



BigBand® Media Services Platform MSP2000 Hardware Installation and Replacement Guide

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Document Identification

BigBand® Media Services Platform MSP2000 Hardware Installation and Replacement Guide

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Abstract

This document describes installation and replacement procedures for the BigBand® MSP2000.

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About This Document

This document describes the installation of the BigBand® MSP2000 chassis, and module installation and replacement procedures. The document contains the following chapters:

Chapter 1: Preparing for Installation

Information and instructions on electrostatic discharge requirements, cabling, ground and power connections, cooling requirements, and electromagnetic interference precautions.

Chapter 2: Installing the Chassis and Modules

Information on unpacking components, instructions on mounting the chassis in a rack, installing modules, installing front and rear filler panels, installing XFP/SFP transceivers and filler plugs, and connecting video, frame-ground, Dual Node Redundancy, and power-feed cables, and powering up the chassis.

Chapter 3: Initial Configuration

Information and instructions on connecting to the CLI, enabling the Management interface, assigning the Management IP address, connecting the Management interface, verifying chassis availability on the network, connecting to the CLI via SSH, enabling Telnet access and connecting via Telnet, assigning the host name, setting the time zone, assigning an NTP server, assigning a default video IP address, saving and restoring configuration data, managing software images, and configuring a Dual Node Redundancy cluster.

Chapter 4: Replacing Field Replaceable Units

Instructions on how to replace Switch Control Modules, Switch Control Rear IO Modules, Video Processing Modules, transceivers, Power Entry Modules, and Fan Modules.

Glossary

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Who Should Use This Guide

This manual is intended for technicians who install the BigBand® MSP2000 hardware and perform initial configuration of the system and exchange field replaceable modules. Technicians should have previous experience in performing similar tasks for headend and network equipment.

Document Conventions

Special Notices

BigBand Networks emphasizes the importance of carefully following all procedures described in this document to prevent personal injury or damage to the equipment, and to assure maximum efficiency and machine life. Additionally, BigBand Networks offers supplemental Notes and Timesaving information which may assist you with your installation, configuration, and support tasks.

The reader should pay careful attention to sections that contain the following symbols.



Warning: Information that alerts you to potential electric shock or personal 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.



Caution: Information that alerts you to potential loss of data or potential damage to an application, system, or device.



Note: Notes contain helpful suggestions and other important non-hazard information.

Input/Output Conventions

Table 1.1 shows CLI syntax conventions.

Table 1.1 CLI Syntax Conventions

Convention	Description
boldface font	CLI commands and keywords
<i>italic font</i>	Variables
[]	Optional elements
[x y z]	Optional parameters are enclosed in square brackets ([]) and where there are alternative values, separated by vertical bars ()
{x y z}	Alternative, but required, parameters are grouped in braces ({ }) and separated by vertical bars ()
^	The symbol ^ represents the key labeled Control. For example, the key combination ^Z means that you should hold down the Control key while pressing the Z key
screen	This font indicates system output.
boldface screen	This font indicates user input.

Reference Documents

Depending on the implementation at your site, you may need to refer to the following additional BigBand documents:

- [1] BigBand® Media Services Platform MSP2000 System Overview and Specifications
- [2] BigBand® Media Services Platform MSP2000 Operations Guide
- [3] BigBand® Media Services Platform MSP2000 CLI Reference Guide
- [4] BigBand® Media Services Platform MSP2000 System Release Notes

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Preparing for Installation

This chapter consists of:

- [Electrostatic Discharge Requirements](#) on page 9
- [Cable Routing](#) on page 10
- [Power Supply Circuit Breaker](#) on page 10
- [Grounding and Power Connections](#) on page 10
- [Cooling Requirements](#) on page 11
- [Electromagnetic Interference](#) on page 11

1.1 Electrostatic Discharge Requirements



Caution: The BigBand® MSP2000 contains static-sensitive components and should be handled with care. Failure to employ adequate anti-static measures can result in irreparable damage to components.

Electrostatic discharge (ESD) can damage equipment and electrical circuitry. ESD damage occurs when electronic components are improperly handled and can result in permanent or intermittent equipment failure.

The following safety precautions must be followed to minimize the possibility of ESD damage when working with electronic components:

- Keep each module or component in its anti-static bag until you are ready to install it.
- Ensure that the chassis is electrically connected to a proper ground. (See [Grounding and Power Connections](#) on page 10).
- Before touching a module or component, attach an ESD wrist strap to your wrist and connect the other end of the strap to a known ground.
- Always ensure that the strap makes good skin contact.
- Handle modules or components only in an area that has its working surfaces, floor coverings, and chairs connected to a known ground.

- The resistance value of the antistatic strap must be checked periodically. The value must be between 1 and 10 $M\Omega$.
- Hold modules only by their edges and mounting hardware. Do not touch components or connector pins.



Caution: To effectively prevent ESD damage, the wrist strap and cord must be in serviceable condition.

For further information on ESD, visit www.esda.org.

1.2 Cable Routing

Before installing the chassis, check that you have the power and network cables you require. You must also plan the routing of the power and network cables. Routing is, to some extent, determined by the modules installed as this dictates where network connectors are located; either at the front or rear of the chassis.

1.3 Power Supply Circuit Breaker

There must be a readily accessible circuit breaker between the building's power source and the chassis' PEM input terminals.

The required rating of the circuit breaker is determined by the nominal input voltage and current requirements. See the *BigBand® Media Services Platform MSP2000 System Overview and Specifications* [1] document for the exact circuit breaker rating.

1.4 Grounding and Power Connections



Caution: Failure to follow the instructions in this installation guide when attaching and connecting the frame-ground and power cables may result in electric shock or personal injury.

Three frame-ground connection studs are located at the rear of the chassis at the bottom on the right. These are arranged to allow for a twin-hole lug to be mounted either vertically or horizontally.

For proper chassis operation, a ground cable must connect at least one of these studs to the high-quality ground used by the other equipment in the rack.

To reduce electrical noise, use an adequately sized ground cable for the frame-ground connection. See the *BigBand® Media Services Platform MSP2000 System Overview and Specifications* [1] document for the exact chassis ground cable size.

The chassis must be grounded using the same grounding strategy as used by other systems at your facility. If a grounding strategy has not already been established at your facility, you should

consult with an electrician who has experience providing high-quality grounding for carrier-class electronic equipment.

Each PEM (Power Entry Module) has anti-rotation connection studs for the –VDC and Return power connections.

See the *BigBand® Media Services Platform MSP2000 System Overview and Specifications* [1] document for the exact power supply and return cable sizes.

Within each module the DC resistance between logic ground and chassis ground is greater than 9 MΩ. If an application requires it, a low-impedance connection between logic ground and chassis ground can be installed in each module.

1.5 Cooling Requirements

The installation site environment must be compatible with the recommended operating temperature range for the chassis. The chassis' maximum recommended continuous operating temperature is 104°F (40°C), and the chassis is rated to operate at 23° to 131°F (–5° to 55°C) for a maximum of only 96 consecutive hours during transient conditions greater than 104°F (40°C).

Be aware that in closed or multi-rack assembly environments the local ambient temperature may be greater than the room ambient temperature.

Ensure that the air at the front of the chassis remains within the specified maximum temperature limit by measuring the temperature with a thermometer. If the air temperature exceeds the maximum specified temperature and all four FMs (Fan Modules) operating at full speed are unable to maintain all system components within their recommended temperature limits, the software may begin to reduce the thermal load by reducing the application load. This may result in reduced platform performance. This response of reducing platform performance due to excessive temperatures protects the system from physical damage caused by overheating.

If the ambient room temperature exceeds the non-operating temperature limit, physical damage to the platform may occur even if the modules are not operating.

The chassis expels heated air to the rear of the platform and this temperature increase must be considered when planning placement of the chassis and surrounding equipment. The path must be clear for this expelled heated air to exit the chassis and rack. In most cases, other equipment that requires air-cooling should not be installed directly behind the platform.

A fully loaded chassis operating at full power can consume as much as 3.5 kW and move as much as 17 m³/min (460 cfm) of air. The placement of the system within the rack must accommodate this airflow and the chassis' contribution to heating must be considered when planning or confirming the capacity of your facility's cooling system.

1.6 Electromagnetic Interference

For detailed EMI and RFI specifications see the *BigBand® Media Services Platform MSP2000 System Overview and Specifications* [1] document.

The EMC, EMI, and RFI specifications of the chassis and all nearby equipment should be considered when planning the placement of the platform and surrounding equipment.

The platform emits electromagnetic waves that may interfere with nearby equipment. Similarly, nearby electronic equipment may emit electromagnetic waves that interfere with the platform. To conform with installation standards and to ensure that electromagnetic interference is kept within required levels, you must abide by the directions for installation provided in [Grounding and Power Connections](#) on page 10, [Connecting Frame Ground Cables](#) on page 16, and [Connecting Power-Feed Cables](#) on page 29.

If the chassis experiences unexpected or intermittent data errors, consider the possibility of electromagnetic interference from nearby equipment as a possible cause of the problem. Identifying and measuring errors caused by electromagnetic interference can be challenging and may require the assistance of engineering personnel with experience in this field.

The BigBand® MSP2000 complies with FCC Part 15 Class A and ETSI 300-386 v1.2.1 EMI regulations.

Cable Shielding and Grounding

To comply with the NEBS Level 3 Intra-building Lightning Requirement, all intra-building cabling must be shielded and the shield must be grounded at both ends, as required by GR-1089-CORE, Section 4.5.9.

Installing the Chassis and the Modules

This chapter consists of:

- [Unpacking the Chassis](#) on page 13
- [Mounting the Chassis in the Rack](#) on page 14
- [Connecting Frame Ground Cables](#) on page 16
- [Module Installation Overview](#) on page 17
- [Installing the Switch Control Module](#) on page 18
- [Installing the Switch Control Rear Input Output Module](#) on page 21
- [Installing the Video Processing Module](#) on page 22
- [Installing Front Filler Panels](#) on page 25
- [Installing Rear Filler Panels](#) on page 25
- [Installing XFP and SFP Transceivers and Filler Plugs](#) on page 26
- [Connecting Data and Video Cables](#) on page 27
- [Connecting Two Chassis for Dual Node Redundancy](#) on page 28
- [Connecting Power-Feed Cables](#) on page 29
- [Powering Up the Chassis](#) on page 31

All sections are relevant for first-time chassis installations. Procedures should be performed in the order presented.

Sections [2.4](#) through [2.7](#), [2.11](#) and [2.14](#) are relevant for subsequent installation of additional modules, or replacement of modules.



Caution: Be sure to follow the electrostatic discharge (ESD) procedures described in [Electrostatic Discharge Requirements](#) on page 9 when working on equipment.

2.1 Unpacking the Chassis

The chassis modules and transceivers are shipped separately from the chassis. Power Entry Modules and Fan Modules are pre-installed in the chassis.



Caution: Wear either an ESD wrist strap or ESD heel strap and work on a conductive floor surface as you open the carton. See [Electrostatic Discharge Requirements](#) on page 9.

To unpack the chassis:

1. Remove the chassis from its carton and place it right-side up on a stable surface.
2. Perform a thorough inspection to confirm components are securely installed and are not loose.



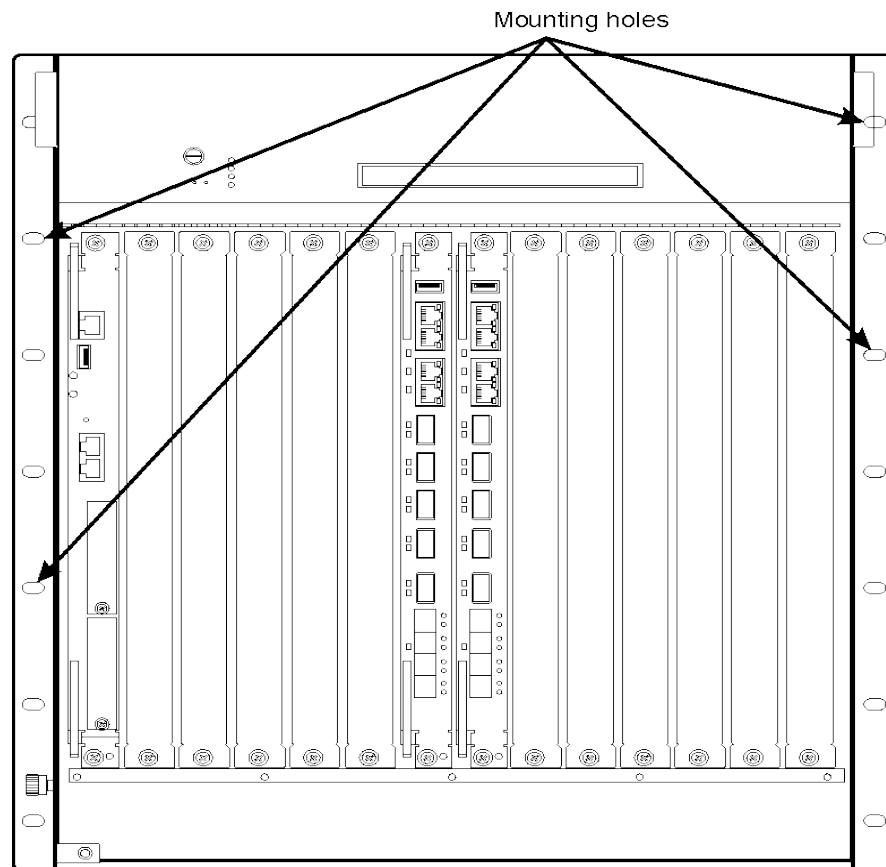
Caution: Mounting screws and other items can work loose or become damaged during the course of handling, shipping, and assembly. Operating a damaged platform can harm the chassis and the devices that interface to it.

2.2 Mounting the Chassis in the Rack

The chassis' 12U height fits easily into a standard 42U 19-inch rack or cabinet. As the chassis is not very deep from front to rear, it is sufficient for it to be supported by the front vertical mounting plates alone ([Figure 2.1](#)).

The chassis with no additional modules weighs approximately 128 lbs (58 kg). See the *BigBand® Media Services Platform MSP2000 System Overview and Specifications* [\[1\]](#) document for the exact chassis and component weights.

Figure 2.1 Chassis Front Showing Mounting Holes on the Front Mounting Plates



Each of the chassis' front vertical mounting plates has 7 holes (Figure 2.1). Nuts and bolts attached through these holes hold the mounting plates (and hence the chassis) in the rack. The type of nuts and bolts you need depends on your rack, which is manufacturer-specific. If you do not already have the necessary nuts and bolts, acquire them before proceeding with the installation.

Tools required (depending on the type of nuts and bolts that your specific rack requires):

- Phillipsscrewdriver #2
- Screwdriver to suit the bolts you're using for mounting the chassis
- Two wrenches that suit the nuts (and bolts) you're using for mounting the chassis

To mount the chassis in the rack:



Warning: A fully loaded chassis may weigh up to 162 lbs (74 Kg) and requires at least two people for installation in the rack.

1. Slide the chassis into the rack between the front upright supports at the height required. Have your assistant(s) hold the chassis in place.

2. Insert and tighten the 14 mounting nuts and bolts in the holes along the left and right front chassis mounting plates (Figure 2.1).

2.3 Connecting Frame Ground Cables

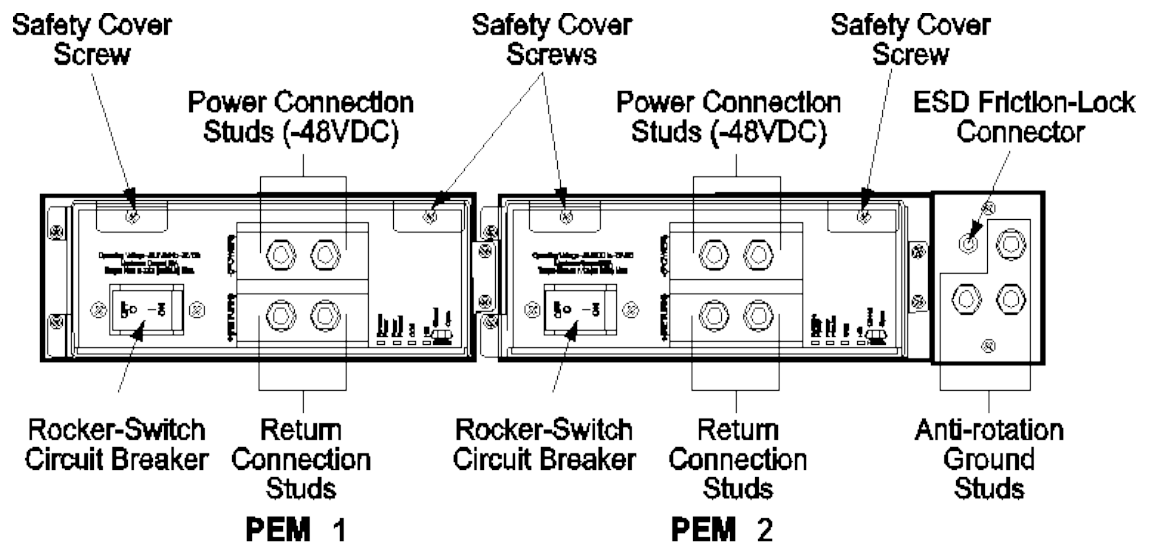
See [Grounding and Power Connections](#) on page 10 before proceeding.

Tools required:

- 10 mm (3/8 in) or adjustable wrench

Figure 2.2 shows the anti-rotation frame-ground studs on the right hand side of the PEMs as viewed from the rear of the chassis. PEM 1 is on the left and PEM 2 is on the right.

Figure 2.2 Anti-rotation Frame-Ground Studs, PEM 1 and PEM 2



To connect frame-ground cables:

1. Connect the frame-ground cable to at least one of the anti-rotation ground studs on the back right hand side of the chassis (Figure 2.2).
2. Tighten the nut(s) holding the cable in place.
3. Connect the other end of this cable to a high-quality facility ground connection.



Caution: Failure to connect the platform to a high-quality ground connection may reduce the performance and availability of the platform and the equipment that connects to it. Improper grounding may increase electrical noise in the platform, causing data loss and other performance problems.

2.4 Module Installation Overview



Caution: Do not install modules in slots other than their designated locations. Insertion into an incorrect location will damage the module.

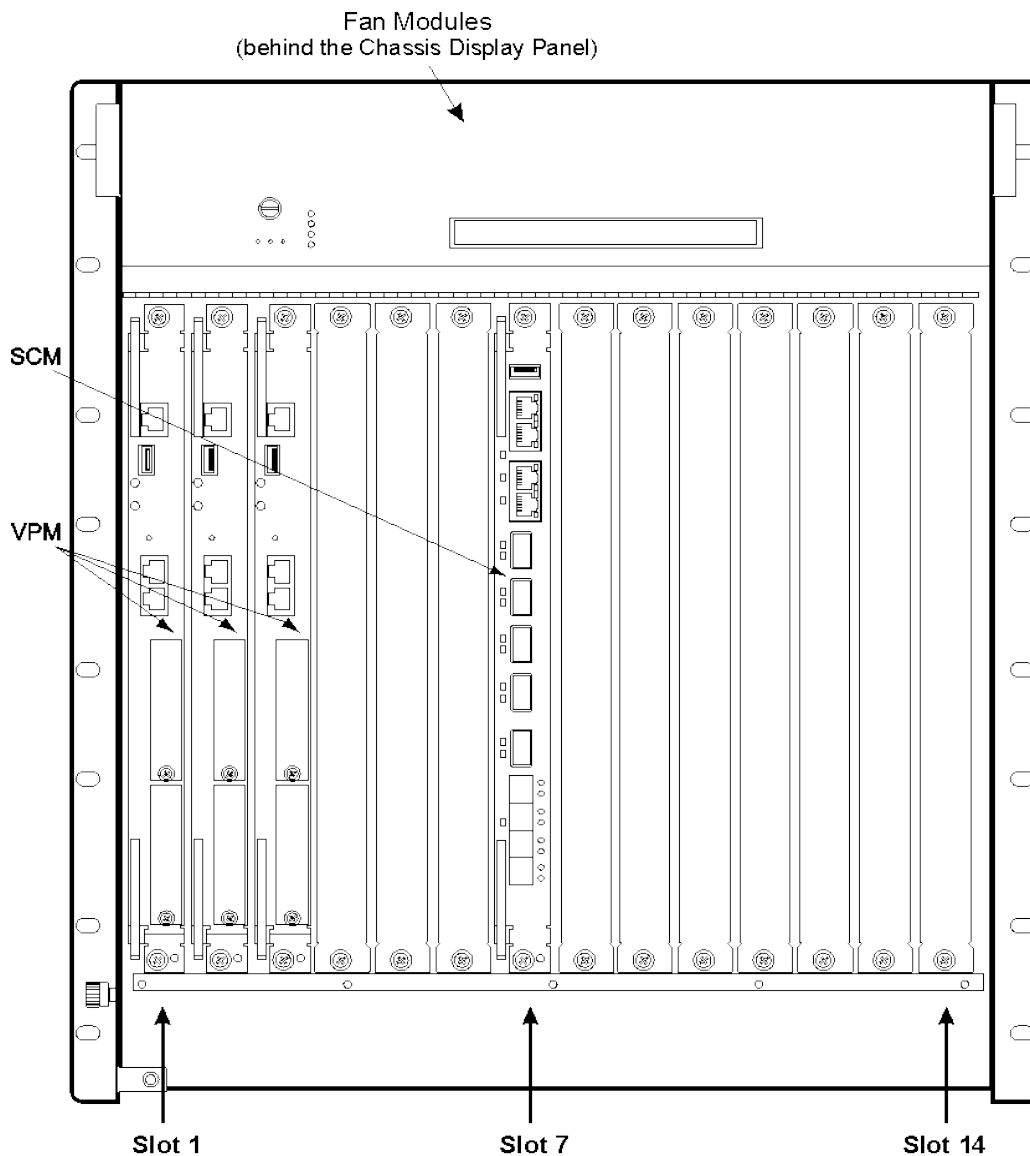
The BigBand® MSP2000 front slots are populated with one SCM and multiple VPMs. These can be seen in [Figure 2.3](#), where the chassis is shown from the front. See the *BigBand® Media Services Platform MSP2000 System Release Notes* [\[4\]](#) for the number of SCM and VPMs currently supported.

Slots are numbered from 1 to 14 from left to right on the front of the chassis, and correspondingly from 1 to 14 from right to left on the rear of the chassis. This slot number is significant and is used throughout the software and configuration as the module/slot identifier.

Front slot 7 is reserved for the SCM. VPMs may be installed in any of front slots 1 to 6 or 9 to 14. Slot 8 front and rear is reserved for future use.

Of the rear slots, only slot 7 may be occupied by an SCMRIO, and then, only when there is an SCM in front slot 7.

Figure 2.3 Chassis Front Showing Slot Numbering and Location of the FMs, SCM, and VPMs



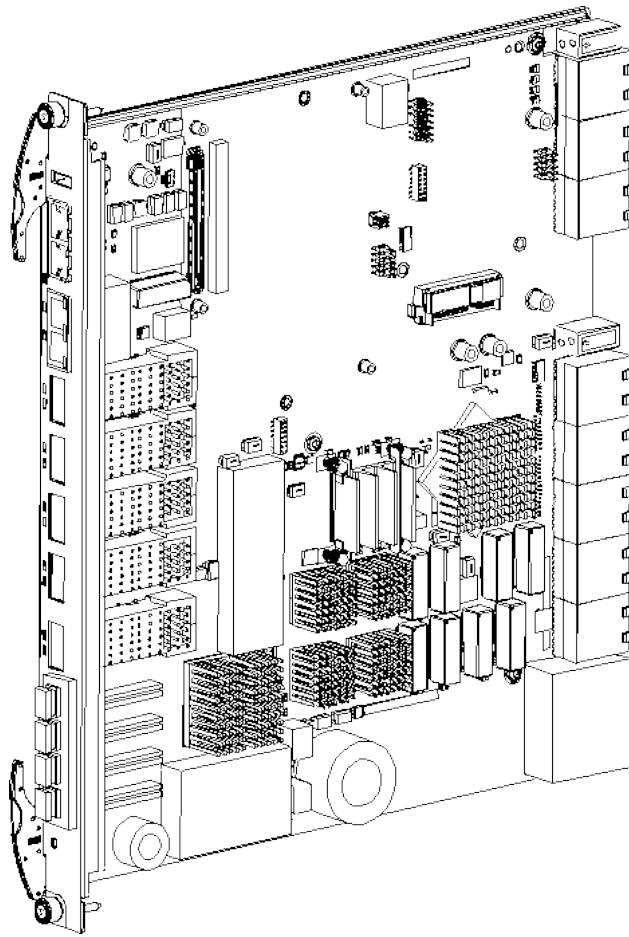
2.5 Installing the Switch Control Module



Caution: Be sure to follow the electrostatic discharge (ESD) procedures described in [Electrostatic Discharge Requirements](#) on page 9 when you install the product.

Figure 2.4 shows the SCM.

Figure 2.4 Switch Control Module

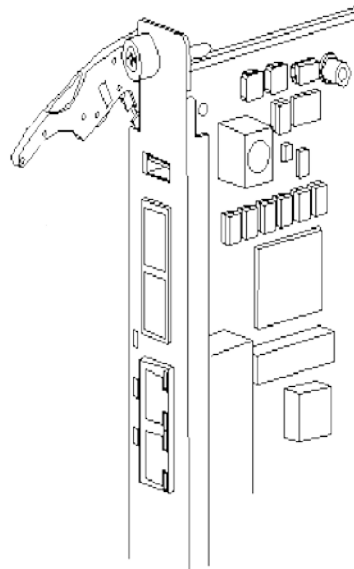


Caution: Install the SCM only in slot 7.

To install an SCM:

1. Remove the SCM from its anti-static bag.
2. Hold the module vertically so that the name at the top is the correct way up.
3. While pressing the metal tab on both ejector latches, open both of the SCM's ejector latches by pulling them outwards ([Figure 2.5](#)).

Figure 2.5 Ejector Latches in Open Position



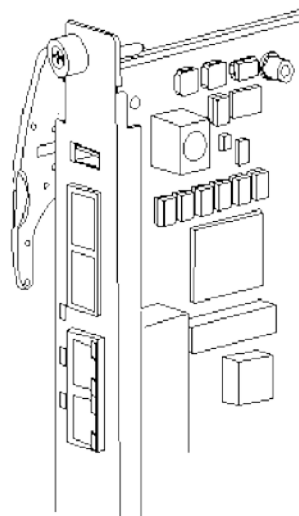
4. Using slot 7, carefully align the edges of the SCM so that it fits within the narrow guide rails of the chassis.
5. Holding the ejector latches in the open position, slide the SCM all the way into the chassis.



Caution: Do not force the SCM into the slot.

6. Once the SCM is inserted all the way into the chassis, simultaneously close both ejector latches by pushing them inwards. This seats the SCM's connectors into the chassis backplane (Figure 2.6).

Figure 2.6 Ejector Latches in Closed Position



7. Make sure the front panel EMC gasket seals the surfaces it touches.