privileged EXEC mode:

```
Router# show chassis slot
```

Note These commands are not valid for slot 0. Slot 0 is the motherboard.

Figure 3-2 Slot Numbering on the Cisco VGD 1T3 Voice Gateway



Step 2 Initialize the software busyout procedure by entering the **busyout** command:

```
Router# busyout slot-number
```

Step 3 Check busyout status for the slot, by entering the **show busyout** command.

```
Router# show busyout slot-number
```

Timesaver Use the **clear voice dsp** command to immediately disable active calls on the voice digital feature card.

Step 4 Verify that the OK/MAINT LED is off; this indicates that the feature card is offline and ready to be removed.

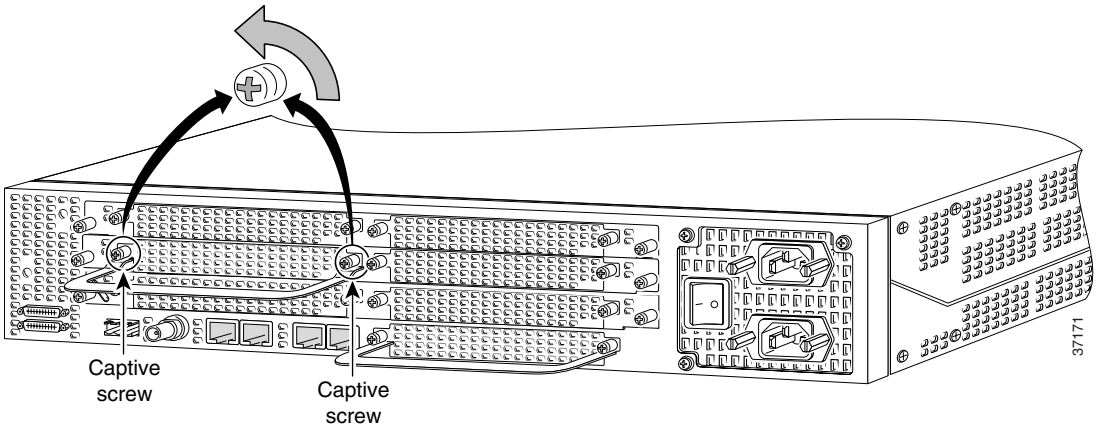
Note The OK/MAINT LED is green before you enter the **busyout** command. After you enter the **busyout** command, the LED changes to yellow. The LED turns off after all calls are disconnected and resources taken out of service, indicating that busyout is complete.

Step 5 Attach an ESD-preventive wrist strap.

Warning **Do not work on the system or connect or disconnect cables during periods of lightning activity.** Statement 1001

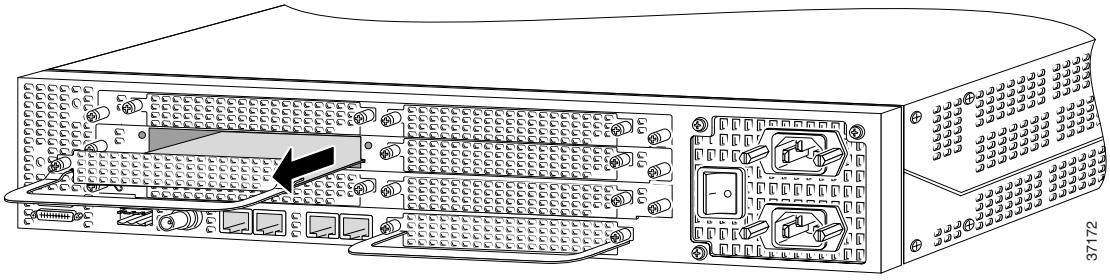
Step 6 Loosen the two captive screws that secure the feature card to the chassis until each screw is free of the chassis. (See Figure 3-3.)

Figure 3-3 Loosening the Captive Screws on the Cisco VGD 1T3 Voice Gateway



Step 7 Grasp the feature card handle with one hand. Pull the card toward you until the card slides free of the chassis. Grasp the sheet metal on each side of the feature card with your other hand to support and guide the feature card out of the slot. (See Figure 3-4.)

Figure 3-4 Removing a Feature Card from the Cisco VGD 1T3 Voice Gateway

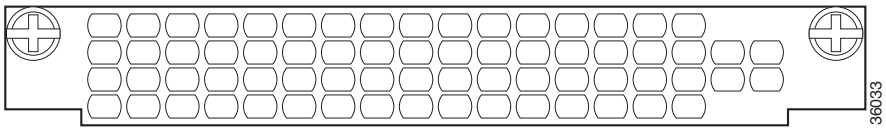


Caution Avoid touching any pins or circuit board components when you remove or install a feature card.

Step 8 After you remove the feature card, set it aside on an ESD-preventive mat.

Step 9 If the feature card slot is to remain empty, install a blank cover over the open card slot to ensure proper airflow inside the chassis. (See Figure 3-5.)

Figure 3-5 Blank Feature Card Cover



Online Insertion and Removal for the Voice Digital Feature Card Example

The following output is an example of the online insertion and removal (OIR) process for a voice digital feature card in slot 3 of the Cisco VGD 1T3 Voice Gateway:

```
Router# show chassis slot 3 detail

Slot 3:
DFC type is VGD VGD-FC

OIR events:
        Number of insertions = 0, Number of removals = 0
DFC State is DFC_S_OPERATIONAL

Error events (Bus errors, PCI errors):
        Number of errors recovered = 0

Carrier Card Cookie Info:
Manufacture Cookie Info:
        Board ID                : 0x4BE
        Hardware Revision       : 1.1
        Part Number             : 73-9527-01
        Board Revision          : A0
        Fab Part Number         : 28-6928-01
        Product (FRU) Number    :
        PCB Serial Number       : JAE09096VWJ
        RMA Test History        : 00
        RMA Number              : 0-0-0-0
        RMA History             : 00
        Version Identifier      : V01
 EEPROM contents (hex):
          0x00: 04 FF 40 04 BE 41 01 01 82 49 25 37 01 42 41 30
          0x10: 85 1C 1B 10 01 CB 92 00 00 00 00 00 00 00 00 00
          0x20: 00 00 00 00 00 00 00 00 00 C1 8B 4A 41 45 30 39
          0x30: 30 39 36 56 57 4A 03 00 81 00 00 00 00 04 00 89
          0x40: 56 30 31 20 FF FF FF FF FF FF FF FF FF FF FF FF
DFC Cookie Info:
Manufacture Cookie Info:
        Board ID                : 0x4CF
        Hardware Revision       : 1.0
        Part Number             : 73-9980-01
        Board Revision          : 03
```

```
        Fab Part Number          : 28-7322-01
        Product (FRU) Number     : aa
        PCB Serial Number        : JAB091100N2
        RMA Test History         : 00
        RMA Number               : 0-0-0-0
        RMA History              : 00
        Version Identifier       : VP1
EEPROM contents (hex):
          0x00: 04 FF 40 04 CF 41 01 00 82 49 26 FC 01 42 30 33
          0x10: 85 1C 1C 9A 01 CB 82 61 61 C1 8B 4A 41 42 30 39
          0x20: 31 31 30 30 4E 32 03 00 81 00 00 00 00 04 00 89
          0x30: 56 50 31 00 D9 02 40 C1 FF FF FF FF FF FF FF FF
FRU NUMBER : VGD-FC=

        PVDM Slot 3:
        64-channel (G.711) Voice/Fax PVDMII DSP SIMM PVDM daughter card
        Hardware Revision        : 3.2
        Part Number              : 73-8541-04
        Board Revision           : A0
        Deviation Number         : 0
        Fab Version              : 03
        PCB Serial Number        : FOC09040A93
        RMA Test History         : 00
        RMA Number               : 0-0-0-0
        RMA History              : 00
        Processor type           : 00
        Product (FRU) Number     : PVDM2-64
        Version Identifier       : NA
        EEPROM format version 4
        EEPROM contents (hex):
          0x00: 04 FF 40 03 EC 41 03 02 82 49 21 5D 04 42 41 30
          0x10: 88 00 00 00 00 02 03 C1 8B 46 4F 43 30 39 30 34
          0x20: 30 41 39 33 03 00 81 00 00 00 00 04 00 09 00 CB
          0x30: 88 50 56 44 4D 32 2D 36 34 89 4E 41 20 20 D9 02
          0x40: 40 C1 FF FF FF FF FF FF FF FF FF FF FF FF FF FF
          0x50: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
          0x60: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
          0x70: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
Carrier Card Master PLD/FPGA Rev 0x0006
VGD-FC FPGA Rev 0x0008
```

Installing the Voice Digital Feature Card

Warning **Do not work on the system or connect or disconnect cables during periods of lightning activity.** Statement 1001

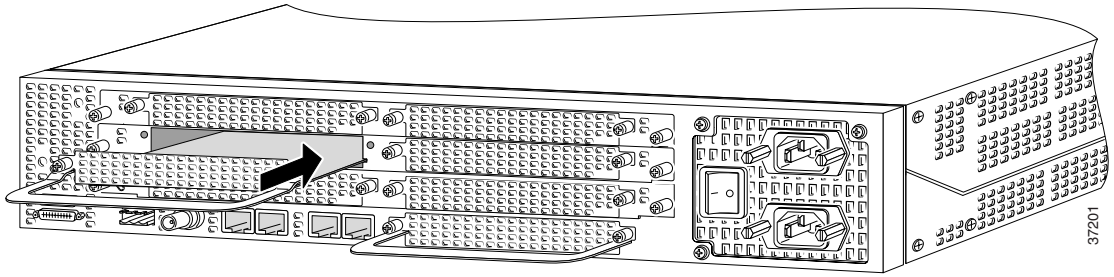
Note When you replace a feature card in a slot with a new feature card of the same type, the system software recognizes the new feature card and brings up the trunk interfaces automatically. If you replace the existing feature card with a new feature card of a different type, you must reconfigure the system. For configuration details, see the *Cisco VGD 1T3 Voice Gateways Software Configuration Guide*.

To install the voice digital feature card, follow these steps:

Step 1 Attach an ESD-preventive wrist strap.

Step 2 Slide the feature card into the slot until the connector pins make contact with the carrier card backplane connector. (See Figure 3-6.)

Figure 3-6 Installing a Feature Card in the Cisco VGD 1T3 Voice Gateway

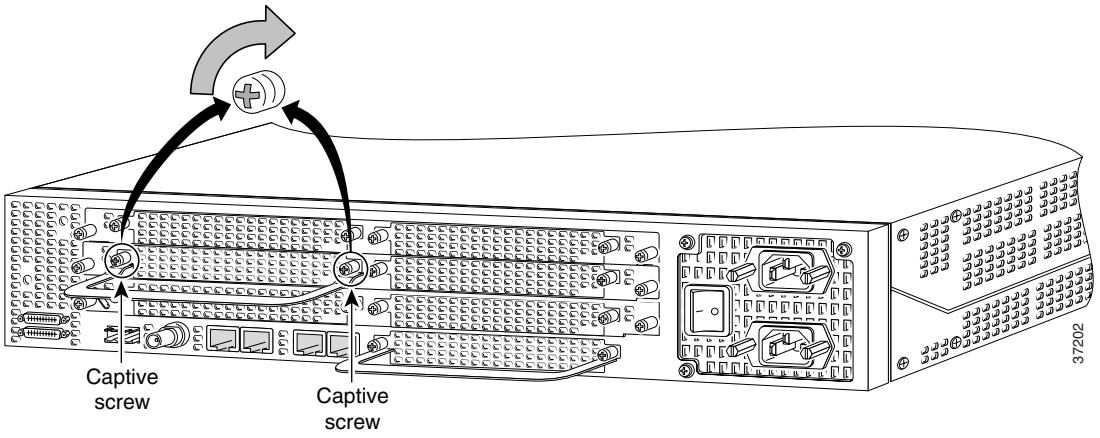


Step 3 Align the captive screws with their holes, and then seat the card completely.

Step 4 Seat the feature card in the carrier by pushing the card firmly until the captive screws are aligned with their holes.

Step 5 Tighten the screws to secure the feature card to the chassis. (See Figure 3-7.)

Figure 3-7 Tightening the Captive Screws on the Cisco VGD 1T3 Voice Gateway



Step 6 Check the OK/MAINT LED to verify that the card is working properly. For information about the voice digital feature card LED, see the "LEDs" section on page 4-1.

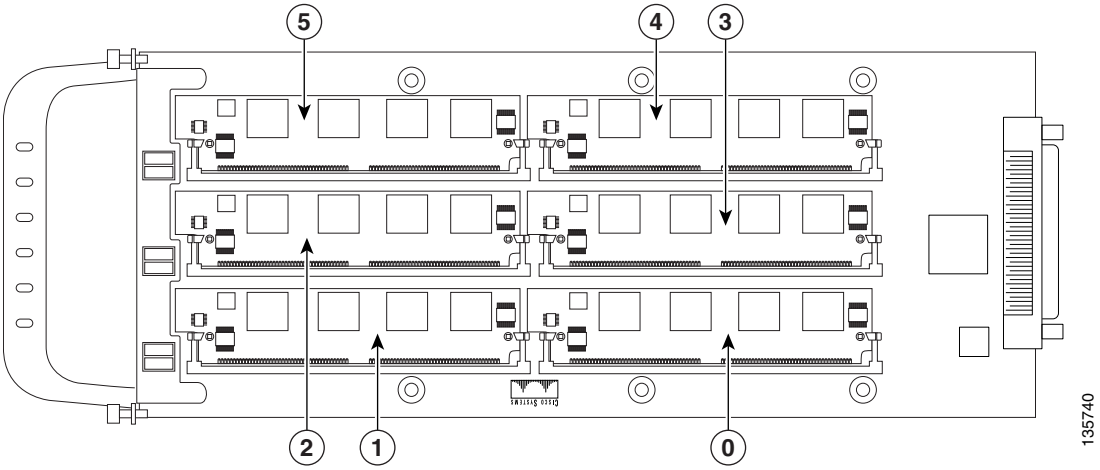
Note To use the voice digital feature card, at least one voice digital feature card must be present when the Cisco VGD 1T3 Voice Gateway is powered on. More voice digital feature cards can be inserted later. See the "Online Insertion and Removal of the Voice Digital Feature Card" section on page 3-2 for more information.

Replacing PVDM2 Modules in the Voice Digital Feature Card

The voice digital feature card contains six 80-pin SIMM sockets for PVDM2 modules, numbered 0 to 5. (See Figure 3-8.) Each socket can be filled with a single 80-pin PVDM2 module.

Note The voice digital feature card supports a 64-channel PVDM2 module.

Figure 3-8 PVDM2 Slot Locations

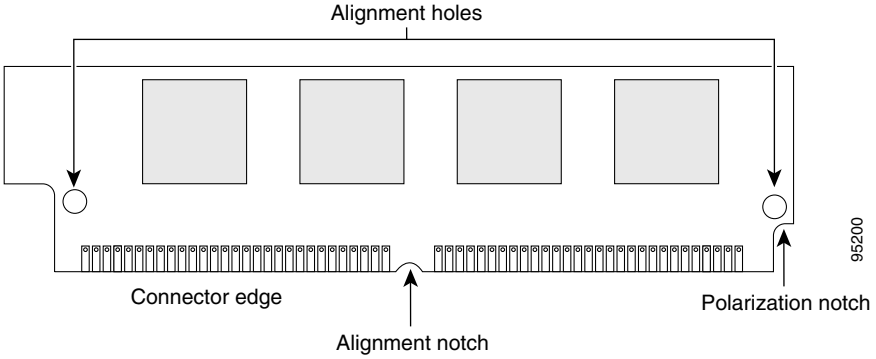


Orienting the PVDM2 Module During Installation

The PVDM2 modules are manufactured with a polarization notch to ensure proper orientation, and with alignment holes to ensure proper positioning. Figure 3-9 shows the polarization notch and alignment holes on a PVDM2 module. PVDM2 modules are installed with the connector edge down.

Caution To avoid damaging ESD-sensitive components, observe all ESD precautions. To avoid damaging the voice digital feature card, avoid using excessive force when you remove or replace PVDM2 modules.

Figure 3-9 PVDM2 Orientation



Removing PVDM2 Modules From the Voice Digital Feature Card

To remove PVDM2 modules from the voice digital feature card, perform the following steps:

Step 1 Attach an ESD-preventive wrist strap.

Step 2 Find the appropriate PVDM2 slot on the voice digital feature card. (See Figure 3-8.)

Caution Handle PVDM2 modules by the card edges only. PVDM2 modules are ESD-sensitive components and can be damaged by mishandling.

Step 3 Remove one PVDM2 module at a time. To lift the PVDM2 module out of its socket, pull the locking spring clips on both sides outward and tilt the PVDM2 up, free of the clips.

Step 4 Hold the PVDM2 module by the edges with your thumb and index finger and lift it out of the socket. Place the removed PVDM2 module in an antistatic bag to protect it from ESD damage.

Step 5 Repeat Step 2 to Step 4 for each PVDM2 module you are removing.

Installing PVDM2 Modules in the Voice Digital Feature Card

To install PVDM2 modules in the voice digital feature card, perform the following steps:

Step 1 Attach an ESD-preventive wrist strap.

Step 2 Find the appropriate PVDM2 slot on the voice digital feature card. (See Figure 3-8.)

Caution Handle PVDM2 modules by the card edges only. PVDM2 modules are ESD-sensitive components and can be damaged by mishandling.

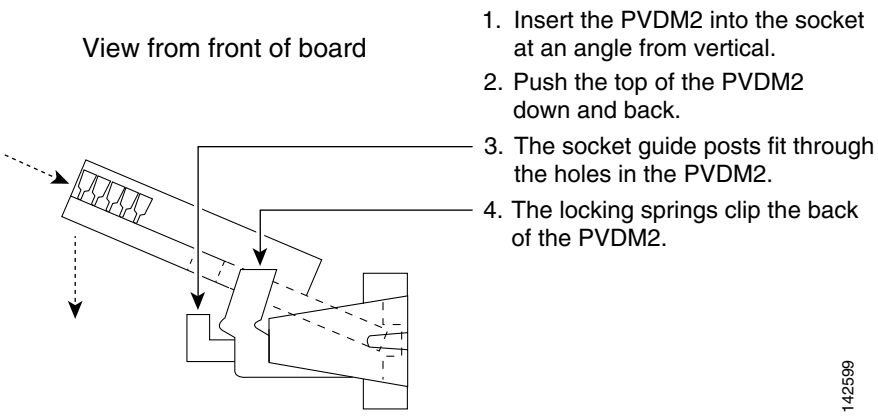
Step 3 Hold the PVDM2 module with the polarization notch pointing toward the back of the voice digital feature card, with the connector edge pointing down. (See Figure 3-9.)

Caution It is normal to feel some resistance, but do not use excessive force to install the PVDM2 module into the socket, and do not touch the surface components. If the PVDM2 module does not fit easily into the socket, remove it and check the orientation of the alignment holes and polarization notch.

Step 4 Insert the PVDM2 module into the connector slot at approximately a 45 degree angle to the voice digital feature card. (See Figure 3-10.) Gently press the PVDM2 module down, using as little force as possible. When the PVDM2 module is properly seated, the socket guide posts fit through the alignment holes, and the connector springs click into place.

Step 5 Ensure that each PVDM2 module is straight and that the alignment holes (as shown in Figure 3-10) align with the plastic guides on the socket.

Figure 3-10 Installing PVDM2 Modules in the Voice Digital Feature Card



Step 6 Repeat Step 2 to Step 5 for each PVDM2 module.

Note When the voice digital feature card is installed and running, you can check that the PVDM2 modules are installed correctly by entering the **show voice dsp summary** command. If an installed PVDM2 module is missing from the output, try reseating the PVDM2 module.

Digital Signal Processor Firmware

Digital signal processor (DSP) firmware is automatically downloaded to the voice digital feature card from the Cisco IOS image when you boot the system for the first time, or when you insert a voice digital feature card while the system is operating. When you insert feature cards while the system is operating, the Cisco IOS image recognizes the cards and downloads the required firmware to the cards.

For more information on voice digital feature card firmware and upgrade options, see the *Cisco VGD 1T3 Voice Gateways Software Configuration Guide*.

Getting Help

For information about technical support, onsite service, and exchange and repair services, see the "Technical Assistance" section on page xii.

Where to Go Next

The remaining chapters of this guide include information on troubleshooting feature cards and building cables.

- Chapter 4, "Troubleshooting"
- Appendix A, "Cabling Specifications"