



# Installing Memory, PVDM, and VPN Modules in ASI Cards, MRP Cards, and SPE Cards in the Cisco ICS 7750

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This document explains how to install memory modules, packet voice/data modules (PVDMs), and Virtual Private Network (VPN) modules on analog station interface 81 (ASI81) cards, ASI160 cards, multiservice route processor 200 (MRP200), MRP300, MRP3-8FXS, and MRP3-16FXS cards, and SPE310 cards in the Cisco Integrated Communications System (ICS) 7750. These items are referred to from this point as the *ASI81*, *ASI160*, *MRP200*, *MRP300*, *MRP3-8FXS*, *MRP3-16FXS*, *SPE310*, and the *Cisco ICS 7750*, respectively.

In each card, you can install the modules listed:

- ASI81 and ASI160:
  - MEM-MRP-16D=
  - MEM-MRP-32D=
  - MEM-MRP-64D=
  - PVDM-256K-4=
  - PVDM-256K-8=
  - PVDM-256K-12=
  - PVDM-256K-16=
  - PVDM-256K-20=



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**Note** For ASI cards, the PVDM-256K-16= is recommended.

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- MRP200:
  - MEM-MRP-16D=
  - MEM-MRP-32D=
  - MEM-MRP-64D=
  - MOD7700-VPN=
  - PVDM-256K-4=
  - PVDM-256K-8=
  - PVDM-256K-12=
  - PVDM-256K-16=
  - PVDM-256K-20=
- MRP300:
  - MEM-MRP-16D=
  - MEM-MRP-32D=
  - MEM-MRP-64D=
  - MOD7700-VPN=
  - PVDM-256K-4=
  - PVDM-256K-8=
  - PVDM-256K-12=
  - PVDM-256K-16=
  - PVDM-256K-20=
  - MEM7700-16MFS=
  - MEM7700-32MFS=
  - MEM7700-64MFS=
- MRP3-8FXS, MRP3-16FXS
  - MEM-MRP-16D=
  - MEM-MRP-32D=
  - MEM-MRP-64D=
  - PVDM-256K-4=
  - PVDM-256K-8=
  - PVDM-256K-12=
  - PVDM-256K-16=
  - PVDM-256K-20=
  - MEM7700-16MFS=
  - MEM7700-32MFS=
  - MEM7700-64MFS=



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**Note** For a list of MRP card PVDM requirements for any supported combination of WAN interface cards (WICs), voice interface cards (VICs), and voice WAN interface cards (VWICs), refer to the “PVDM Requirements” appendix in the *Cisco ICS 7750 Installation and Configuration Guide*.

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- SPE310:
  - MEM-SPE-256D=
  - MEM-SPE-512D=



**Note**

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For additional information about these modules, see “[Module Overview](#)” on page 9. For information about removing and replacing other system cards, power supply modules, and the fan tray, refer to *Cisco ICS 7750 FRU Installation and Replacement* and the *Cisco ICS 7750 Installation and Configuration Guide*. For technical specifications, refer to the *Cisco ICS 7750 System Description*. For additional safety information and for translations of the warnings that appear in this document, refer to the *Regulatory Compliance and Safety Information for the Cisco ICS 7750* publication.

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# Document Conventions

This publication uses the following conventions:



## Note

Means *reader take note*. Notes contain helpful suggestions or references to materials not contained in this manual.



## Caution

Means *reader be careful*. In this situation, you might do something that could result in equipment damage or loss of data.



## Warning

This warning symbol means **danger**. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents. To see translations of the warnings that appear in this publication, refer to the *Regulatory Compliance and Safety Information* document that accompanied this device.

## Waarschuwing

Dit waarschuwingssymbool betekent gevaar. U verkeert in een situatie die lichamelijk letsel kan veroorzaken. Voordat u aan enige apparatuur gaat werken, dient u zich bewust te zijn van de bij elektrische schakelingen betrokken risico's en dient u op de hoogte te zijn van standaard maatregelen om ongelukken te voorkomen. Voor vertalingen van de waarschuwingen die in deze publicatie verschijnen, kunt u het document *Regulatory Compliance and Safety Information* (Informatie over naleving van veiligheids- en andere voorschriften) raadplegen dat bij dit toestel is ingesloten.

## Varoitus

Tämä varoitusmerkki merkitsee vaaraa. Olet tilanteessa, joka voi johtaa ruumiinvammaan. Ennen kuin työskentelet minkään laitteiston parissa, ota selvää sähkökytkentöihin liittyvistä vaaroista ja tavanomaisista onnettomuuksien ehkäisykeinoista. Tässä julkaisussa esiintyvien varoitusten käännökset löydät laitteen mukana olevasta *Regulatory Compliance and Safety Information* -kirjasesta (määräysten noudattaminen ja tietoa turvallisuudesta).

## Attention

Ce symbole d'avertissement indique un danger. Vous vous trouvez dans une situation pouvant causer des blessures ou des dommages corporels. Avant de travailler sur un équipement, soyez conscient des dangers posés par les circuits électriques et familiarisez-vous avec les procédures couramment utilisées pour éviter les accidents. Pour prendre connaissance des traductions d'avertissements figurant dans cette publication, consultez le document *Regulatory Compliance and Safety Information* (Conformité aux règlements et consignes de sécurité) qui accompagne cet appareil.

## Warnung

Dieses Warnsymbol bedeutet Gefahr. Sie befinden sich in einer Situation, die zu einer Körperverletzung führen könnte. Bevor Sie mit der Arbeit an irgendeinem Gerät beginnen, seien Sie sich der mit elektrischen Stromkreisen verbundenen Gefahren und der Standardpraktiken zur Vermeidung von Unfällen bewußt. Übersetzungen der in dieser Veröffentlichung enthaltenen Warnhinweise finden Sie im Dokument *Regulatory Compliance and Safety Information* (Informationen zu behördlichen Vorschriften und Sicherheit), das zusammen mit diesem Gerät geliefert wurde.

<b>Avvertenza</b>	<b>Questo simbolo di avvertenza indica un pericolo. La situazione potrebbe causare infortuni alle persone. Prima di lavorare su qualsiasi apparecchiatura, occorre conoscere i pericoli relativi ai circuiti elettrici ed essere al corrente delle pratiche standard per la prevenzione di incidenti. La traduzione delle avvertenze riportate in questa pubblicazione si trova nel documento <i>Regulatory Compliance and Safety Information</i> (Conformità alle norme e informazioni sulla sicurezza) che accompagna questo dispositivo.</b>
<b>Advarsel</b>	<b>Dette varselsymbolet betyr fare. Du befinner deg i en situasjon som kan føre til personskade. Før du utfører arbeid på utstyr, må du være oppmerksom på de faremomentene som elektriske kretser innebærer, samt gjøre deg kjent med vanlig praksis når det gjelder å unngå ulykker. Hvis du vil se oversettelser av de advarslene som finnes i denne publikasjonen, kan du se i dokumentet <i>Regulatory Compliance and Safety Information</i> (Overholdelse av forskrifter og sikkerhetsinformasjon) som ble levert med denne enheten.</b>
<b>Aviso</b>	<b>Este símbolo de aviso indica perigo. Encontra-se numa situação que lhe poderá causar danos físicos. Antes de começar a trabalhar com qualquer equipamento, familiarize-se com os perigos relacionados com circuitos eléctricos, e com quaisquer práticas comuns que possam prevenir possíveis acidentes. Para ver as traduções dos avisos que constam desta publicação, consulte o documento <i>Regulatory Compliance and Safety Information</i> (Informação de Segurança e Disposições Reguladoras) que acompanha este dispositivo.</b>
<b>¡Advertencia!</b>	<b>Este símbolo de aviso significa peligro. Existe riesgo para su integridad física. Antes de manipular cualquier equipo, considerar los riesgos que entraña la corriente eléctrica y familiarizarse con los procedimientos estándar de prevención de accidentes. Para ver una traducción de las advertencias que aparecen en esta publicación, consultar el documento titulado <i>Regulatory Compliance and Safety Information</i> (Información sobre seguridad y conformidad con las disposiciones reglamentarias) que se acompaña con este dispositivo.</b>
<b>Varning!</b>	<b>Denna varningssymbol signalerar fara. Du befinner dig i en situation som kan leda till personskada. Innan du utför arbete på någon utrustning måste du vara medveten om farorna med elkretsar och känna till vanligt förfarande för att förebygga skador. Se förklaringar av de varningar som förekommer i denna publikation i dokumentet <i>Regulatory Compliance and Safety Information</i> (Efterrättelse av föreskrifter och säkerhetsinformation), vilket medföljer denna anordning.</b>

## Required Tools and Equipment

You need the following tools and equipment to remove and install SPE and MRP cards:

- Number 1 Phillips screwdriver
- ESD-prevention equipment or the disposable ESD-preventive wrist strap included in the hardware accessory kit
- Antistatic mat, foam pad, or bag for removed cards (place removed components into an antistatic bag if you plan to return them to the factory; or place them on an antistatic mat or foam pad if you are replacing components)

## Safety Precautions and Maintenance Guidelines

This section provides guidelines that you should follow when working on the Cisco ICS 7750.

## General Safety Precautions

Read the warnings in this section before working on the system.



**Warning**

**Read the installation instructions before you connect the system to its power source.**



**Warning**

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



**Warning**

**This product relies on the building's installation for short-circuit (overcurrent) protection. Ensure that a fuse or circuit breaker no larger than 120 VAC, 15A U.S. (240 VAC, 16A international) is used on the phase conductors (all current-carrying conductors).**



**Warning**

**This equipment is intended to be grounded. Ensure that the host is connected to earth ground during normal use.**



**Warning**

**Only trained and qualified personnel should be allowed to install or replace this equipment.**



**Warning**

**The device is designed to work with TN power systems.**



**Warning**

**SPE cards contain a lithium battery. There is the danger of explosion if the battery is replaced incorrectly. Replace the battery only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.**

## ESD Safety Precautions

Electrostatic discharge (ESD) can damage equipment and impair electrical circuitry. ESD occurs when electronic printed circuit cards are improperly handled. ESD can result in complete or intermittent failures. Always follow ESD-prevention procedures when removing and replacing cards and other system components:

- Ensure that the chassis is electrically connected to earth ground.
- Wear an ESD-preventive wrist strap, ensuring that it makes good skin contact.
- Connect the clip to an unpainted surface of the chassis frame to safely channel ESD voltages to ground.
- To properly guard against ESD damage and shocks, the wrist strap must be used correctly. If no wrist strap is available, ground yourself by touching the metal part of the chassis.



**Caution**

**For safety, periodically check the resistance value of the antistatic strap, which should be between 1 and 10 megohms (Mohms).**

**Caution**

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Static voltages as low as 30 volts can cause latent damage to circuitry. Be sure to observe all standard antistatic procedures (for example, wear a grounding strap) when handling electronic equipment and components.

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**Warning**

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**Blank faceplates (filler panels) serve three important functions: they prevent exposure to hazardous voltages and currents inside the chassis; they contain electromagnetic interference (EMI) that might disrupt other equipment; and they direct the flow of cooling air through the chassis. Do not operate the system unless all cards and faceplates are in place.**

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## Safety with Electricity

**Note**

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The following guidelines are IMPORTANT SAFETY INSTRUCTIONS.

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Follow these guidelines when working on equipment powered by electricity:

- Locate the emergency power-off switch in the room in which you are working. Then, if an electrical accident occurs, you can quickly shut the power *off*.
- Disconnect all power before installing or removing a Cisco ICS 7750 chassis.
- Do not work alone if potentially hazardous conditions exist.
- Never assume that power is disconnected from a circuit. Always check.
- Look carefully for possible hazards in your work area, such as moist floors, ungrounded power extension cables, and missing safety grounds.

If an electrical accident occurs, proceed as follows:

- Use caution; do not become a victim yourself.
- Turn *off* power to the chassis.
- If possible, send another person to get medical aid. Otherwise, determine the condition of the victim, and then call for help.
- Determine whether the victim needs rescue breathing or external cardiac compressions; then take appropriate action.

**Note**

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SAVE THESE INSTRUCTIONS.

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## Telephone Wiring Guidelines

Use the following guidelines when working with any equipment that is connected to telephone wiring or to other network cabling:

- Never install telephone wiring during a lightning storm.
- Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations.

- Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.
- Use caution when installing or modifying telephone lines.
- Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.
- Use caution when installing or modifying telephone lines.

## More Than One Power Supply Warning



**Warning**

This unit might have more than one power supply connection. All connections need to be removed to de-energize the unit.

**Waarschuwing**

Deze eenheid kan meer dan één stroomtoevoerverbinding bevatten. Alle verbindingen dienen ontkoppeld te worden om de eenheid te ontkrachten.

**Varoitus**

Tässä laitteessa voi olla useampia kuin yksi virtakytkentä. Kaikki liitännät on irrotettava, jotta jännite poistetaan laitteesta.

**Attention**

Pour supprimer toute tension et tout courant électrique de l'unité, TOUTES les connexions d'alimentation doivent être débranchées.

**Warnung**

Dieses Gerät kann mehr als eine Stromzufuhr haben. Um sicherzustellen, daß der Einheit kein Strom zugeführt wird, müssen alle Verbindungen entfernt werden.

**Avvertenza**

Questo prodotto può avere più di una connessione di alimentazione elettrica. Tutte le connessioni devono essere staccate per togliere la corrente dal prodotto.

**Advarsel**

Denne enheten kan ha mer enn én strømtilførselskobling. Alle koblinger må fjernes fra enheten for å utkoble all strøm.

**Aviso**

Esta unidade poderá ter mais do que uma conexão de fonte de energia. Todas as conexões necessitam de ser removidas para desactivar a unidade.

**¡Advertencia!**

Esta unidad puede contar con más de una conexión para fuentes de alimentación. Para cortar por completo el suministro de energía, deben desconectarse todas las conexiones.

**Varning!**

Denna enhet har eventuellt mer än en strömförsörjningsanslutning. Alla anslutningar måste tas bort för att göra enheten strömlös.

## Lifting and Reaching Safety Precautions



Warning

To prevent personal injury or damage to the chassis, never attempt to lift or tilt the chassis using the handles on modules (such as power supplies, fans, or cards); these types of handles are not designed to support the weight of the unit. Lift the unit only by using handles that are an integral part of the chassis, or by grasping the chassis underneath its lower edge.



Warning

Two people are required to lift the chassis. To prevent injury, keep your back straight and lift with your legs, not your back.

## Module Overview

This section describes the modules that you can install in SPE or MRP cards.

### Modules for SPE310 Cards

The SPE310 ships with 512 MB of onboard RAM. You can increase the RAM on the SPE310 by installing DIMMs in its two DIMM slots. The maximum amount of RAM that is supported on the SPE310 is 1.536 GB (with a 512-MB DIMM installed in each of the two slots). You may populate one, or both, of these DIMM slots.

[Table 1](#) provides information about upgrade and replacement DIMMs for the SPE310.

**Table 1** *SPE310 Card Upgrade and Replacement DIMMs*

Description	Cisco Part Number
256-MB SDRAM DIMM	MEM-SPE-256D=
512-MB SDRAM DIMM	MEM-SPE-512D=

### Modules for ASI Cards

ASI cards ship with 64 MB of onboard RAM and can support 64 MB of add-on memory. You can install the following types of modules in an ASI card:

- DIMM. ASI cards have one DIMM slot. Installing a DIMM increases the dynamic RAM (DRAM) of ASI cards. The maximum amount of RAM that is currently supported on ASI cards is 128 MB.
- PVDM. ASI cards have two PVDM slots. Installing or replacing a PVDM gives ASI cards additional digital signal processors (DSPs) for processing heavier voice traffic loads.

[Table 2](#) provides information about the modules that are recommended for installation in ASI cards.

**Table 2 ASI Card Upgrade and Replacement DIMMs and PVDMs**

Description	Cisco Part Number
16-MB SDRAM DIMM	MEM-MRP-16D=
32-MB SDRAM DIMM	MEM-MRP-32D=
64-MB SDRAM DIMM	MEM-MRP-64D=
16-channel packet voice/fax data DSP module	PVDM-256K-16=

## Modules for MRP200 Cards

The MRP200 ships with 64 MB of onboard RAM. You can install the following types of modules in an MRP200:

- DIMM. The MRP200 has one DIMM slot. Installing a DIMM increases the dynamic RAM (DRAM) of the MRP200. The maximum amount of RAM that is supported on the MRP200 is 128 MB.
- PVDM. The MRP200 has two PVDM slots. Installing or replacing a PVDM gives the MRP200 additional DSPs for processing heavier voice traffic loads. (Refer to Chapter 6, “Configuring the Cisco ICS 7750,” in the *Cisco ICS 7750 Installation and Configuration Guide* for additional information about DSP resources on MRP cards.)
- Virtual Private Network (VPN) module. The MRP200 has a socket for a VPN module. Installing a VPN module gives the MRP200 the ability to encrypt data using the Data Encryption Standard (DES) and Triple DES (3DES) algorithms at speeds suitable for a full-duplex T1 serial connection (4 megabits per second [Mbps] for 1514-byte packets).

Table 3 provides information about the modules that you can install in the MRP200.

**Table 3 MRP200 Card Upgrade and Replacement DIMMs, PVDMs, and VPN Modules**

Description	Cisco Part Number
16-MB SDRAM DIMM	MEM-MRP-16D=
32-MB SDRAM DIMM	MEM-MRP-32D=
64-MB SDRAM DIMM	MEM-MRP-64D=
4-channel packet voice/fax data DSP module	PVDM-256K-4=
8-channel packet voice/fax data DSP module	PVDM-256K-8=
12-channel packet voice/fax data DSP module	PVDM-256K-12=
16-channel packet voice/fax data DSP module	PVDM-256K-16=
20-channel packet voice/fax data DSP module	PVDM-256K-20=
Virtual private network module	MOD7700-VPN=

## Modules for MRP300 Cards

The MRP300 ships with 64 MB of onboard RAM and can support 64 MB of add-on memory. You can install the following types of modules in an MRP300:

- DIMM. The MRP300 has one DIMM slot for upgrading MRP memory. Installing a DIMM increases the DRAM of the MRP300. The maximum amount of RAM that is supported on the MRP300 is 128 MB.
- PVDMs. The MRP300 has two PVDM slots. Installing or replacing a PVDM gives the MRP300 additional DSPs for processing heavier voice traffic loads. (Refer to Chapter 6, “Configuring the Cisco ICS 7750,” in the *Cisco ICS 7750 Installation and Configuration Guide* for additional information about DSP resources on MRP cards.)
- VPN module. The MRP300 has a socket for a VPN module. Installing a VPN module gives the MRP300 the ability to encrypt data using the DES and 3DES algorithms at speeds suitable for a full-duplex T1 serial connection (4 megabits per second [Mbps] for 1514-byte packets).
- Single in-line memory module (SIMM). The MRP300 has one SIMM Flash memory module slot. The MRP300 has 16 MB of onboard Flash memory, and it has a SIMM slot for increasing the Flash memory up to 80 MB by adding 16-MB, 32-MB, or 64-MB SIMMs.

Table 4 provides information about the modules that you can install in the MRP300.

**Table 4 MRP300 Card Upgrade and Replacement DIMMs, PVDMs, and VPN Modules**

Description	Cisco Part Number
16-MB SDRAM DIMM	MEM-MRP-16D=
32-MB SDRAM DIMM	MEM-MRP-32D=
64-MB SDRAM DIMM	MEM-MRP-64D=
4-channel packet voice/fax data DSP module	PVDM-256K-4=
8-channel packet voice/fax data DSP module	PVDM-256K-8=
12-channel packet voice/fax data DSP module	PVDM-256K-12=
16-channel packet voice/fax data DSP module	PVDM-256K-16=
20-channel packet voice/fax data DSP module	PVDM-256K-20=
Virtual private network module	MOD7700-VPN=
16-MB SIMM	MEM7700-16MFS=
32-MB SIMM	MEM7700-32MFS=
64-MB SIMM	MEM7700-64MFS=

## Modules for MRP3-8FXS and MRP3-16FXS Cards

MRP3-8FXS and MRP3-16FXS cards are ASI cards with Flash memory. They ship with 64 MB of onboard RAM and can support 64 MB of add-on memory. You can install the following types of modules in an MRP3-8FXS or MRP3-16FXS card:

- DIMM. MRP3-8FXS and MRP3-16FXS cards have one DIMM slot. Installing a DIMM increases the DRAM of MRP3-8FXS and MRP3-16FXS cards. The maximum amount of RAM that is currently supported on these cards is 128 MB.
- PVDM. MRP3-8FXS and MRP3-16FXS cards have two PVDM slots. Installing or replacing a PVDM gives these cards additional DSPs for processing heavier voice traffic loads. (Refer to Chapter 6, “Configuring the Cisco ICS 7750,” in the *Cisco ICS 7750 Installation and Configuration Guide* for additional information about DSP resources on MRP cards.)

- SIMM. The MRP3-8FXS and MRP3-16FXS cards each have one SIMM Flash memory module slot. The MRP3-8FXS and MRP3-16FXS cards have 16 MB of onboard Flash memory, and they also have a SIMM slot for increasing the Flash memory up to 80 MB by adding 16-MB, 32-MB, or 64-MB SIMMs.

Table 5 provides information about the modules that are recommended for installation in MRP3-8FXS and MRP3-16FXS cards.

**Table 5** MRP3-8FXS and MRP3-16FXS Card Upgrade and Replacement DIMMs and PVDMs

Description	Cisco Part Number
16-MB SDRAM DIMM	MEM-MRP-16D=
32-MB SDRAM DIMM	MEM-MRP-32D=
64-MB SDRAM DIMM	MEM-MRP-64D=
16-channel packet voice/fax data DSP module	PVDM-256K-16=
16-MB SIMM	MEM7700-16MFS=
32-MB SIMM	MEM7700-32MFS=
64-MB SIMM	MEM7700-64MFS=

## Hot Swapping Cards

You can hot swap cards while the Cisco ICS 7750 is operating. With hot swapping, you do not need to power down the system.



### Warning

**Only trained and qualified personnel should be allowed to install or replace this equipment.**



### Caution

You can install only one system alarm processor (SAP) and one system switch processor (SSP) card in a single Cisco ICS 7750 chassis. If you must hot swap the SAP, the cooling fans do not operate, and the system's ability to detect alarms associated with the operating environment, fans, and power supply modules is degraded until an operational SAP is properly reinserted in the chassis. If you must hot swap the SSP, the system loses LAN connectivity, and calls being made from or to Cisco IP Phones that are routed through that SSP are disconnected until an operational SSP is properly reinserted in the chassis.



### Note

Depending on your system configuration, hot swapping SPEs, ASIs, or MRPs can adversely affect users connected to the system. For example, if Cisco CallManager is running on only one SPE, hot swapping that SPE disconnects calls to or from the Public Switched Telephone Network (PSTN) and prevents the system from processing further PSTN traffic until an operational SPE is properly reinserted in the chassis. Similarly, hot swapping an MRP that is in the process of routing voice or WAN traffic prevents that traffic from reaching its destination. Contact your Cisco sales representative for guidelines on installing cards and software on your system for maximum availability and redundancy.

## Card and Module Replacement Guidelines

The following are examples of recommended practices for inserting system cards:

- Do not force the faceplate into its slot. This action can damage the pins on the backplane if they are not aligned properly with the module or card.
- Fully depress the ejector levers to ensure that the card or module connector mates with the backplane correctly. The card or module should be firmly seated in the slot. Any card that is only partially connected to the backplane can disrupt system operation.
- Use the installation screws (at the top and bottom of the card) to secure the card firmly in place in the chassis.

## Removing Cards

For card removal instructions, refer to [Cisco ICS 7750 FRU Installation and Replacement](#).



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**Note** Do not press the SHTDN button on any card other than the SPE card.

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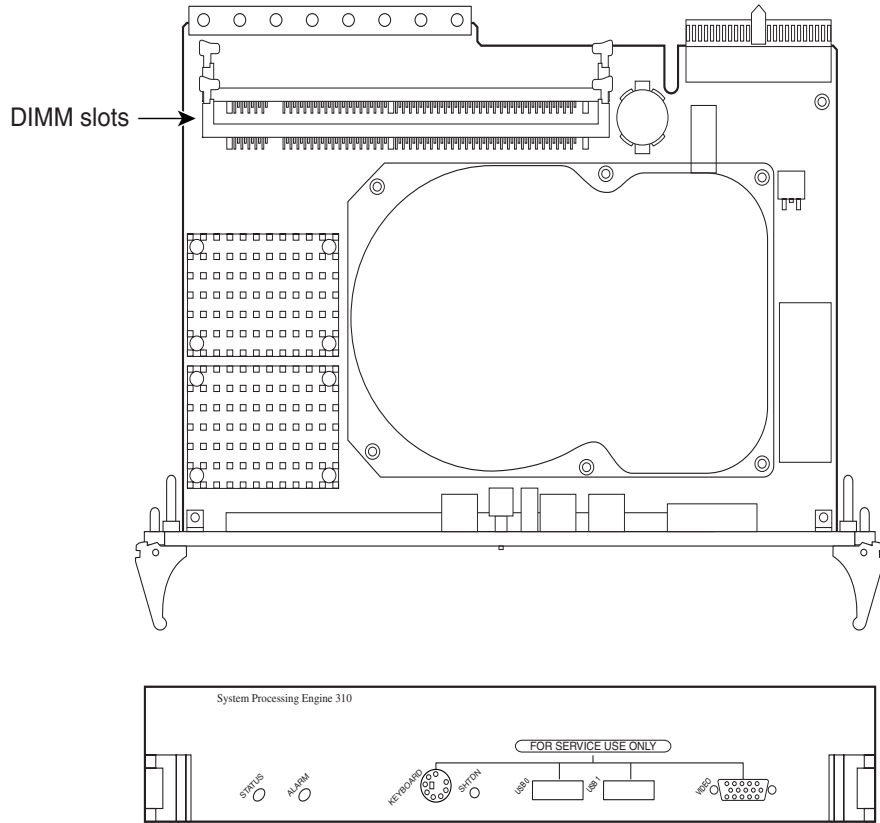
## Locating Modules

This section shows you how to locate the DIMM and PVDM slots on SPE310, MRP200, ASI81, ASI160, MRP300, MRP3-8FXS, and MRP3-16FXS cards, and the SIMM (Flash memory) slots on the MRP300, MRP3-8FXS, and MRP3-16FXS cards.

# Locating the DIMM Slots on the SPE310

The SPE310 has two DIMM slots (see [Figure 1](#)).

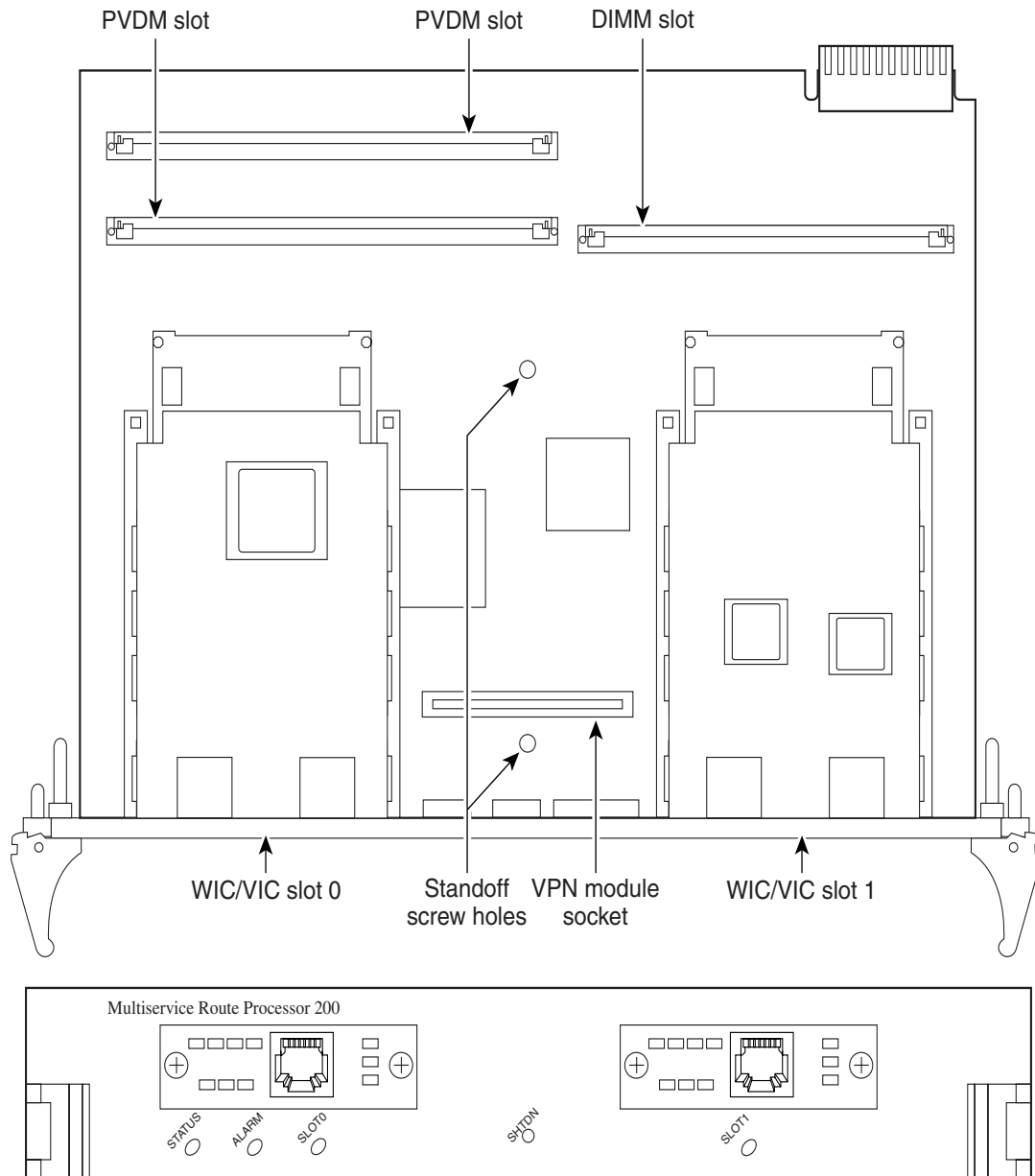
**Figure 1** *SPE310—DIMM Locations*



## Locating the DIMM and PVDM Slots on MRP200 and ASI Cards, and the VPN Module Socket on MRP200 Cards

The MRP200 has one DIMM slot, two PVDM slots, and one VPN module socket. ASI cards have one DIMM slot and two PVDM slots. See [Figure 2](#).

**Figure 2** MRP200, ASI81, and ASI160—DIMM, PVDM, and VPN Module Locations



**Note** The VPN module socket is installed on the MRP200. The ASI cards do not have a VPN module socket.

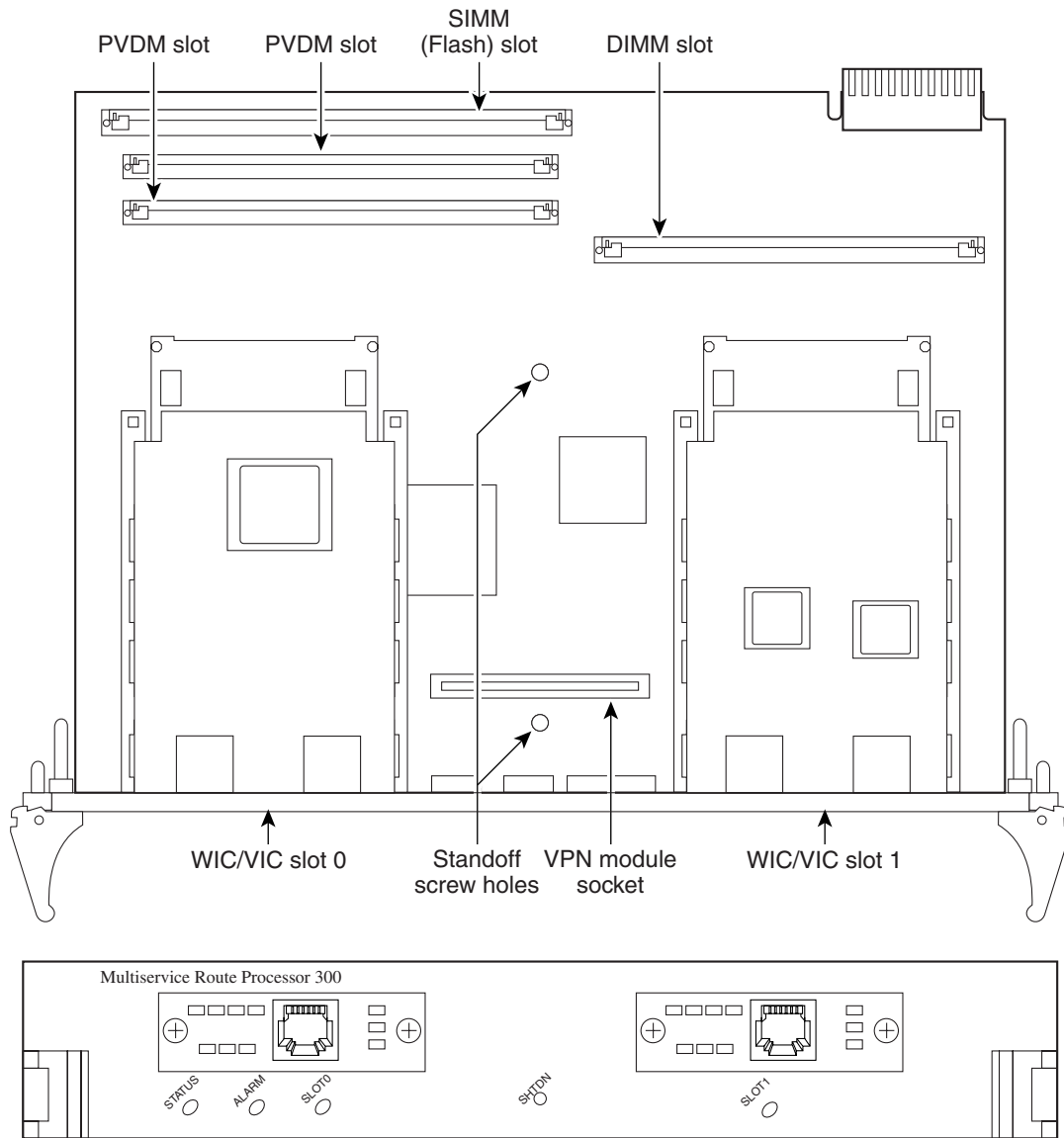
**Note**

For a front view of ASI81 and ASI160 cards, refer to the “Processor Cards Feature Summary” chapter in the *Cisco ICS 7750 System Description*.

## Locating the DIMM, PVDM, and Flash Memory Slots on MRP300, MRP3-8FXS, and MRP3-16FXS Cards, and the VPN Module Socket on MRP300 Cards

The MRP300 has one DIMM slot, two PVDM slots, one VPN module socket, and one SIMM (Flash memory) slot. MRP3-8FXS and MRP3-16FXS cards have one DIMM slot, two PVDM slots, and one SIMM (Flash memory) slot. See [Figure 3](#).

**Figure 3** MRP300, MRP3-8FXS, and MRP3-16FXS—DIMM, PVDM, SIMM, and VPN Modules



**Note** The VPN module socket is installed on the MRP300. The MRP3-8FXS and MRP3-16FXS cards do not have a VPN module socket.



**Note** The MRP3-8FXS and MRP3-16FXS cards look identical to the ASI81 and ASI160 cards except for the names on the front panel. For a front view of ASI81 and ASI160 cards, refer to the [Cisco ICS 7750 System Description](#), “Processor Cards Feature Summary” chapter.

# Removing and Installing Modules

This section explains how to remove and install modules.



**Warning** When performing the procedures in this section, wear grounding wrist straps to avoid ESD damage to the Cisco ICS 7750. Do not directly touch the backplane with your hand or any metal tool, to prevent personal injury or equipment damage.

## Removing and Installing DIMMs

This section explains how to remove and install DIMMs.

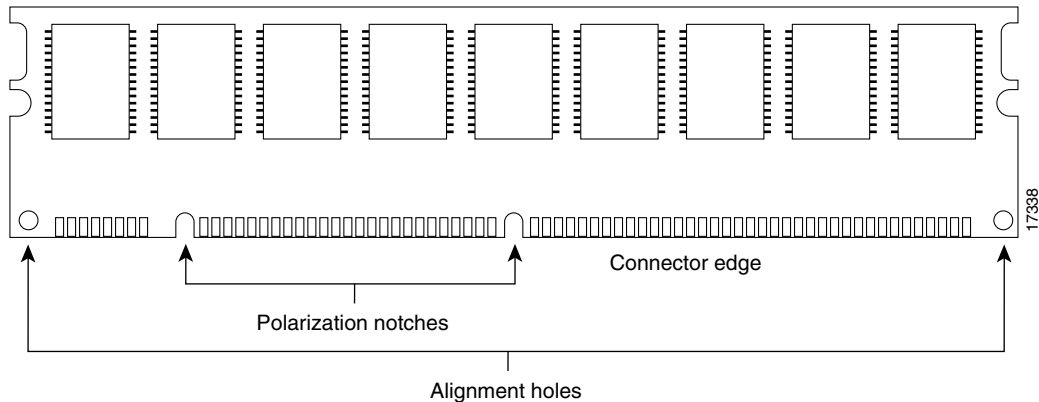
### DIMM Orientation

DIMMs are manufactured with polarization notches to ensure proper orientation and with alignment holes to ensure proper positioning. [Figure 4](#) shows the notches and holes on a DIMM. DIMMs are installed with the connector edge down.



**Caution** To avoid damaging ESD-sensitive components, observe all ESD precautions. To avoid damaging the underlying board, do not use excessive force when you remove or replace DIMMs.

**Figure 4** DIMM Orientation Aids



### Removing a DIMM from an SPE Card

Complete the following steps to remove a DIMM from an SPE310.

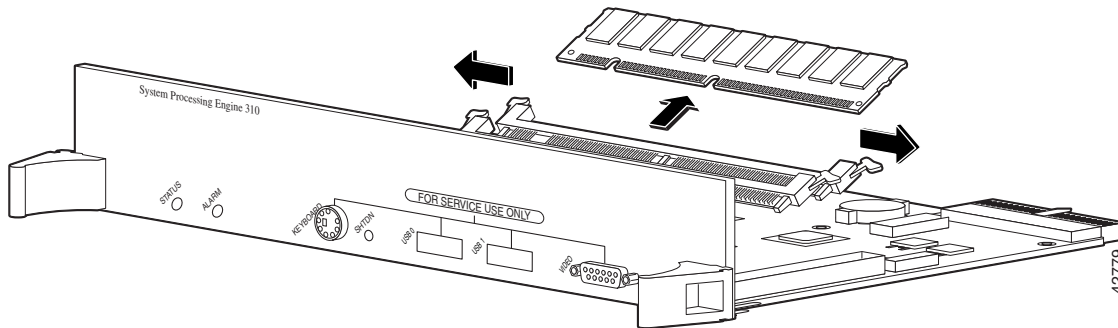
- Step 1** Attach an ESD-preventive wrist strap, and ensure that it makes good contact with your skin. Connect the equipment end of the wrist strap to the metal back plate of the chassis, avoiding contact with the connectors.
- Step 2** Locate the DIMM slots on the SPE. See [Figure 1 on page 14](#).

**Caution**

Handle DIMMs by the edges only. DIMMs are ESD-sensitive components, and they can be damaged by mishandling.

- Step 3** Remove the DIMM by pushing the plastic release latches on each side of the DIMM slot outward. (See [Figure 5](#).) This ejects the DIMM from its socket.

**Figure 5** Removing a DIMM from an SPE Card



- Step 4** Hold the DIMM by the edges with your thumbs and index fingers, and lift it out of the socket. Place the removed DIMM in an antistatic bag to protect it from ESD damage.
- Step 5** If necessary, repeat Step 3 and Step 4 for the other DIMM.

## Installing a DIMM in an SPE Card

Complete the following steps to install a DIMM in an SPE310:

- Step 1** Attach an ESD-preventive wrist strap and ensure that it makes good contact with your skin. Connect the equipment end of the wrist strap to the metal back plate of the chassis, avoiding contact with the connectors.

**Caution**

Handle DIMMs by the edges only. DIMMs are ESD-sensitive components, and they can be damaged by mishandling.

- Step 2** Remove the DIMM from its antistatic packaging.

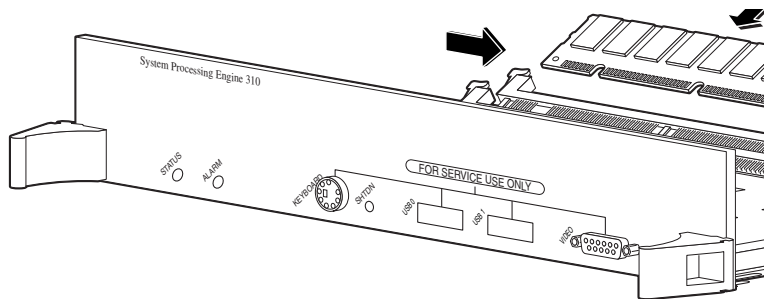
- Step 3** Hold the DIMM with the polarization notches closer to the card edge and with the connector edge at the bottom.

**Caution**

It is normal to feel some resistance when installing a DIMM, but do not use excessive force on the DIMM, and do not touch the surface components.

- Step 4** Insert the DIMM perpendicular to the socket. Push the DIMM firmly into place (see [Figure 6](#)), using the minimum amount of force required. When the DIMM is properly seated, the socket guide posts fit through the alignment holes, and the locking spring clips click into place.

**Figure 6** Installing a DIMM in an SPE Card



- Step 5** Ensure that each DIMM is straight (perpendicular to the socket).
- Step 6** Repeat Steps 3 through 5 as necessary for a second DIMM.

If you do not intend to install components on any other cards, go to [“Installing Cards” on page 31](#). To install a DIMM on an MRP200, MRP300, MRP3-8FXS, MRP3-16FXS, or ASI card, continue with the next two sections. To install PVDMs on an MRP200, MRP300, MRP3-8FXS, MRP3-16FXS, or ASI card, go to [“Removing and Installing PVDMs” on page 22](#). To install a VPN module on an MRP200 or MRP300, go to [“Installing a VPN Module in the MRP200 or MRP300” on page 28](#).

### Removing the DIMM from an MRP200, MRP300, MRP3-8FXS, MRP3-16FXS, or ASI Card

Complete the following steps to remove the DIMM from an MRP200, MRP300, MRP3-8FXS, MRP3-16FXS, or ASI card:

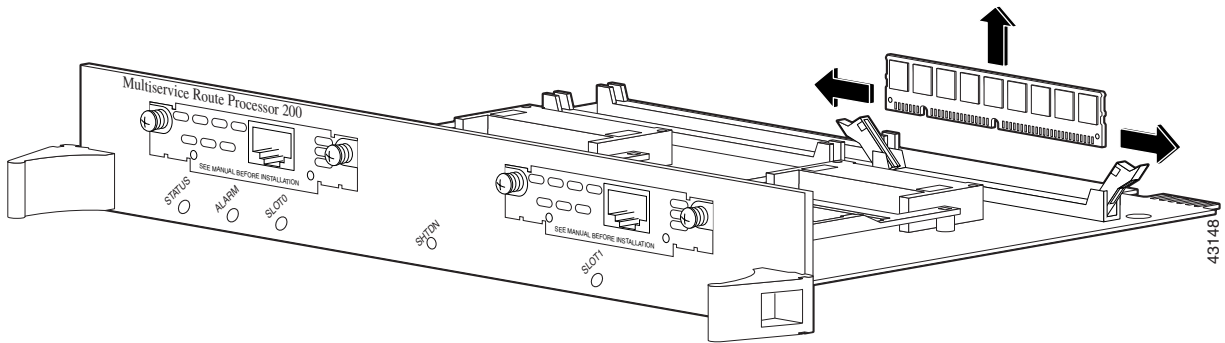
- Step 1** Attach an ESD-preventive wrist strap, and ensure that it makes good contact with your skin. Connect the equipment end of the wrist strap to the metal back plate of the chassis, avoiding contact with the connectors.
- Step 2** Locate the DIMM slot on the MRP200 or the ASI card (see [Figure 2 on page 15](#)), MRP300, MRP3-8FXS, or the MRP3-16FXS card (see [Figure 3 on page 17](#).)



**Caution** Handle DIMMs by the edges only. DIMMs are ESD-sensitive components, and they can be damaged by mishandling.

- Step 3** Remove the DIMM by pushing the plastic release latches on each side of the DIMM slot outward. (See [Figure 7](#).) This ejects the DIMM from its socket.

**Figure 7** Removing the DIMM from an MRP200, MRP300, MRP3-8FXS, MRP3-16FXS, or ASI Card



- Step 4** Hold the DIMM by the edges with your thumbs and index fingers, and lift it out of the socket. Place the removed DIMM in an antistatic bag to protect it from ESD damage.

## Installing a DIMM in an MRP200, MRP300, MRP3-8FXS, MRP3-16FXS, or ASI Card

Complete the following steps to install a DIMM in an MRP200, MRP300, MRP3-8FXS, MRP3-16FXS, or an ASI card:

- Step 1** Attach an ESD-preventive wrist strap, and ensure that it makes good contact with your skin. Connect the equipment end of the wrist strap to the metal back plate of the chassis, avoiding contact with the connectors.



**Caution**

Handle DIMMs by the edges only. DIMMs are ESD-sensitive components, and they can be damaged by mishandling.

- Step 2** Remove the replacement DIMM from its antistatic packaging.
- Step 3** Hold the DIMM with the polarization notches closer to the center of the card and with the connector edge at the bottom.

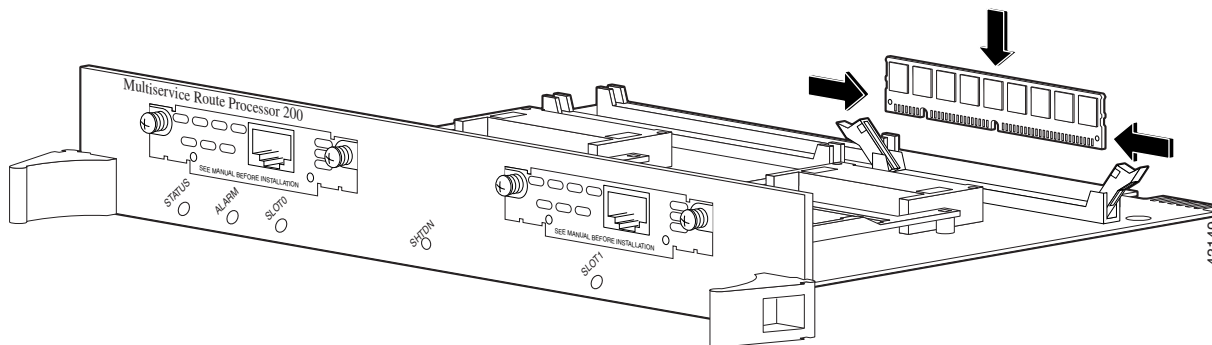


**Caution**

It is normal to feel some resistance when installing a DIMM, but do not use excessive force on the DIMM, and do not touch the surface components.

- Step 4** Insert the DIMM perpendicular to the socket. Push the DIMM firmly into place (see [Figure 8](#)), using the minimum amount of force required. When the DIMM is properly seated, the socket guide posts fit through the alignment holes, and the locking spring clips click into place.

**Figure 8** Installing a DIMM in an MRP200, MRP300, MRP3-8FXS, MRP3-16FXS, or ASI Card



**Step 5** Ensure that the DIMM is straight (perpendicular to the socket).

When you finish installing DIMMs, if you do not intend to install PVDMs or a VPN module on this card and do not intend to install components on any other cards, go to [“Installing Cards” on page 31](#). To install PVDMs on an MRP200, MRP300, MRP3-8FXS, MRP3-16FXS, or ASI card, continue with [“Removing and Installing PVDMs” on page 22](#). To install a VPN module on an MRP200 or MRP300, go to [“Installing a VPN Module in the MRP200 or MRP300” on page 28](#).

## Removing and Installing PVDMs

This section explains how to remove and install PVDMs on MRP200, MRP300, MRP3-8FXS, MRP3-16FXS, and ASI cards.



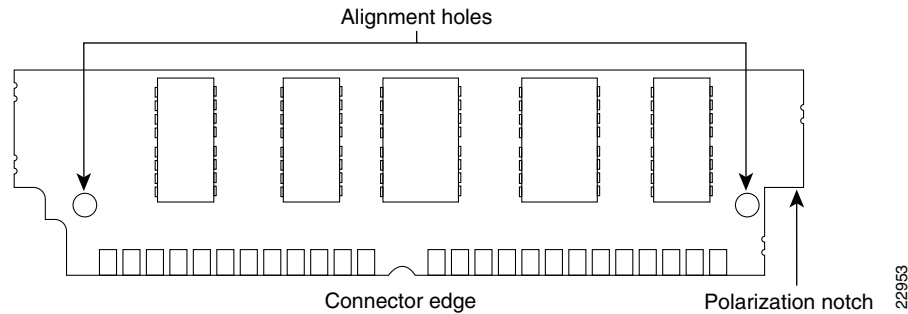
**Note** PVDM modules and SIMM Flash memory modules are set into the cards in different directions when you remove or install either of these modules. SIMM Flash memory modules are available on MRP300, MRP3-8FXS, and MRP3-16FXS cards only. On MRP200, ASI81, and ASI160 cards, the PVDM modules tilt from the center of the card to the edge of the card. On MRP300, MRP3-8FXS, and MRP3-16FXS cards, the PVDM modules tilt from the edge of the card toward the center of the card.

### PVDM Orientation

PVDMs are manufactured with a polarization notch to ensure proper orientation and with alignment holes to ensure proper positioning. [Figure 9 on page 23](#) shows the notch and the holes on a PVDM. PVDMs are installed with the connector edge down.



**Caution** To avoid damaging ESD-sensitive components, observe all ESD precautions. To avoid damaging MRP200, MRP300, MRP3-8FXS, MRP3-16FXS, or ASI cards, avoid using excessive force when you remove or replace PVDMs.

**Figure 9 PVDM Orientation**

## Removing PVDMs

Complete the following steps to remove PVDMs:

- 
- Step 1** Attach an ESD-preventive wrist strap, and ensure that it makes good contact with your skin. Connect the equipment end of the wrist strap to the metal back plate of the chassis, avoiding contact with the connectors.
- Step 2** Locate the PVDM slots on the MRP200 or the ASI card (see [Figure 2 on page 15](#)), MRP300, MRP3-8FXS, or the MRP3-16FXS card (see [Figure 3 on page 17](#).)

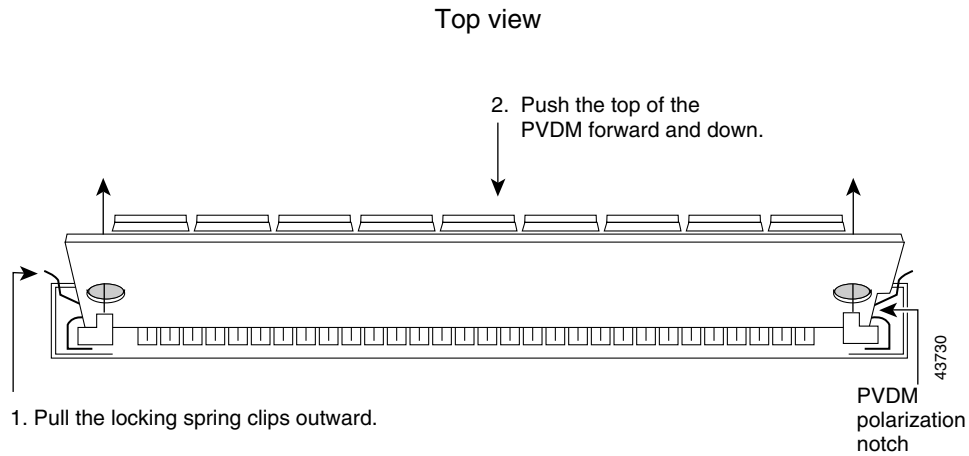


**Caution**

Handle PVDMs by the card edges only. PVDMs are ESD-sensitive components, and they can be damaged by mishandling.

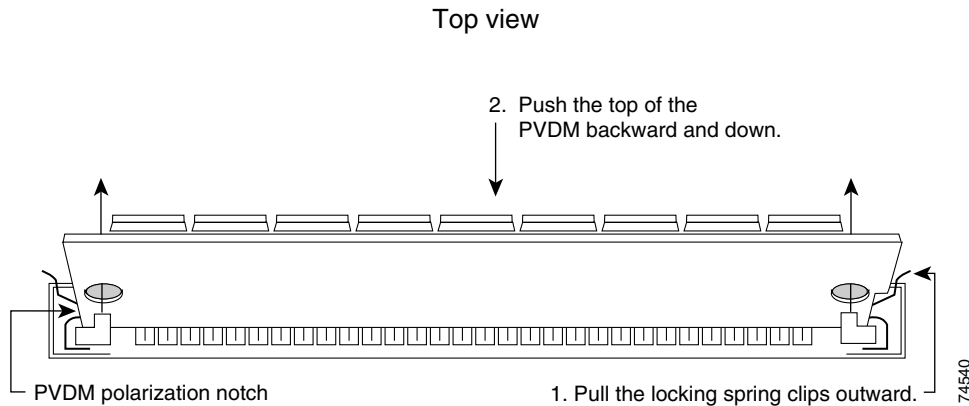
- 
- Step 3** Remove one PVDM at a time, beginning with the PVDM closest to the rear of the card. To lift the PVDM out of its socket, pull the locking spring clips on both sides outward, and tilt the PVDM so it is free of the clips.
- a. On the MRP200, ASI81, or ASI160 cards, tilt the PVDM away from the rear of the card. (See [Figure 10 on page 24](#).)

**Figure 10** Removing PVDMs on the MRP200, ASI81, or ASI160



- b. On the MRP300, MRP3-8FXS, or MRP3-16FXS cards, tilt the PVDM toward the rear of the card. (See [Figure 11.](#))

**Figure 11** Removing PVDMs on the MRP300, MRP3-8FXS, or MRP3-16FXS



- Step 4** Hold the PVDM by the edges with your thumbs and index fingers, and lift it out of the socket. Place the removed PVDM in an antistatic bag to protect it from ESD damage.
- Step 5** Repeat Step 4 for the second PVDM.

## Installing PVDMs

Complete the following steps to install PVDMs:

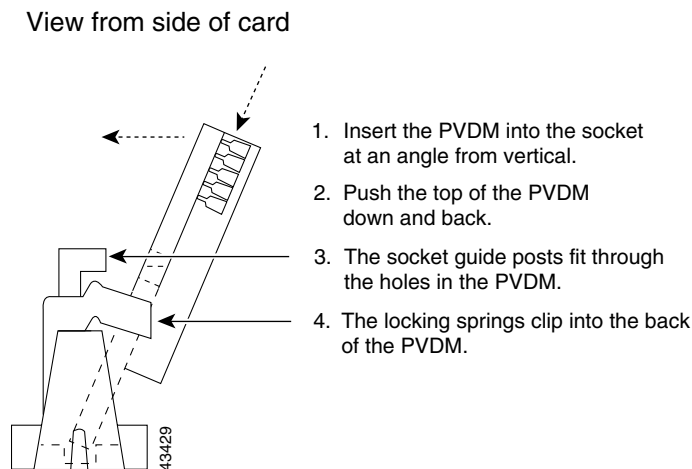
- Step 1** Attach an ESD-preventive wrist strap, and ensure that it makes good contact with your skin. Connect the equipment end of the wrist strap to the metal back plate of the chassis, avoiding contact with the connectors.
- Step 2** Locate the PVDM slots on the MRP200 or the ASI card (see [Figure 2 on page 15](#)), or on the MRP300, MRP3-8FXS, or the MRP3-16FXS card (see [Figure 3 on page 17](#).)

**Caution**

Handle PVDMs by the card edges only. PVDMs are ESD-sensitive components, and they can be damaged by mishandling.

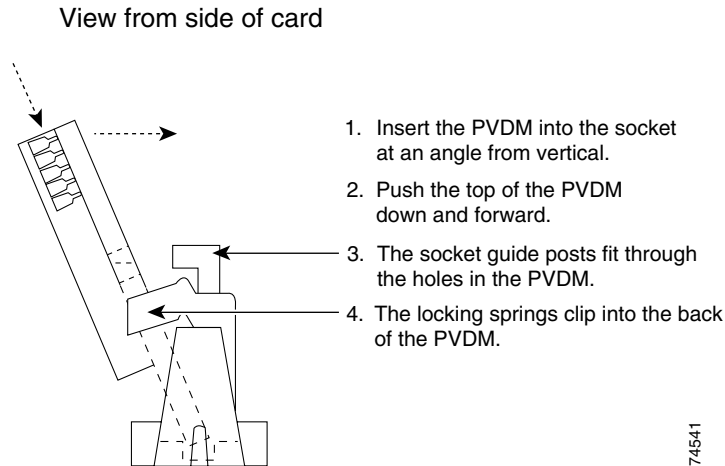
- Step 3** Hold the PVDM with the polarization notch closer to the card edge and the connector edge at the bottom (see [Figure 10 on page 24](#)).
- Step 4** On MRP200, ASI81, and ASI160 cards, beginning with the slot closer to the front of the card, insert the PVDM into the connector slot at an angle, tilted toward the center of the card. Align or move the PVDM into a vertical position (see [Figure 12](#)), using the minimum amount of force required. When the PVDM is properly seated, the socket guide posts fit through the alignment holes, and the connector springs click into place.

**Figure 12** *Installing PVDMs on the MRP200, ASI81, or ASI160*



- Step 5** Ensure that the PVDM is straight and that the alignment holes line up with the plastic guides on the socket (see [Figure 10 on page 24](#)).
- Step 6** On MRP300, MRP3-8FXS, and MRP3-16FXS cards, beginning with the slot closer to the front of the card, insert the PVDM into the connector slot at an angle, tilted toward the rear of the card. Align or move the PVDM into a vertical position (see [Figure 13 on page 26](#)), using the minimum amount of force required. When the PVDM is properly seated, the socket guide posts fit through the alignment holes, and the connector springs click into place.

**Figure 13** Installing PVDMs on the MRP300, MRP3-8FXS, or MRP3-16FXS



**Step 7** Ensure that the PVDM is straight and that the alignment holes line up with the plastic guides on the socket (see [Figure 11 on page 24](#)).



**Caution**

It is normal to feel some resistance, but do not use excessive force on the PVDM, and do not touch the surface components.

**Step 8** Repeat Step 3 through Step 7 for the second PVDM.

## Removing and Installing SIMMs

This section explains how to remove and install SIMM Flash memory modules on MRP300, MRP3-8FXS, and MRP3-16FXS cards.



**Note**

SIMM Flash memory modules are available on MRP300, MRP3-8FXS, and MRP3-16FXS cards only.

Complete the following steps to remove the SIMM Flash memory module from an MRP300, MRP3-8FXS, or MRP3-16FXS card:

**Step 1** Attach an ESD-preventive wrist strap, and ensure that it makes good contact with your skin. Connect the equipment end of the wrist strap to the metal back plate of the chassis, avoiding contact with the connectors.

**Step 2** Locate the SIMM Flash memory slot on the MRP300, MRP3-8FXS, or MRP3-16FXS card. (See [Figure 3 on page 17](#).)



**Caution**

Handle SIMMs by the edges only. SIMMs are ESD-sensitive components, and they can be damaged by mishandling.

- Step 3** Remove the SIMM by pulling the locking spring clips on both sides outward and tilting the SIMM free of the clips.
- Step 4** Hold the SIMM by the edges with your thumbs and index fingers, and lift it out of the socket. Place the removed SIMM in an antistatic bag to protect it from ESD damage.
- 

## Installing a SIMM in an MRP300, MRP3-8FXS, or MRP3-16FXS Card

Complete the following steps to install a SIMM Flash memory module in an MRP300, MRP3-8FXS, or MRP3-16FXS card:

---

- Step 1** Attach an ESD-preventive wrist strap, and ensure that it makes good contact with your skin. Connect the equipment end of the wrist strap to the metal back plate of the chassis, avoiding contact with the connectors.

- Step 2** Locate the SIMM Flash memory slot on the MRP300, MRP3-8FXS, or MRP3-16FXS card (see [Figure 3 on page 17](#)).



**Caution** Handle SIMMs by the edges only. SIMMs are ESD-sensitive components, and they can be damaged by mishandling.

---

- Step 3** Remove the replacement SIMM from its antistatic packaging.

- Step 4** Face the front panel of the MRP300, MRP3-8FXS, or MRP3-16FXS card. Hold the SIMM with the component side toward you.

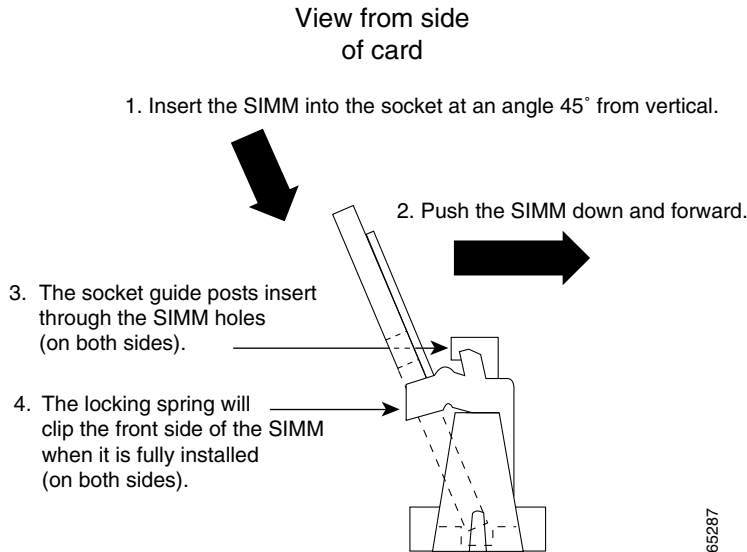


**Caution** It is normal to feel some resistance when installing a SIMM, but do not use excessive force on the SIMM, and do not touch the surface components.

---

- Step 5** Position the SIMM so that the indexing slot in the connector (bottom edge) of the SIMM is lined up with the indexing tab inside the SIMM slot. Tilt the SIMM 45 degrees away from the rear of the card, and insert it into the slot (see [Figure 14 on page 28](#)). Rock it into its vertical position, using the minimum amount of force required. When the SIMM is properly seated, the connector springs will click into place.
-

**Figure 14** Installing a SIMM Flash Memory Module in an MRP300, MRP3-8FXS or MRP3-16FXS Card



When you finish installing a SIMM, if you do not intend to install a VPN module on this card and do not intend to install components on any other cards, go to [“Installing Cards” on page 31](#). To install PVDMs on an MRP200, MRP300, MRP3-8FXS, MRP3-16FXS, or ASI card, continue with [“Removing and Installing PVDMs” on page 22](#). To install a VPN module on an MRP200 or MRP300, go to [“Installing a VPN Module in the MRP200 or MRP300” on page 28](#). To install DIMMs on an SPE, go to [“Installing a DIMM in an SPE Card” on page 19](#).

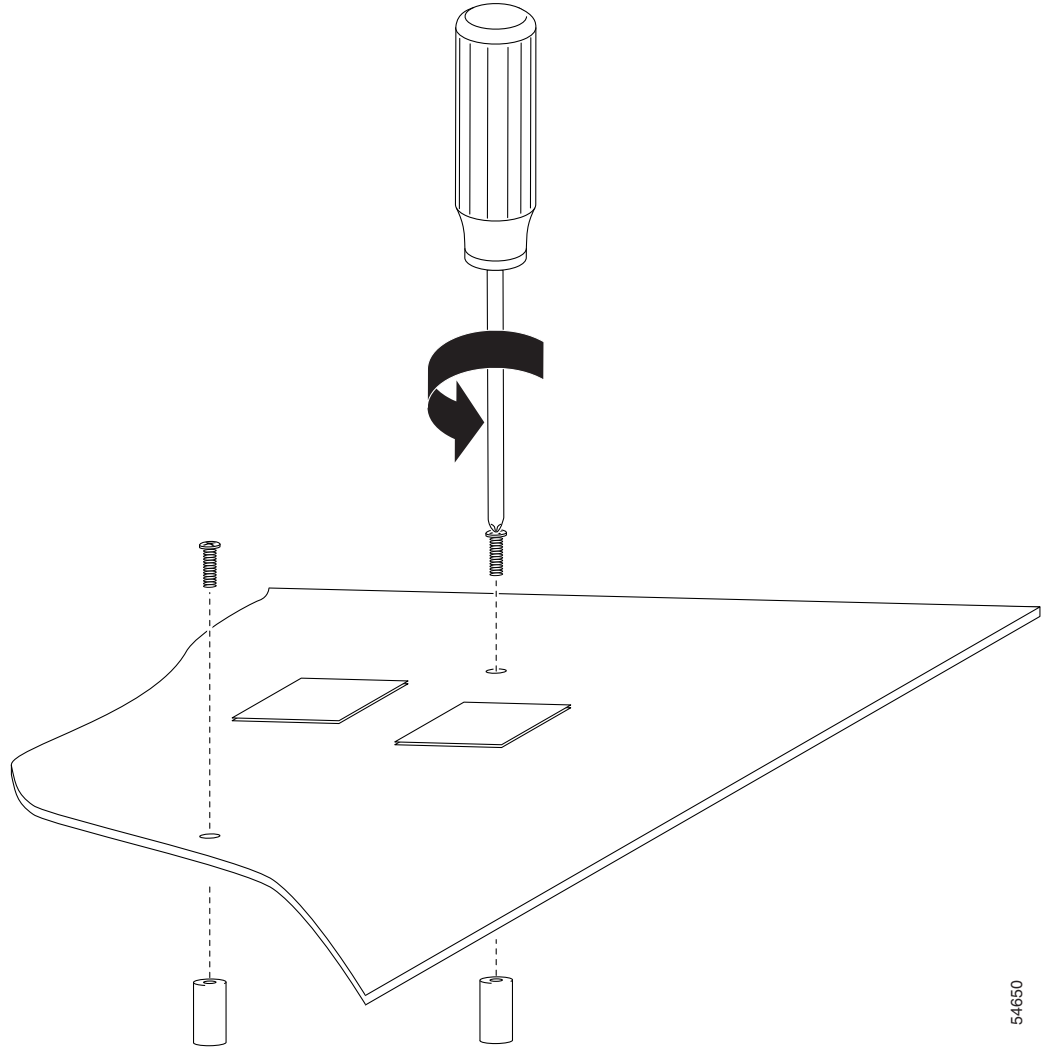
## Installing a VPN Module in the MRP200 or MRP300

Follow these steps to install a VPN module in the MRP200 or MRP300:

- Step 1** Attach an ESD-preventive wrist strap, and ensure that it makes good contact with your skin. Connect the equipment end of the wrist strap to the metal back plate of the chassis, avoiding contact with the connectors.
- Step 2** Locate the VPN module socket and the two holes in the MRP200 motherboard that are used for the VPN module standoff screws (see [Figure 2 on page 15](#)). For the MRP300, see [Figure 3 on page 17](#).
- Step 3** Turn the MRP bottom side up, and attach the two metal standoffs to the MRP200 or MRP300, using the screws provided with the VPN module (see [Figure 15 on page 29](#)). The standoffs should be on the same side of the motherboard as the VPN module socket.

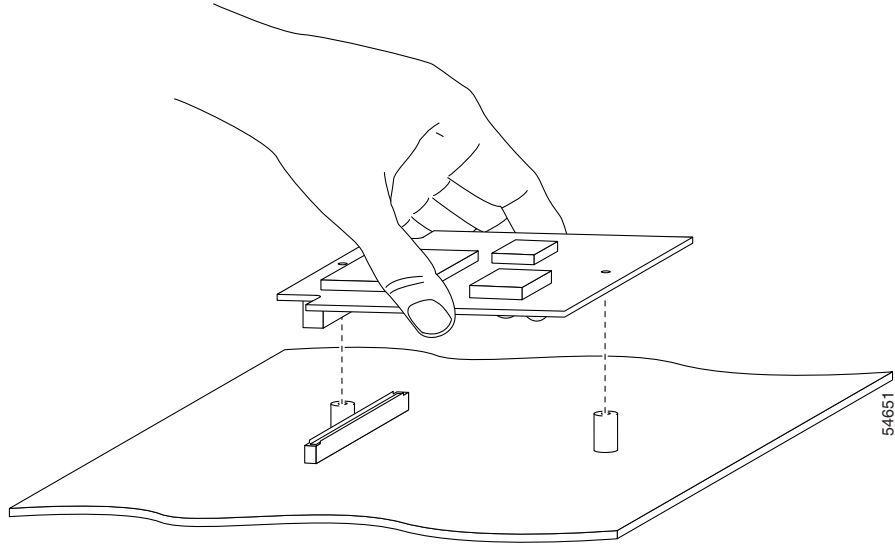


**Caution** Handle the MRP200 or MRP300 and the VPN module by the card edges only. These items are ESD-sensitive components, and they can be damaged by mishandling.

**Figure 15** *Installing Standoffs*

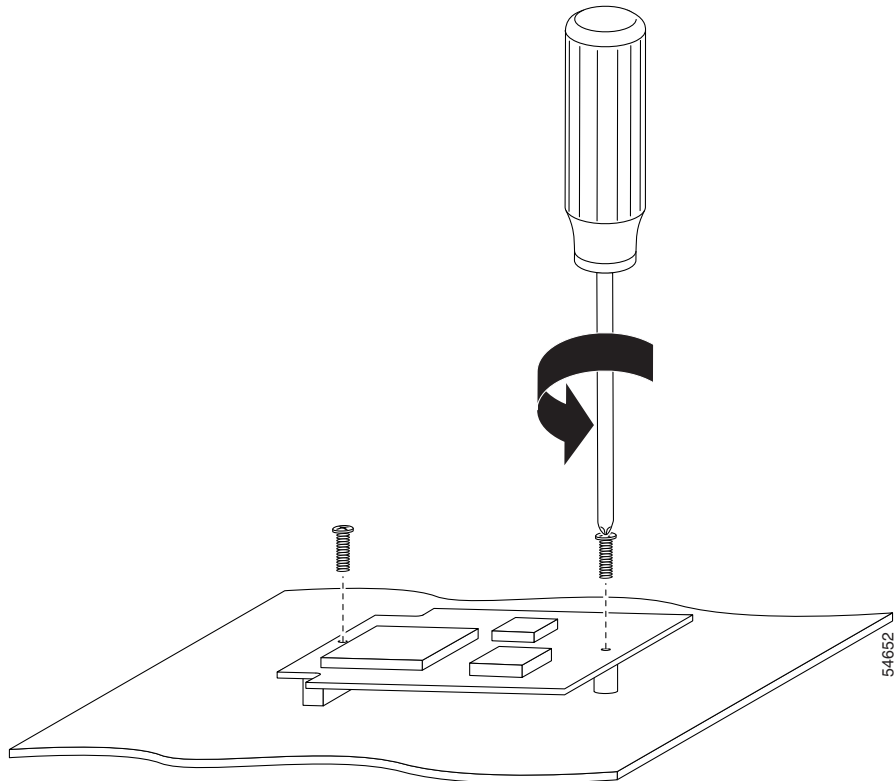
**Step 4** Turn the MRP right side up, and insert the VPN module into the VPN module socket (see [Figure 16](#)).

**Figure 16** *Installing the VPN Module*



**Step 5** Secure the VPN module to the metal standoffs (see [Figure 17](#)).

**Figure 17** *Securing the VPN Module*



# Installing Cards

For card installation instructions, refer to *Cisco ICS 7750 FRU Installation and Replacement*.

## RMA Return Instructions

Under the terms and conditions of the Cisco Systems return materials authorization (RMA) policy, any replaced RMA parts must be returned to Cisco Systems.

Follow these guidelines to return parts:

- Use the disposable grounding wrist trap when packing and handling electronic part(s).
- Reuse the original packaging material to return electronic parts.
- Affix an RMA return shipping label to the outside of each package.
- Write the RMA number on the outside of all packages you return and in the reference field (Section 2) on the waybill.
- Return the parts within ten days of the date that you receive the replacement parts, or you will be billed for the outstanding parts at list price. If you are unable to return the parts within this time frame, you must call Asset Recovery at 408 526-7284 to get an approved extension.
- You are responsible for all return shipping costs and customs duties. For all non-U.S. returns, you must include five copies of the proforma/customs invoice for each shipment, which lists the following items: RMA number; value of the items; description of items (including the Cisco product number).
- Send a copy of the waybill and flight details by fax to Cisco USA at 408 526-5533. You can also send a copy of the waybill and flight details by e-mail to [asset-recovery@cisco.com](mailto:asset-recovery@cisco.com). Either method eliminates the need for further information from you and assists Cisco Systems in closing the RMA.
- For U.S. returns, please send a copy of the ship date and waybill tracking number as follows:
  - Fax: 408 526-5533
  - E-mail: [asset-recovery@cisco.com](mailto:asset-recovery@cisco.com)
- For all returns, ship the return parts freight-prepaid to:

Cisco Systems  
RMA Receiving  
2011A Senter Road  
Docks 2-3-4  
San Jose, CA 95112  
Attention: RMA #

## Checking the Status of Returned RMA Parts

To check the status of your RMA on the web, go to the following website:

[http://www.cisco.com/cgi-bin/front.x/agents/svo\\_tools/SVOStatusDispatcher](http://www.cisco.com/cgi-bin/front.x/agents/svo_tools/SVOStatusDispatcher)

If you have any questions, please use any of the following methods to contact Cisco Systems:

- For U.S. customers: 800 800-1180, extension 6-7284
- For international customers: 408 526-7284
- For all customers:
  - FAX number: 408 526-5533
  - Electronic mail: [asset-recovery@cisco.com](mailto:asset-recovery@cisco.com)

## Related Documentation

Use this document with the following documents listed in the following sections:

### Cisco ICS 7750 Documents

The documents described in this section are available on Cisco.com and on CD:

- On Cisco.com, starting under the **Service & Support** heading, navigate to **Technical Documents > Voice/Telephony > Cisco ICS 7750**.
- On the Documentation CD-ROM (order number DOC-CONDOCCD=), navigate to **Product Documentation > Voice/Telephony > Cisco ICS 7750**.

## Obtaining Documentation

The following sections provide sources for obtaining documentation from Cisco Systems.

### World Wide Web

You can access the most current Cisco documentation on the World Wide Web at the following URL:

<http://www.cisco.com>

Translated documentation is available at the following URL:

[http://www.cisco.com/public/countries\\_languages.shtml](http://www.cisco.com/public/countries_languages.shtml)

### Documentation CD-ROM

Cisco documentation and additional literature are available in a CD-ROM package, which ships with your product. The Documentation CD-ROM is updated monthly and may be more current than printed documentation. The CD-ROM package is available as a single unit or as an annual subscription.

## Ordering Documentation

Cisco documentation is available in the following ways:

- Registered Cisco Direct Customers can order Cisco Product documentation from the Networking Products MarketPlace:  
[http://www.cisco.com/cgi-bin/order/order\\_root.pl](http://www.cisco.com/cgi-bin/order/order_root.pl)
- Registered Cisco.com users can order the Documentation CD-ROM through the online Subscription Store:  
<http://www.cisco.com/go/subscription>
- Nonregistered Cisco.com users can order documentation through a local account representative by calling Cisco corporate headquarters (California, USA) at 408 526-7208 or, in North America, by calling 800 553-NETS(6387).

## Documentation Feedback

If you are reading Cisco product documentation on the World Wide Web, you can submit technical comments electronically. Click **Feedback** in the toolbar and select **Documentation**. After you complete the form, click **Submit** to send it to Cisco.

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To submit your comments by mail, for your convenience many documents contain a response card behind the front cover. Otherwise, you can mail your comments to the following address:

Cisco Systems, Inc.  
Document Resource Connection  
170 West Tasman Drive  
San Jose, CA 95134-9883

We appreciate your comments.

## Obtaining Technical Assistance

Cisco provides Cisco.com as a starting point for all technical assistance. Customers and partners can obtain documentation, troubleshooting tips, and sample configurations from online tools. For Cisco.com registered users, additional troubleshooting tools are available from the TAC website.

## Cisco.com

Cisco.com is the foundation of a suite of interactive, networked services that provides immediate, open access to Cisco information, networking solutions, services, programs, and resources at any time, from anywhere in the world.

Cisco.com is a highly integrated Internet application and a powerful, easy-to-use tool that provides a broad range of features and services to help you to

- Streamline business processes and improve productivity
- Resolve technical issues with online support
- Download and test software packages

- Order Cisco learning materials and merchandise
- Register for online skill assessment, training, and certification programs

You can self-register on Cisco.com to obtain customized information and service. To access Cisco.com, go to the following URL:

<http://www.cisco.com>

## Technical Assistance Center

The Cisco TAC is available to all customers who need technical assistance with a Cisco product, technology, or solution. Two types of support are available through the Cisco TAC: the Cisco TAC Web Site and the Cisco TAC Escalation Center.

Inquiries to Cisco TAC are categorized according to the urgency of the issue:

- Priority level 4 (P4)—You need information or assistance concerning Cisco product capabilities, product installation, or basic product configuration.
- Priority level 3 (P3)—Your network performance is degraded. Network functionality is noticeably impaired, but most business operations continue.
- Priority level 2 (P2)—Your production network is severely degraded, affecting significant aspects of business operations. No workaround is available.
- Priority level 1 (P1)—Your production network is down, and a critical impact to business operations will occur if service is not restored quickly. No workaround is available.

Which Cisco TAC resource you choose is based on the priority of the problem and the conditions of service contracts, when applicable.

## Cisco TAC Web Site

The Cisco TAC Web Site allows you to resolve P3 and P4 issues yourself, saving both cost and time. The site provides around-the-clock access to online tools, knowledge bases, and software. To access the Cisco TAC Web Site, go to the following URL:

<http://www.cisco.com/tac>

All customers, partners, and resellers who have a valid Cisco services contract have complete access to the technical support resources on the Cisco TAC Web Site. The Cisco TAC Web Site requires a Cisco.com login ID and password. If you have a valid service contract but do not have a login ID or password, go to the following URL to register:

<http://www.cisco.com/register/>

If you cannot resolve your technical issues by using the Cisco TAC Web Site, and you are a Cisco.com registered user, you can open a case online by using the TAC Case Open tool at the following URL:

<http://www.cisco.com/tac/caseopen>

If you have Internet access, it is recommended that you open P3 and P4 cases through the Cisco TAC Web Site.

## Cisco TAC Escalation Center

The Cisco TAC Escalation Center addresses issues that are classified as priority level 1 or priority level 2; these classifications are assigned when severe network degradation significantly impacts business operations. When you contact the TAC Escalation Center with a P1 or P2 problem, a Cisco TAC engineer will automatically open a case.

To obtain a directory of toll-free Cisco TAC telephone numbers for your country, go to the following URL:

<http://www.cisco.com/warp/public/687/Directory/DirTAC.shtml>

Before calling, please check with your network operations center to determine the level of Cisco support services to which your company is entitled; for example, SMARTnet, SMARTnet Onsite, or Network Supported Accounts (NSA). In addition, please have available your service agreement number and your product serial number.

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This document is to be used with the documents listed in the “[Related Documentation](#)” section.

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