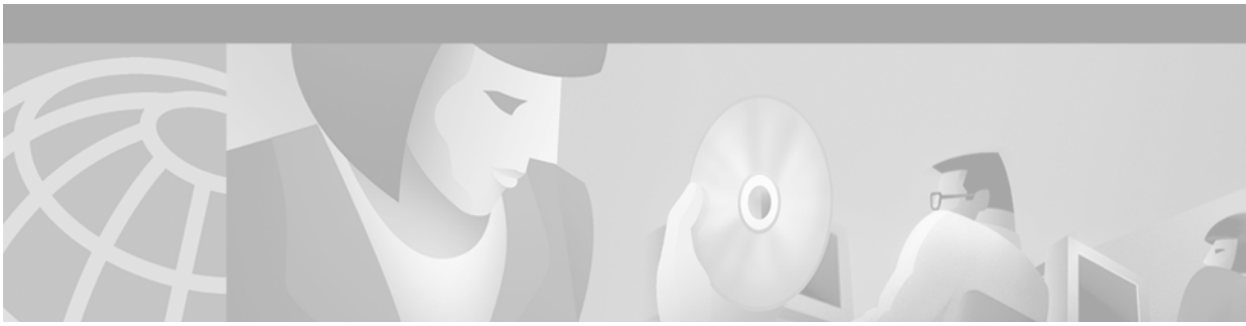


Catalyst 6000 Family Multilayer Switch Feature Card 2 Installation Note

Product number: WS-F6K-MSFC2=

This publication describes how to install the Catalyst 6000 Family Multilayer Switch Feature Card 2 (MSFC2) on a Supervisor Engine 1A or Supervisor Engine 2.

Contents

This publication contains these sections:

Corporate Headquarters:
Cisco Systems, Inc., 170 West Tasman Drive, San Jose, CA 95134-1706 USA

Safety Overview

Safety warnings appear throughout this publication in procedures that may harm you if performed incorrectly. A warning symbol precedes each warning statement.

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.**

Avvertenza **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 *Regulatory Compliance and Safety Information* (Conformità alle norme e informazioni sulla sicurezza) che accompagna questo dispositivo.**

Advarsel **Dette varselsymbolet betyr fare. Du befinner deg i en situasjon som kan føre til personskade. Før du utfører arbeid på utstyr, må du vare 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 *Regulatory Compliance and Safety Information* (Overholdelse av forskrifter og sikkerhetsinformasjon) som ble levert med denne enheten.**

Aviso **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 *Regulatory Compliance and Safety Information* (Informação de Segurança e Disposições Reguladoras) que acompanha este dispositivo.**

¡Advertencia! **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 *Regulatory Compliance and Safety Information* (Información sobre seguridad y conformidad con las disposiciones reglamentarias) que se acompaña con este dispositivo.**

Varning! **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 förkommer i denna publikation i dokumentet *Regulatory Compliance and Safety Information* (Efterrättelse av föreskrifter och säkerhetsinformation), vilket medföljer denna anordning.**

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

Features

The MSFC2 ships with 128-MB SDRAM at 100 MHz with Error Checking and Correction (ECC) (single-bit error detection and correction; 2-bit error detection) as the default and is upgradeable to 256 MB or 512 MB.

Table 1 lists the Cisco IOS features available for the MSFC2.

Table 1 Cisco IOS Features

Layer 3 Forwarding Features
Wire-speed IP, IP multicast, and IPX routing between VLANs (switches running the Cisco IOS for the Catalyst 6000 Family of Switches product can also route between ports)
Support for up to 128,000 entries for IP network prefixes, IP unicast and multicast addresses, IPX network numbers, and MAC addresses[1]
FIB[2] and adjacency database support as defined in other Cisco routers
Destination-based load sharing among equal cost paths
Layer 3 Routing Protocols
Static IP routing
IP routing protocols: IGRP[3], EIGRP[4], OSPF[5], RIP[6], and RIP-2
IP multicast routing protocols: PIM[7] (sparse and dense mode) and DVMRP[8] interrupt
IPX routing protocols: RIP, NLSP[9], and EIGRP
Layer 3 Related Protocols
IGMP[10] v1 and v2
IGMP snooping
CGMP[11] server support
Full ICMP[12] support
GDP[13]
IRDP[14]
MSDP[15]
MBGP[16]

Table 1 Cisco IOS Features (continued)

Enhanced Services
Standard DNS[17] support
DHCP[18] and BOOTP[19] relay
MHSRP[20]
CDP[21]
Wire-speed IP standard ACL support
Standard reflexive ACL
Layer 3 QoS[22] Related Features
Two priority queues for CoS[23]-based operation
IP precedence-based IP forwarding

1. An MLS cache larger than 32,000 entries increases the probability that a flow will not be switched by the PFC and will get forwarded to the router
2. FIB = forwarding information base
3. IGRP = Interior Gateway Routing Protocol
4. EIGRP = Enhanced Interior Gateway Routing Protocol
5. OSPF = Open Shortest Path First
6. RIP = Routing Information Protocol
7. PIM = Protocol Independent Multicast
8. DVMRP = Distance Vector Multicast Routing Protocol
9. NLSP = NetWare Link Services Protocol
10. IGMP = Internet Group Management Protocol
11. CGMP = Cisco Group Multicast Protocol
12. ICMP = Internet Control Message Protocol
13. GDP = Gateway Discovery Protocol
14. IRDP = ICMP Router Discovery Protocol
15. MSDP = Multicast Source Discovery Protocol
16. MBGP = Multicast Border Gateway Protocol
17. DNS = Domain Naming System
18. DHCP = Dynamic Host Configuration Protocol
19. BOOTP = Boot Protocol
20. MHSRP = Multigroup Hot Standby Routing Protocol
21. CDP = Cisco Discovery Protocol
22. QoS = Quality of Service
23. CoS = Class of Service

Software Requirements

The software requirements are as follows:

- For switches with Cisco IOS on the Catalyst 6000 Family of Switches product on both the supervisor engine and the MSFC2:

  Cisco IOS Release 12.1(2)E or later on both the supervisor engine and the MSFC2. The image required to support this is c6sup12-*-mz, where * is one of the various versions (such as js, is, ds). When you upgrade from MSFC to MSFC2, you need to upgrade the c6sup-*-mz or c6sup11-*-mz image to the new c6sup12-*-mz image.

- For switches with Catalyst supervisor engine software on the supervisor engine and Cisco IOS software on the MSFC2:
  - Catalyst 6000 family supervisor engine software release 5.4(3) or later
  - Cisco IOS Release 12.1(2)E or later on the MSFC2

Parts List

These parts are in the replacement kit:

- One Catalyst 6000 MSFC2 (WS-F6K-MSFC2=)
- One disposable grounding wrist strap
- One bag of spare mounting screws

Required Tools

These tools are required to perform the installation of the MSFC2:

- Antistatic mat or foam pad to support the removed supervisor engine
- 3/16-inch flat-blade screwdriver for the captive installation screws on the supervisor engine
- Number 1 Phillips screwdriver for the screws and cap nut that fasten the MSFC2 to the supervisor engine
- Your own ESD-prevention equipment or the disposable grounding wrist strap included with all upgrade kits, field-replaceable units (FRUs), and spares

Refer to the *Site Preparation and Safety Guide* for ESD details including the locations of the ESD connectors on the Catalyst 6000 family switches.

Installation Guidelines

Follow these guidelines when installing an MSFC2 on a supervisor engine:

- The hardware on both supervisor engines in a single chassis must be identical. You cannot mix an MSFC and an MSFC2 in the same chassis. You must shut down the switch to install the MSFC2, even if you have redundant supervisor engines.
- If you have redundant supervisor engines, you *must* install an MSFC2 on each supervisor engine.
- The Supervisor Engine 1A with only a PFC *cannot* be upgraded to MSFC2. There are no standoffs installed for securing the MSFC2 to the supervisor engine.
- The Supervisor Engine 1A with a PFC and an MSFC (WS-X6K-SUP1A-MSFC) can be upgraded to an MSFC2. You must remove the existing MSFC from the Supervisor Engine 1A. The MSFC2 uses the same standoffs used for the MSFC.
- The Supervisor Engine 2 with a PFC2 (WS-X6K-SUP2-2GE) can be upgraded to an MSFC2. The supervisor engine has standoffs installed for securing the MSFC2 to the supervisor engine.

Preparing the Supervisor Engine

Note Review the guidelines in the "Software Requirements" section on page 6 before you prepare the supervisor engine.

To install the MSFC2 on a Supervisor Engine 1A with a PFC and an MSFC, you must shut down the switch, remove the Supervisor Engine 1A from the chassis, and remove the MSFC from the Supervisor Engine 1A.

To install the MSFC2 on a Supervisor Engine 2, you must shut down the switch and remove the Supervisor Engine 2 from the chassis.

Caution Always use an ESD wrist strap when handling modules or coming into contact with internal components.

Before you remove a supervisor engine, you should first upload the current configuration to a server. This saves time when bringing the module back online. You can recover the configuration by downloading it from the server to the nonvolatile memory of the supervisor engine. For more information, refer to Chapter 26, "Working with Configuration Files," in the *Catalyst 6000 Family Software Configuration Guide*.

To prepare the supervisor engine, follow these steps:

Step 1 Upload the current configuration to a server. On any modules running Cisco IOS, save the running configuration.

Step 2 Shut down the switch.

Step 3 Remove the supervisor engine from the Catalyst 6000 family switch. (Refer to the *Catalyst 6000 Family Module Installation Guide* for removal instructions.)

Step 4 Place the supervisor engine on an antistatic mat or foam.

To remove the MSFC from the Supervisor Engine 1A, see the "Removing the MSFC from the Supervisor Engine 1A" section on page 8 and follow the instructions for removing the MSFC.

To install the MSFC2 on a Supervisor Engine 2, see the "Installing the MSFC2" section on page 10 and follow the instructions for installing the MSFC2.

Removing the MSFC from the Supervisor Engine 1A

Note You must remove the Flash SIMM from the MSFC to access two mounting screws that are located under the SIMM.

Caution Handle the SIMM by its edges only; avoid touching the memory module, pins, or traces (the metal *fingers* along the connector edge of the SIMM). SIMMs are sensitive components that are susceptible to ESD damage and can be shorted by mishandling.

To remove the MSFC from the Supervisor Engine 1A, follow these steps:

Step 1 Note that the Flash SIMM is located at the rear of the MSFC (see Figure 1). Pull the locking spring clips on both sides of the Flash SIMM outward and tilt the Flash SIMM free of the clips (see Figure 2). Be careful not to break the clips on the Flash SIMM connector.

Figure 1 Flash SIMM Location on the MSFC

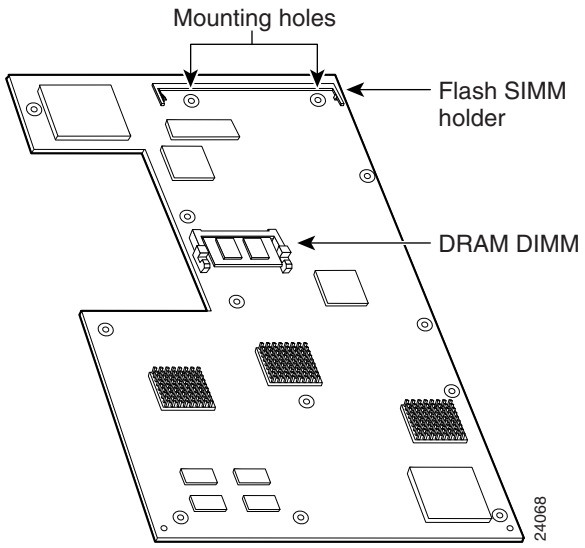
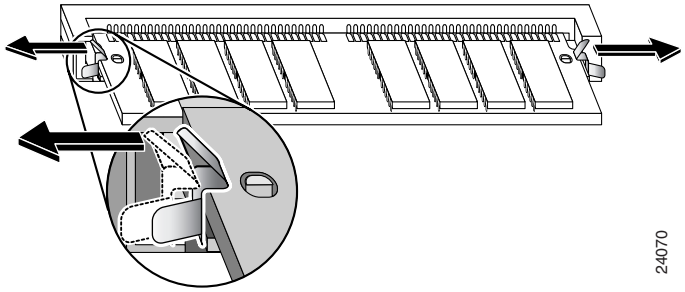


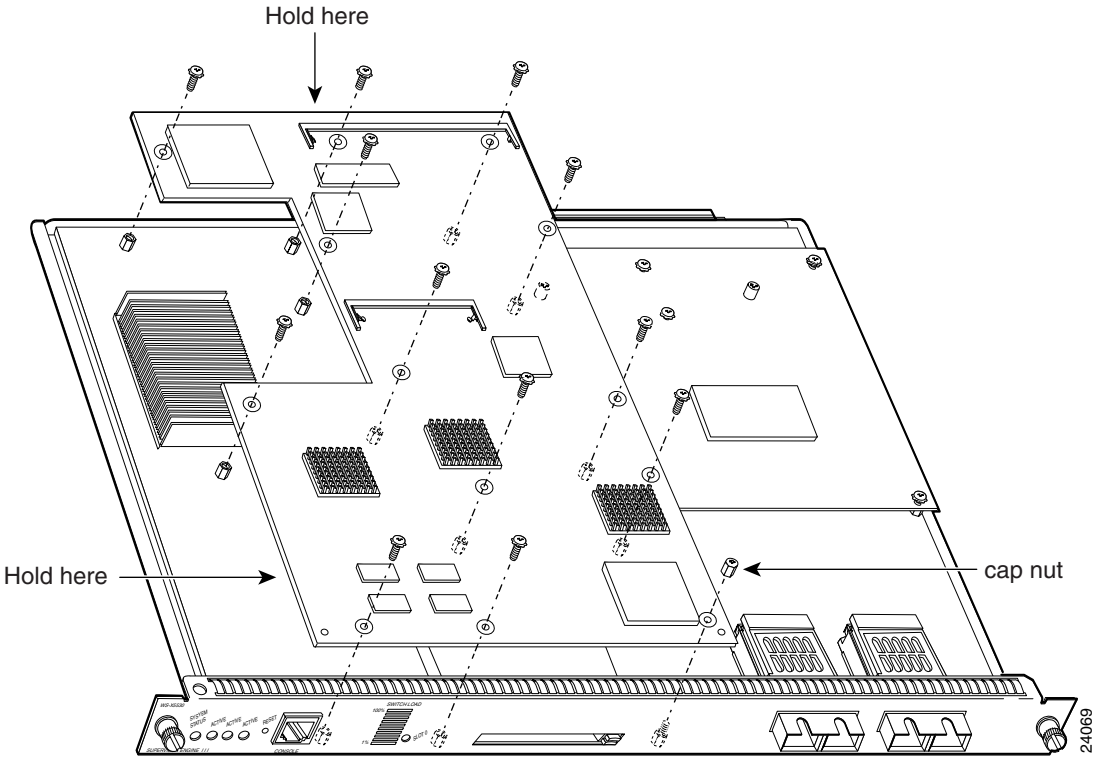
Figure 2 Removing the Flash SIMM



Step 2 Hold the SIMM by the edges and gently lift and remove it, placing it on an antistatic mat or foam.

Step 3 Remove the securing screws and cap nut (see Figure 3).

Figure 3 Removing Securing Screws and Cap Nut



Step 4 Hold the top edge of the MSFC with your right hand and the bottom-left edge with your left hand (see Figure 3). Gently lift the MSFC with both hands simultaneously and remove the MSFC from the supervisor engine.

Caution Use care not to damage the connectors on the supervisor engine. If you damage a connector, you will have to return the supervisor engine to Cisco for repair.

Step 5 Place the MSFC on an antistatic mat or antistatic foam pad.

Installing the MSFC2

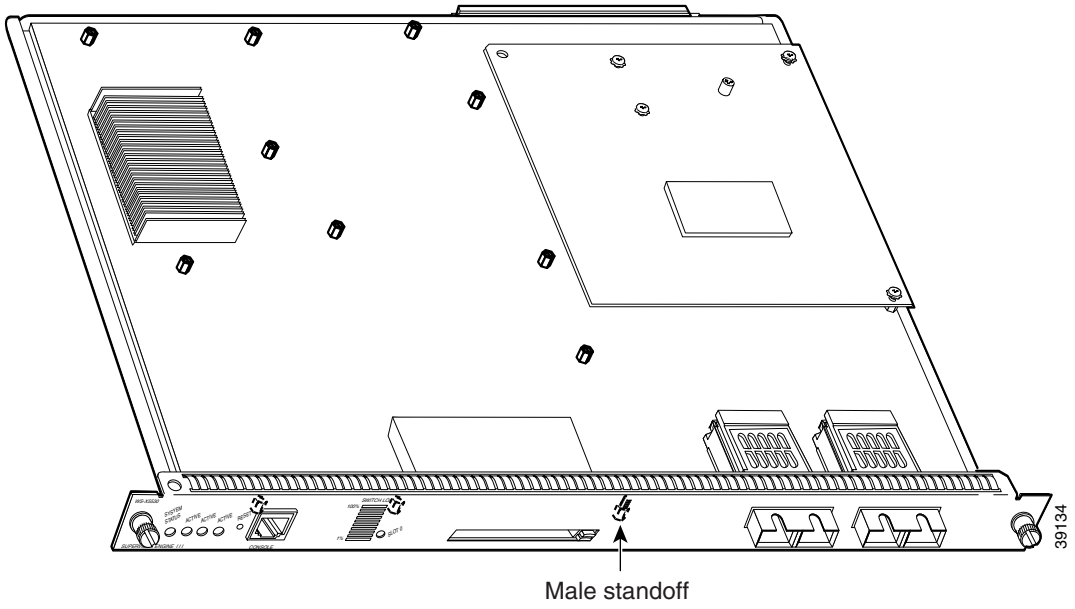
Note The MSFC2 is designed to be installed on a Supervisor Engine 1A and a Supervisor Engine 2. The standoff locations on the different supervisor engines may not be the same. Not all mounting holes on the MSFC2 will be used in all installations. Visually verify that there are standoffs beneath the mounting holes before installing the securing screws.

To install the MSFC2 on the supervisor engine, follow these steps:

Step 1 Remove the MSFC2 from its antistatic bag.

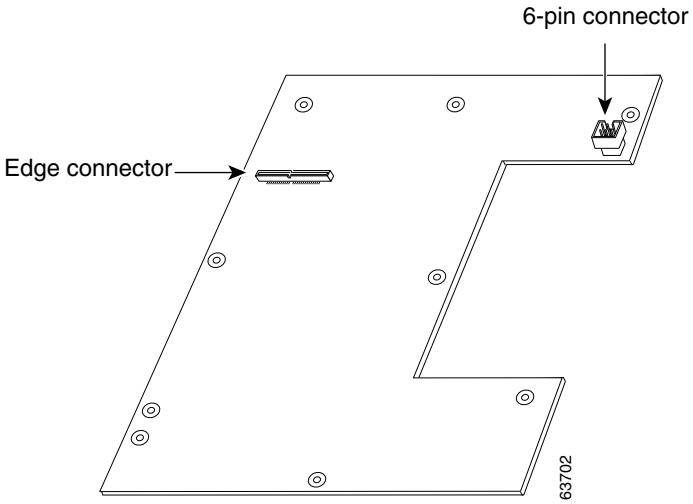
Step 2 Align the MSFC2 with the standoffs on the supervisor engine. (See Figure 4).

Figure 4 Male Standoff Location on the Supervisor Engine



Step 3 Ensure that the connectors on the MSFC2 (see Figure 5) are aligned with the connectors on the supervisor engine.

Figure 5 MSFC2 Connectors



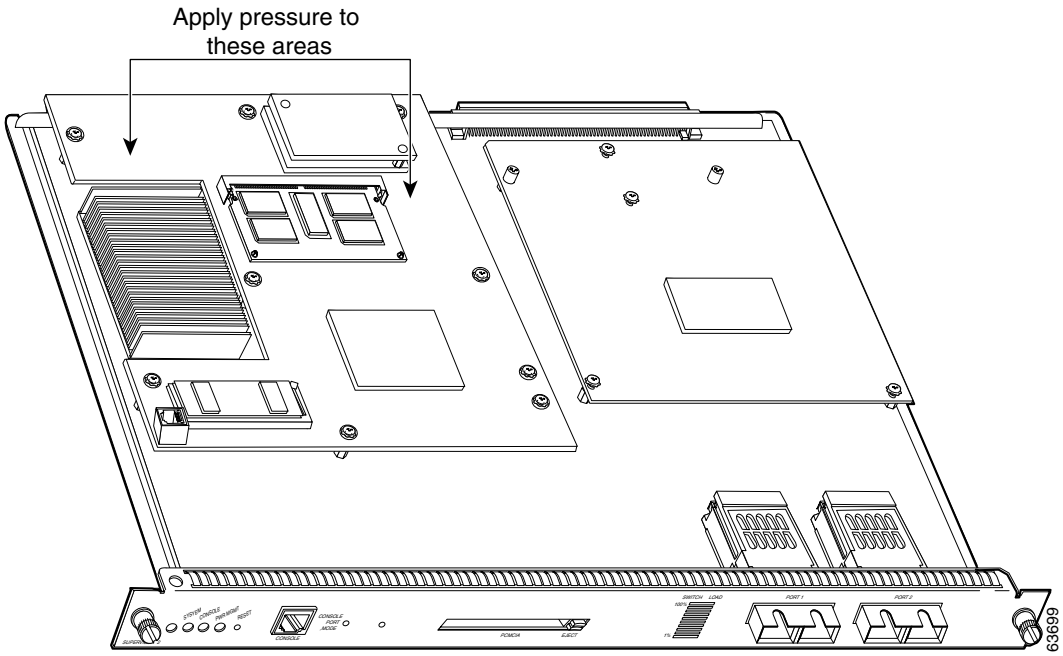
Step 4 Carefully seat the MSFC2 onto the supervisor engine (see Figure 6).

Step 5 Using your thumbs, apply pressure at the locations shown in Figure 6 to ensure that the MSFC2 is securely seated on the supervisor engine.

Caution Ensure that the MSFC2 is securely seated before you install and tighten the cap nut and securing screws. Using the screws to seat the MSFC2 could warp the card.

Caution Use care not to damage the connectors on the supervisor engine. If you damage a connector, you will have to return the supervisor engine to Cisco for repair.

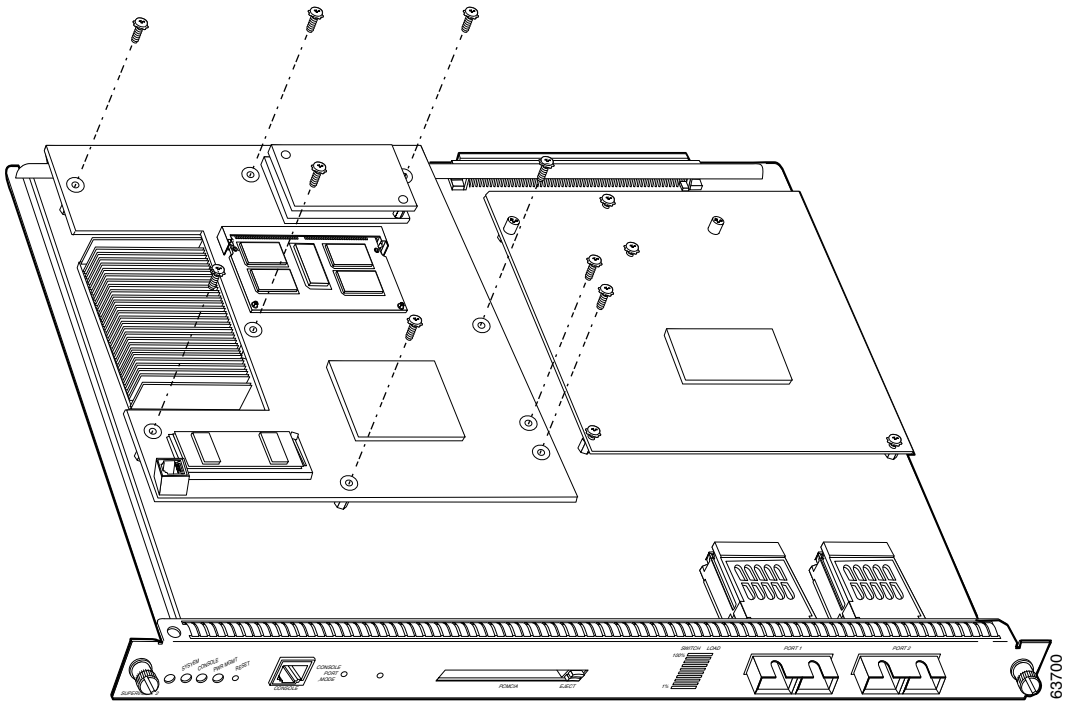
Figure 6 Seating the MSFC2 on the Supervisor Engine



Step 6 Use a Phillips-head screwdriver to install the screws that secure the MSFC2 to the supervisor engine. (See Figure 7).

Caution You *must* install all screws. The screws provide grounding between the MSFC 2 and the supervisor engine. Failure to install all screws will invalidate the safety approvals and can cause fire and electrical hazards.

Figure 7 Installing the Screws



Step 7 Install the supervisor engine in the Catalyst 6000 family switch. (Refer to the *Catalyst 6000 Family Module Installation Guide* for installation instructions.)

Caution The hardware on both supervisor engines in a single chassis must be identical. If you have redundant supervisor engines, you *must* install an MSFC2 on each supervisor engine.

Step 8 If you are installing an MSFC2 on a redundant supervisor engine, go to Step 3 in the "Preparing the Supervisor Engine" section on page 7 and follow the procedure for removing the supervisor engine.

Step 9 Power up the switch.

Step 10 Depending on the software running on the switch, do one of the following steps to verify the installation:

- Cisco IOS for the Catalyst 6000 Family of Switches product on the supervisor engine and the MSFC2:

  Verify that the switch is online. This indicates that the system acknowledges the new module and has brought it online.

- Catalyst supervisor engine software on the supervisor engine and Cisco IOS on the MSFC2:

  Enter the **show module** command to verify that the system acknowledges the new module and has brought it online.

This example shows the output of the **show module** command:

```
Console> show module
Mod Slot Ports Module-Type                Model               Status
--- ---- ----- ------------------------- ------------------- --------
1   1    2     1000BaseX Supervisor      WS-X6K-SUP1A-2GE    ok
15  1    1     Multilayer Switch Feature WS-F6K-MSFC2        ok
2   1    2     1000BaseX Supervisor      WS-X6K-SUP1A-2GE    ok
16  1    1     Multilayer Switch Feature WS-F6K-MSFC2        standby
.
<display text omitted>
.
Console>
```

Related Documentation

For additional information on Catalyst 6000 family switches and command-line interface (CLI) commands, refer to the following publications:

- *Regulatory Compliance and Safety Information for the Catalyst 6000 Family Switches*
- *Catalyst 6000 Family Installation Guide*
- *Catalyst 6000 Family Module Installation Guide*
- *Catalyst 6000 Family Software Configuration Guide*
- *Catalyst 6000 Family Command Reference*
- *Catalyst 6000 Family IOS Software Configuration Guide*
- *Catalyst 6000 Family IOS Command Reference*
- *System Message Guide—Catalyst 6000 Family, Catalyst 5000 Family, Catalyst 4000 Family, Catalyst 2926G Series, Catalyst 2948G, and Catalyst 2980G Switches*
- *Site Preparation and Safety Guide*

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