GIGAswitch/ATM System

Installation and Service

Part Number: AA–QCV7B–TE

June 1996

This document explains how to install and service the GIGAswitch/ATM system.

Revision/Update Information: This is a revised manual.

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Preface

This document provides instructions for installing the GIGAswitch™/ATM hardware. It also provides information about servicing the GIGAswitch/ATM system.

Intended Audience

This document is intended for personnel who are experienced in installing and servicing network hardware.

Document Structure

This document is structured as follows:

Part I contains overview information and installation instructions for the GIGAswitch/ATM system.

- Chapter 1 describes the GIGAswitch/ATM system.
- Chapter 2 describes the procedures that you must complete before installing the GIGAswitch/ATM system. These procedures include verifying the site preparation, unpacking the system, testing the system modules, installing the lower plenum in the rack, setting up electrostatic discharge (ESD) protection, and removing the modules.
- Chapter 3 describes the procedures for installing the GIGAswitch/ATM system. These procedures include lifting the empty system onto the lower plenum, attaching the system to the rack, installing the upper plenum, and installing the modules.

Part II contains information for configuring and testing the GIGAswitch/ATM system.

- Chapter 4 describes the procedures that you must complete before configuring the GIGAswitch/ATM system.
- Chapter 5 describes the clock management module (CMM) commands.
- Chapter 6 describes the procedures for initiating the module self–tests (MSTs) and provides instructions for evaluating the results of the MSTs.

- Chapter 7 describes the procedures for upgrading the firmware.

Part III contains information for replacing the field replaceable units (FRUs).

- Chapter 8 describes the replacement requirements for each GIGAswitch/ATM module and describes the procedures used in replacing some of the modules. These procedures include setting up electrostatic discharge (ESD) protection and removing or applying system power.
- Chapter 9 describes the procedures for replacing the cooling and power modules and the line cards. Cooling and power modules include modules of the fan tray assembly, front end unit (FEU), power status assembly (PSA), and power system controller (PSC) families.
- Chapter 10 describes the procedure for removing the GIGAswitch/ATM system.
- Chapter 11 describes the procedures for replacing the power backplane, crossbar modules, and logic backplane.

Part IV contains reference information.

- Appendix A provides the physical, electrical, and environmental specifications for the GIGAswitch/ATM system.
- Appendix B describes the cooling and power modules in the fan tray assembly, FEU, PSA, and the PSC card families.
- Appendix C describes the logic modules in the line card and crossbar module families.
- Appendix D provides guidelines for installing additional logic modules.

Product Documentation

The GIGAswitch/ATM documentation set consists of the following documents:

- *GIGAswitch/ATM System Installation and Service*, AA–QCV7B–TE
- *GIGAswitch/ATM System Management*, AA–QCV8C–TE
- *GIGAswitch/ATM System Release Notes*, AA–QCV9C–TE

Related Documentation

Additional information is available in the following documents:

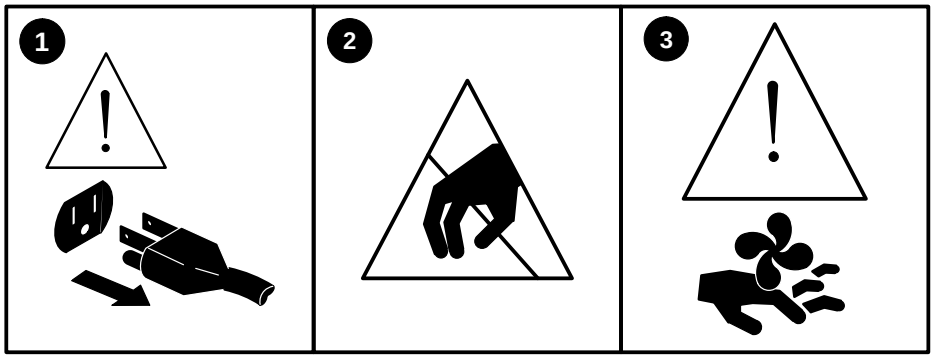
- *OPEN DECconnect Applications Guide*, EC–G2570–42
- *ATM Modular PHY Cards Installation*, EK–DAGGM–IN
- *4–Port Modular Line Card*, EK–DAGBA–IN

Conventions

The following conventions are used in this document:

Bold typeface	Indicates that a word or phrase is being emphasized to the reader.
`Special typeface`	Indicates a literal example of system output or user input. In text, indicates command names, keywords, node names, filenames, directories, and utilities.
Italic typeface	Indicates the complete titles of manuals.
<Return>	Indicates that you press the Return key on the keyboard.
<Ctrl/*x*>	Indicates that you must hold down the key labeled Ctrl while you press another key or a pointing device button.

Safety Symbols



Number	Symbol	Description
1	Caution	Remove system power before removing or installing the system module.
2	Caution – Electrostatic sensitive device	Take precautions to protect against equipment damage due to electrostatic discharge (ESD).
3	Caution – Rotating fans	Allow the fans to run down before removing the fan tray from the unit.

Part I

Installation

Part I contains information and instructions for installing the GIGAswitch/ATM system:

- Chapter 1 describes the GIGAswitch/ATM system and its features.
- Chapter 2 describes the procedures that you must complete prior to installing the GIGAswitch/ATM system. These procedures include verifying the site preparation, unpacking the system, testing the system modules, installing the lower plenum in the rack, setting up electrostatic discharge (ESD) protection, and removing the modules.
- Chapter 3 describes the procedures for installing the GIGAswitch/ATM system. These procedures include lifting the empty system onto the lower plenum, attaching the system to the rack, installing the upper plenum, and installing the modules.

1

Introduction

The GIGAswitch/ATM system is a standalone, intelligent, switching system that forwards cells among a set of connected ATM links based on the VCI field within the cell header. The links can be connected to end stations, bridges, routers, another vendor's switches, and to other GIGAswitch/ATM systems. The core of the GIGAswitch/ATM system is a crossbar module (CBM) that forms point–to–point and point–to–multipoint communication paths by mapping inputs to outputs.

1.1 Versions

The GIGAswitch/ATM chassis (DAGGA–CA) contains a crossbar module, a clock card, and backplanes. A power supply (20 amp AC or 48V) must be added for both versions. If you are using more than ten line cards in your system, order one 20 amp power supply or two 48V power supplies. If you are using less than ten line cards, you can order one power supply (20 amp or 48V). One additional front end unit (FEU) can be ordered as a redundant power supply. The US versions of the AC power supplies include a US power cord. Non–US versions do not package the power cord with the power supply; the appropriate power cord must be ordered separately. See Appendix A for a listing of the power cord types found in country kits. Connection wiring from the 48V source to the 48V power supply is provided by the customer.

1.2 Parts of the GIGAswitch/ATM System

Table 1–1 lists the GIGAswitch/ATM system components.

Table 1–1 GIGAswitch/ATM System Components

Part (Order Number)	Quantity DAGGA–CA	Option
4–port modular line card (DAGGL–BA) with the following orderable options: • Cell buffer expansion card (DAGCB–AA) • 8 MB expanded memory option (FR–PCP7M–AB) • 16 MB expanded memory option (FR–PCP7M–AC) • 48V power module option (DAGPL–AB) • ATM modular PHY cards	0	Up to 13 [1]
1–port 622 Mb/s line card (DAGGL–CA) with the following orderable option: • 48V power module option (DAGPL–AB)	0	Up to 13 [1]
Crossbar module (CBM) (F5–23281)	1	0
Clock card (F5–23289)	1	0
Chassis contains: • Fan tray assembly (70–30578–01) [2] • Logic backplane (F5–23266) • Power backplane (54–22138–01)	1	0
20 amp FEU for US (DEFGB–DA)	0	Up to 2 [3]
20 amp FEU for other countries (DEFGB–DB)	0	Up to 2 [3]
48 volt FEU (DEFGB–BA)	0	Up to 2
Power status assembly (PSA) (70–30585–02) contains: • Power system controller (PSC) card (54–22132–01)	1	0
Power cord (Non–U.S.)	0	1 country kit per FEU

[1] Thirteen line cards total per chassis.
[2] Two per chassis.
[3] One is required for ordinary usage, two are required for redundancy. Refer to Section D.1 for specific information.

1.2.1 Hotswap Capability

All cooling and power modules can be hotswapped. The crossbar module, line cards, and clock card cannot be hotswapped.

1.2.2 Power Switch

The power switch located on the FEU is also a circuit breaker that provides overload and short circuit protection for the power cord and service outlet.

2

Preparing to Install the System

This chapter describes the following procedures that you must complete prior to installing the GIGAswitch/ATM system:

1. Verifying the site preparation
2. Unpacking the system
3. Testing the system modules
4. Preparing the rack
5. Setting up electrostatic discharge (ESD) protection
6. Removing the system modules

2.1 Verifying the Site Preparation

Verify that the following requirements are met before installing the GIGAswitch/ATM system.

- Area
- Cable plant
- Rack space

2.1.1 Area

Appendix A provides the physical, electrical, and environmental specifications for the GIGAswitch/ATM system.

2.1.2 Cable Plant

The *OPEN DECconnect Applications Guide* contains checklists and additional references used to verify proper cable plant installation.

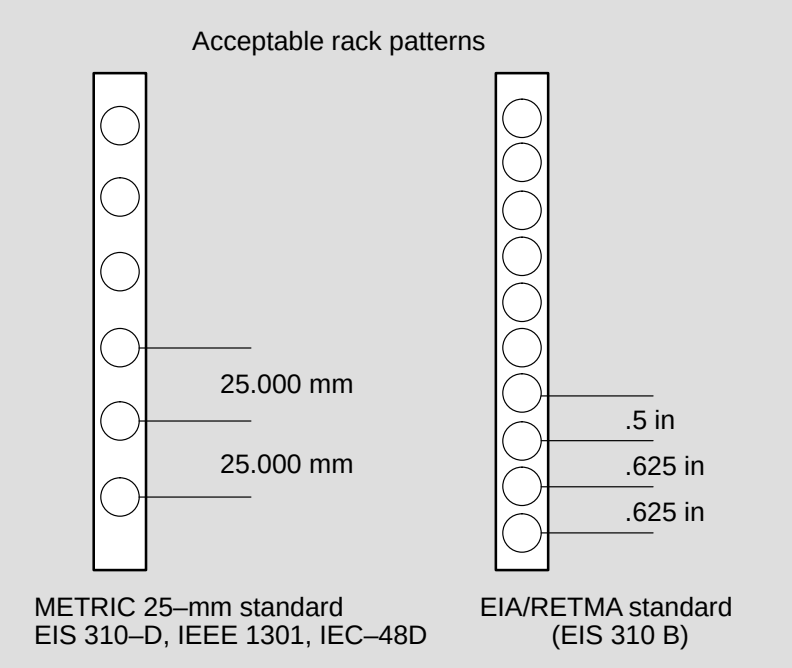
2.1.3 Rack

A grounded rack 47.5 cm (19 in) wide with 90.0 cm (35.4 in) contiguous vertical space is required for the installation of the GIGAswitch/ATM system.

The spacing between the holes of the rack should comply with EIA/RETMA standard EIA 310B or one of the metric 25mm standards (EIA 310–D, IEEE 1301, or IEC–48D).

Figure 2–1 illustrates the acceptable rack patterns for both sets of standards.

Figure 2–1 Rack Patterns



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2.2 Unpacking the System

Perform the following tasks when unpacking the system.

1. Remove the packing material.

2. Identify the contents of the shipping container.

3. Test the modules.

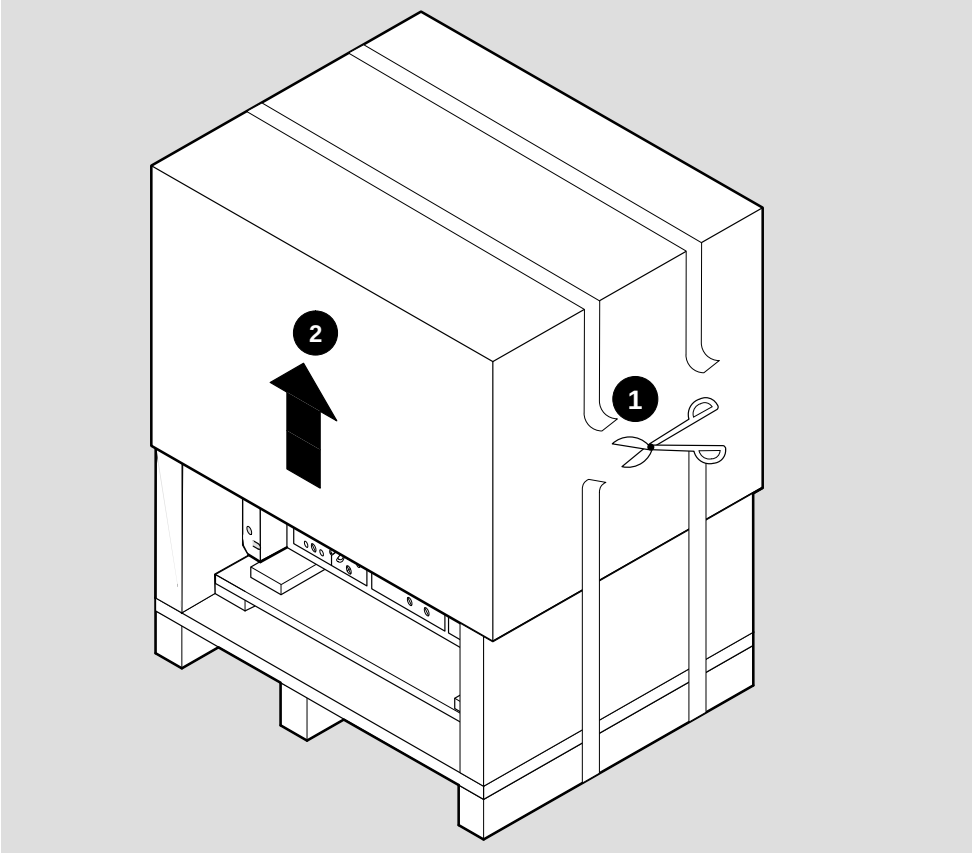
These tasks should take 15 minutes and require a band cutter.

2.2.1 Removing the Packing Material

Note

DO NOT remove the GIGAswitch/ATM system from the pallet. The pallet serves as a temporary operational platform during system module testing.

Figure 2–2 Removing the Packing Material



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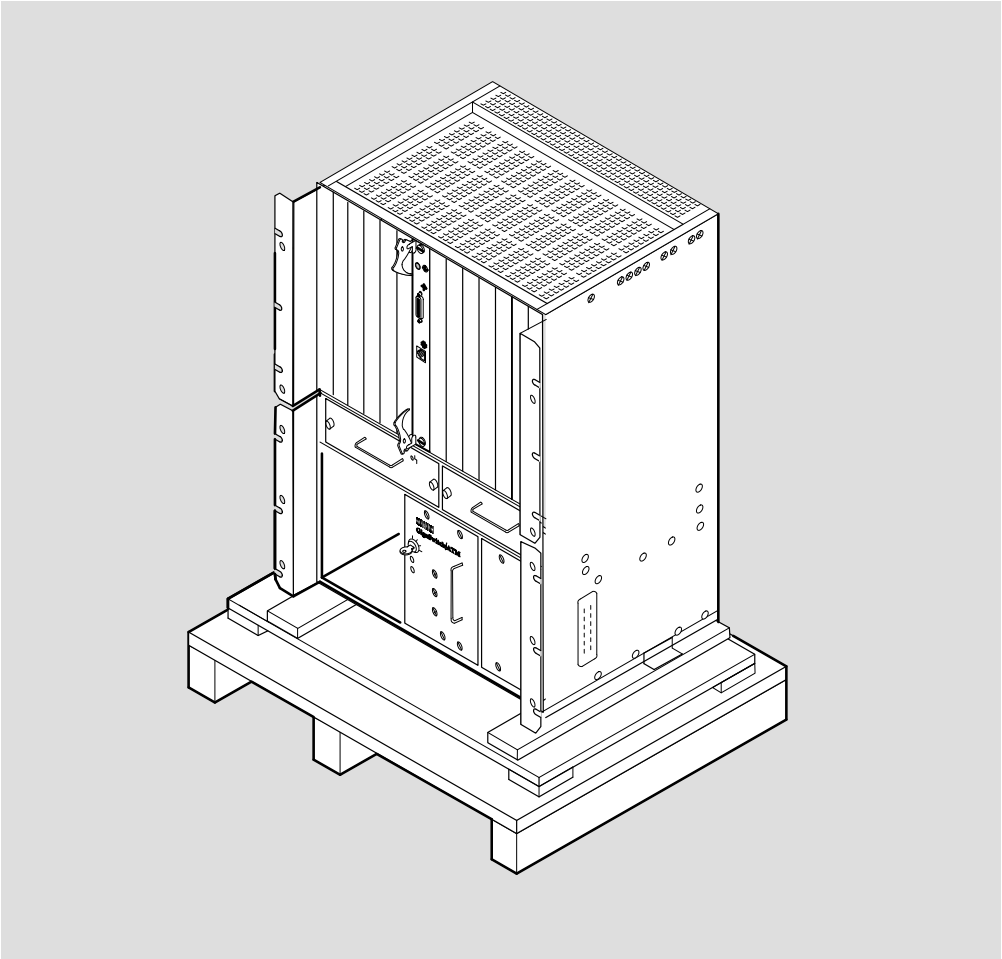
Refer to Figure 2–2 when performing the following tasks to remove the packing material.

1. Locate the banding [1] and the shipping container [2].
2. Cut the banding [1] from the shipping container and the pallet using a band cutter.
3. Two people should slide the shipping container [2] up and off the GIGAswitch/ATM system.
4. Remove the packing material.
5. Remove the shipping bag from the GIGAswitch/ATM system.

2.2.2 Identifying the Contents of the Shipping Container



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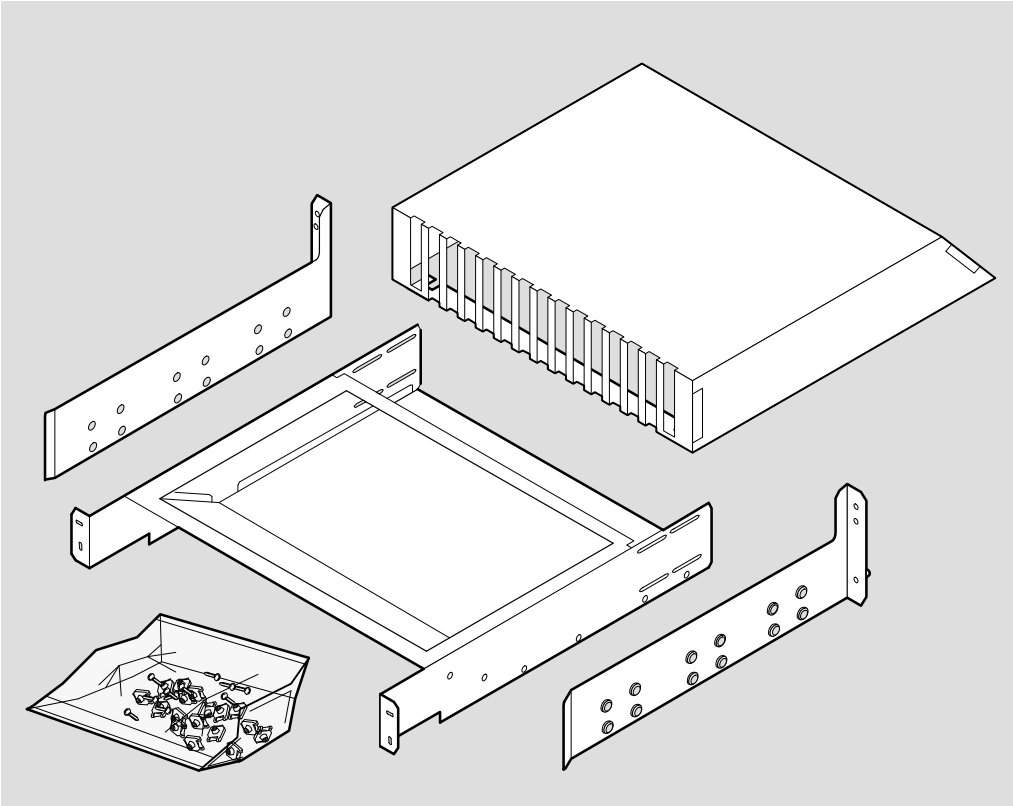
Part Number	Description
DAGGA–CA	GIGAswitch/ATM system
70–30580–01	Rack mount kit
QC–02EAA–GZ	Documentation kit

2.2.2.1 Identifying the Options

Appendix D provides a description of these options, as well as where the options should be installed in the GIGAswitch/ATM system.

2.2.2.2 Identifying the Contents of the Rack Mount Kit



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Part Number	Name	Function
74–45687–01	Upper plenum	Directs air from the front of the rack into the top of the GIGAswitch/ATM system and down through the system.
70–30586–01	Lower plenum (with brackets)	Supports the GIGAswitch/ATM system and directs the air exhausting from the fans in the system to the rear of the rack.
N/A	Hardware container	Contains the clip nuts and screws used to install the lower plenum and the GIGAswitch/ATM system.
36–40161–01	Template	Used to determine the location on the rack for clip nuts.

2.3 Testing the System Modules

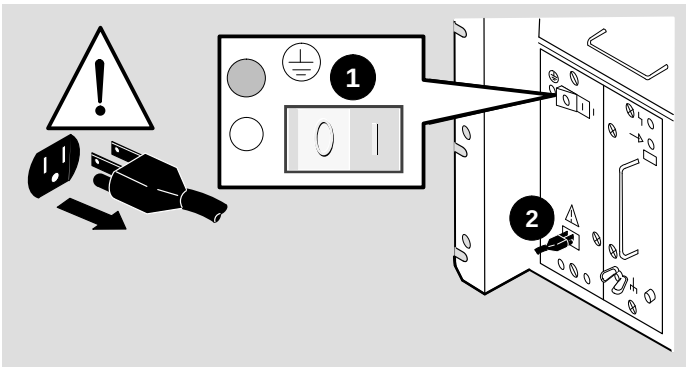
Install the front end unit (refer to Section 3.3.1) before performing the following tasks to test the system modules.

1. Apply power to the GIGAswitch/ATM system.
2. Evaluate the results of the module self–test (MST).

These tasks should take 5 minutes and require no tools.

2.3.1 Applying Power to the System

Figure 2–3 Applying Power



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Refer to Figure 2–3 when completing the following steps to apply power to the system.

1. Locate the power switch [1], the power cord, and the power connector [2]. (Note that non–US power cords are shipped separately in country kits.)
2. Place the power switch [1] in the 0 (OFF) position.
3. Plug the power cord into the power connector [2] and then into the connector for the primary power source.
4. Place the power switch [1] in the 1 (ON) position.

2.3.2 Evaluating the Results of the MST

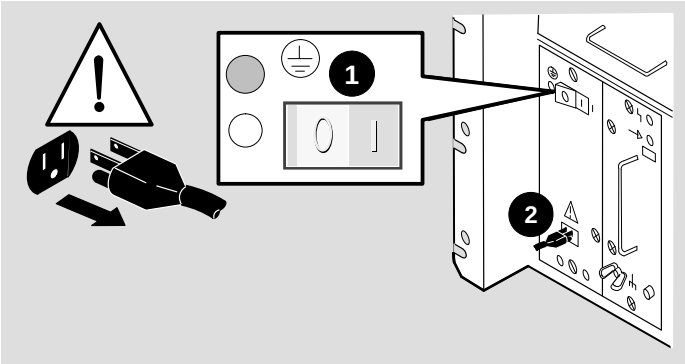
Observe the operational status of the GIGAswitch/ATM system after the power–on MST is complete. If one or more of the following conditions exist, see Chapter 6. If none of the following conditions exist, see Section 2.3.3.

- One or more of the LEDs on the GIGAswitch/ATM system remains solid amber or solid red.

- None of the LEDs light.

2.3.3 Removing Power from the System

Figure 2–4 Removing Power



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Refer to Figure 2–4 when completing the following steps to remove the power from the GIGAswitch/ATM system.

1. Locate the power switch [1] and the power connector [2].
2. Place the power switch [1] in the 0 (OFF) position.
3. Do not remove the power cord from the power connector [2]. The power cord provides the ground for ESD protection.
4. Repeat steps 1 and 2 for any alternate power supply.

2.4 Preparing the Rack

Install the clip nuts and the lower plenum when preparing the rack. These tasks should take 30 minutes and require a number 2 cross–point screwdriver, a pencil, and a tape measure.

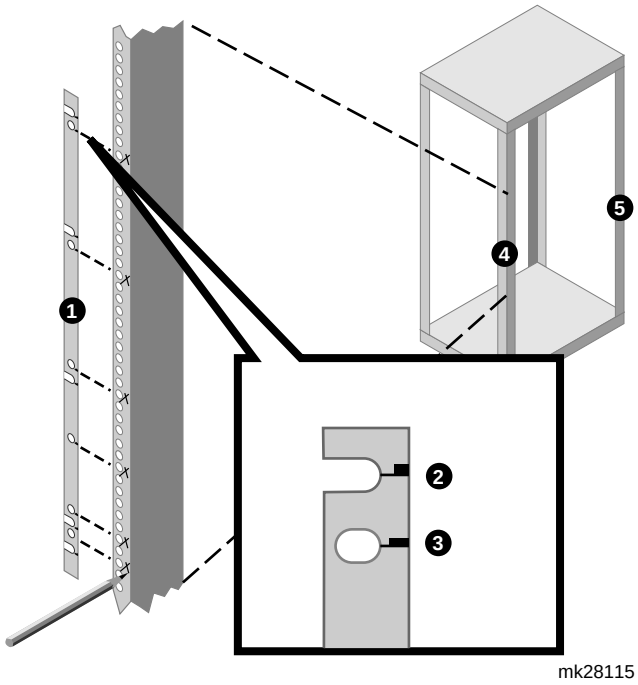
2.4.1 Installing the Clip Nuts

Perform the following tasks when installing the clip nuts.

1. Mark the position for the clip nuts.
2. Attach the clip nuts.

2.4.1.1 Marking the Position for the Clip Nuts

Figure 2–5 Marking Positions for Clip Nuts



Refer to Figure 2–5 when completing the following steps to mark the position for the clip nuts.

1. Locate the template [1] and distinguish between the metric markings [2] and the RETMA (Radio Electronics Television Manufacturer's Association) markings [3].
2. Locate the front rails [4] and the rear rails [5].
3. Identify the area in the rack designated for the GIGAswitch/ATM system.
4. Position the template [1] beside one of the front rails [4]. Match the markings on the template to the holes in the rail using one of the following:
   - Metric markings [2] (open slot) for metric racks.
   - RETMA markings [3] (closed slot) for RETMA racks.

   If the whole pattern does not fit in the space reserved, move equipment (as necessary) to reserve the additional space.
5. Mark the position on the front rail [4] for the clip nuts associated with the GIGAswitch/ATM system.
6. Repeat steps 4 and 5 for the other front rail.

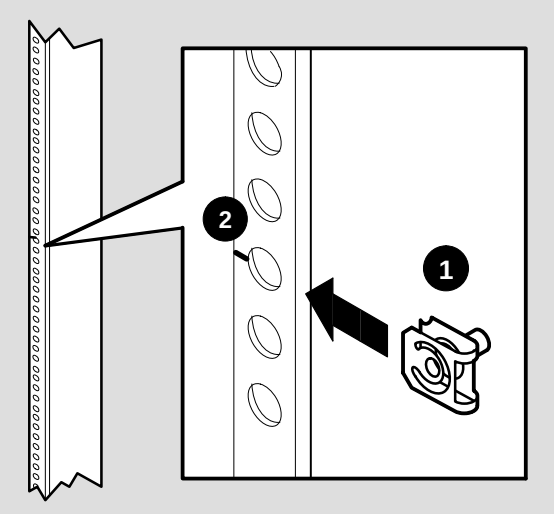
7. Repeat step 4 for a rear rail [5].

8. Mark the position on the inside of the rear rail [5] for the clip nut associated with the lower plenum bracket.

9. Repeat steps 7 and 8 for the other rear rail.

2.4.1.2 Attaching the Clip Nuts

Figure 2–6 Attaching the Clip Nuts



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Refer to Figure 2–6 when completing the following steps to attach the clip nuts to the front rails of the rack.

1. Locate the clip nuts [1] and the marked holes [2] on the rack.

2. Place the clip nuts over the marked holes on the right front rail of the rack. Orient each clip nut [1] so the screw can be installed from the front of the rack and press each clip nut onto the marked hole [2].

3. Repeat step 2 for the left front rail.

4. Place the clip nuts over the marked holes on the right rear rail of the rack. Orient each clip nut [1] so the screw can be installed from the front of the rack and press each clip nut onto the marked hole [2].

5. Repeat step 4 for the left rear rail.

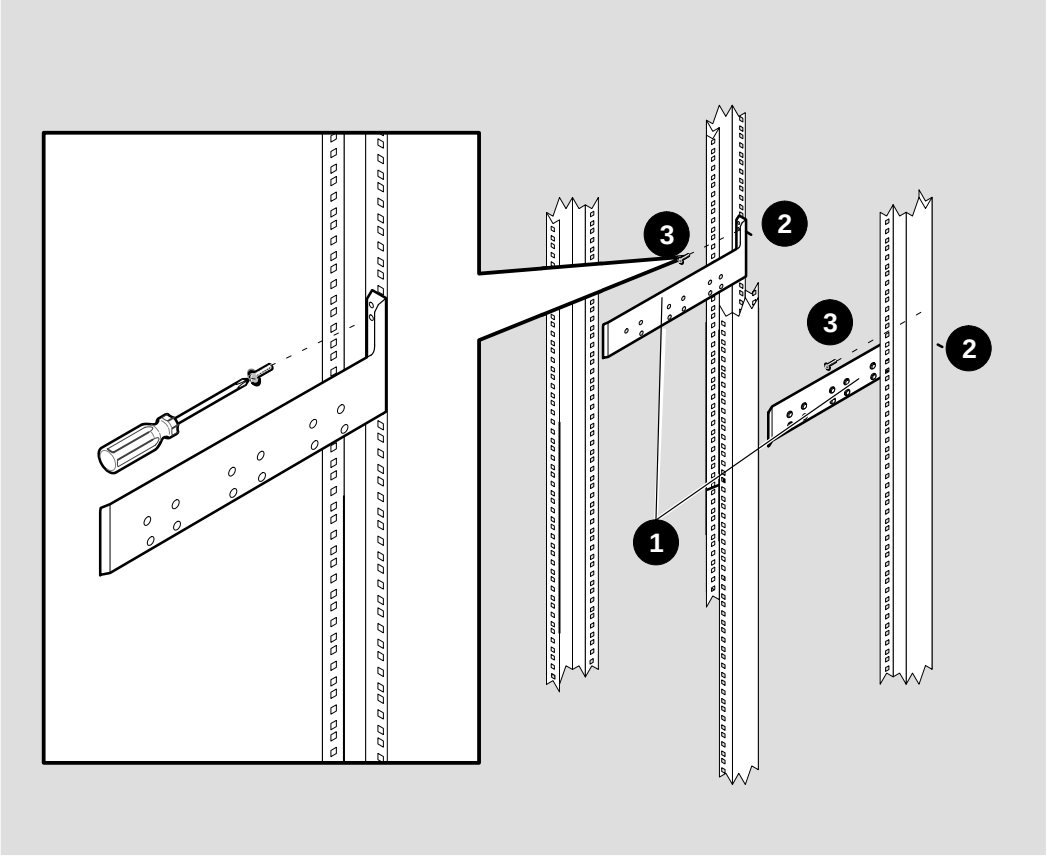
2.4.2 Installing the Lower Plenum

Perform the following tasks when installing the lower plenum.

1. Attach the lower plenum brackets.
2. Attach the lower plenum.

2.4.2.1 Attaching the Lower Plenum Bracket

Figure 2–7 Attaching the Lower Plenum Bracket



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Refer to Figure 2–7 when completing the following steps to attach the lower plenum bracket to the rear rails of the rack.

1. Locate hole and the attached pin on the rear of the lower plenum brackets [1], the rear rails [2], the two screws [3] used to attach the lower plenum brackets to the rear rails of the rack, and the clip nuts (not shown) on the rear rails of the rack.

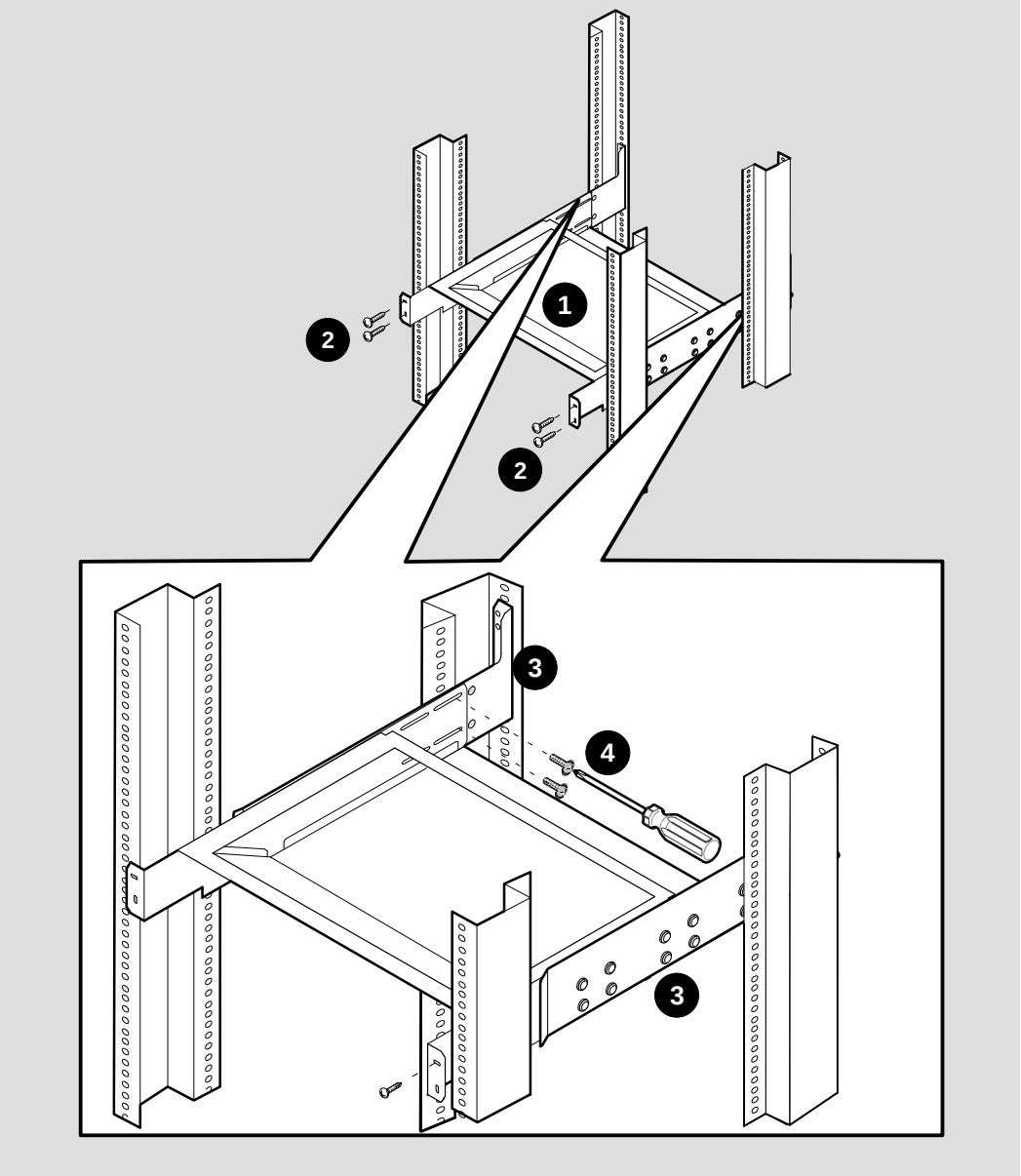
2. Align the hole and the attached pin of the right lower plenum bracket with the corresponding clip nut and hole on the inside of the rear rail [2] and insert the pin of the right lower plenum bracket into the corresponding hole in the rack.

3. Attach the right lower plenum bracket to the right rear rail. Install one screw [3] using a number 2 cross–point screwdriver.

4. Repeat steps 2 and 3 for the left lower plenum bracket.

2.4.2.2 Attaching the Lower Plenum

Figure 2–8 Attaching the Lower Plenum



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Refer to Figure 2–8 when completing the following steps to attach the lower plenum to the rack and to the lower plenum brackets.

1. Locate the lower plenum [1], the four clip nuts and associated screws [2], the right and left lower plenum bracket [3], and the two screws [4] used to connect the right and left lower plenum brackets to the lower plenum.

2. Align the holes in the brackets on the lower plenum [1] with the clip nuts on the front rails of the rack designated for the lower plenum.

3. Attach the lower plenum [1] to the front rails of the rack. Install the four screws [2] using a number 2 cross–point screwdriver.

4. Attach the lower plenum [1] to the right plenum bracket. Install the two screws [4] using a number 2 cross–point screwdriver.

5. Repeat step 4 for the left plenum bracket.

2.5 Setting Up ESD Protection

Protect the logic module against damage from electrostatic discharge (ESD) by using:

- Static–free containers for long–term storage.
- Grounded ESD wrist strap while installing and removing modules.
- Grounded ESD mat for temporary storage.

2.5.1 Using ESD Equipment

The Portable Static–Dissipative Field Service Kit (Part No. 29–26246) is used to protect ESD sensitive modules against damage. Complete the following steps to set up and maintain a static–free area.

1. Ground the unit. The unit is grounded through the power cord when it is connected between the unit and the primary power source.

2. Lay out the static–dissipative work surface (ESD mat) on a flat surface.

3. Connect the ground cord assembly to the ESD mat and to an unpainted surface on the unit.

4. Wear the ESD wrist strap and attach it to the ground cord assembly.

2.6 Removing the System Modules

Warning

Remove system modules from the unit to make it light enough for two people to lift the unit.

Caution

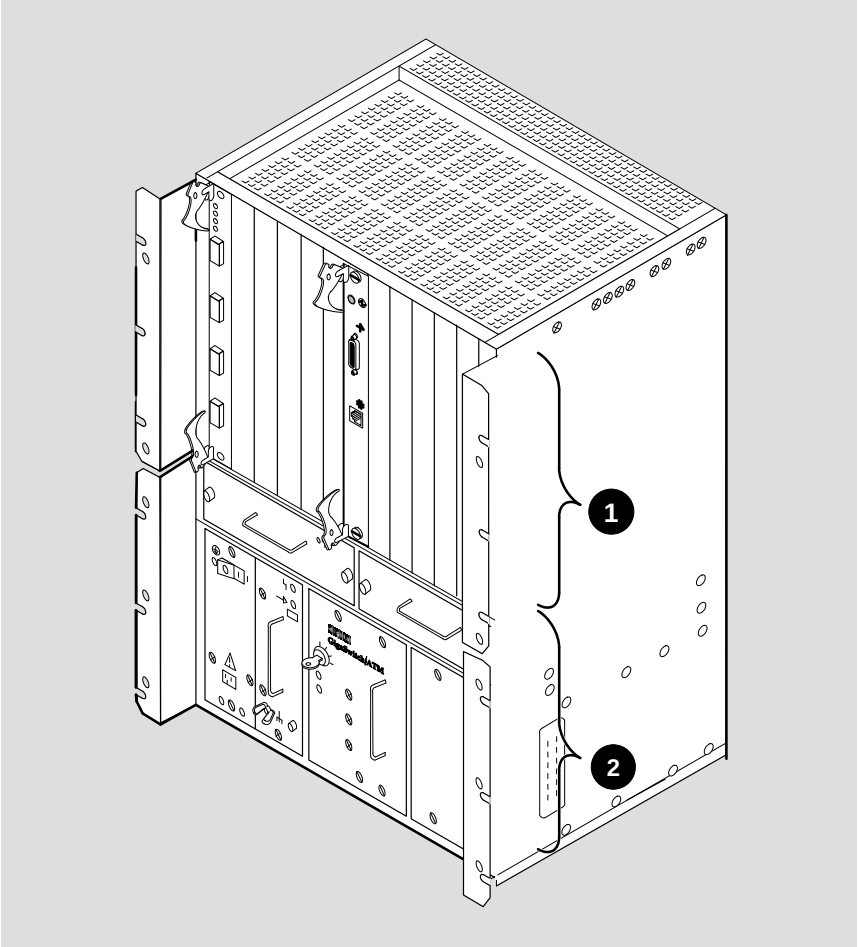
Ensure the power cord is connected at both ends to place the chassis at earth ground potential.

The system (see Figure 2–9) contains both logic modules and cooling and power modules.

1 Logic modules

2 Cooling and power modules

Figure 2–9 System Modules



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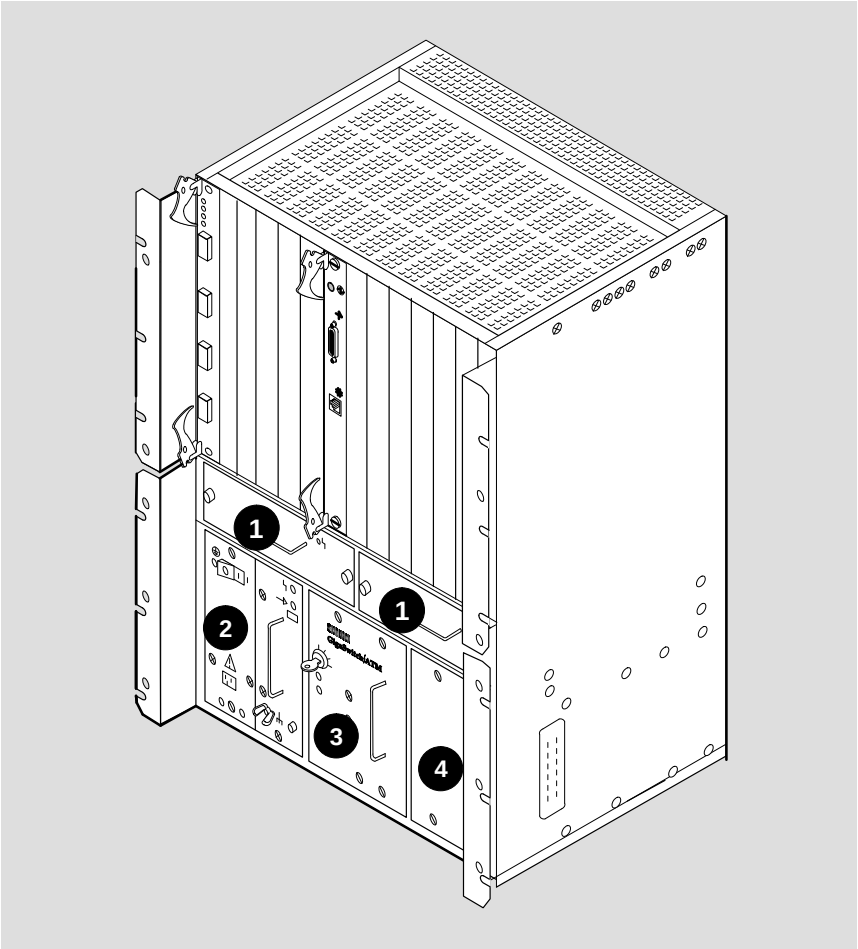
Remove the cooling and power modules to make the unit light enough for two people to lift.

2.6.1 Removing the Cooling and Power Modules

Warning

Remove system modules from the unit to make it light enough for two people to lift the unit.

Figure 2–10 Cooling and Power Modules



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The cooling and power modules consist of the components shown in Figure 2–10 and are listed in the following table.

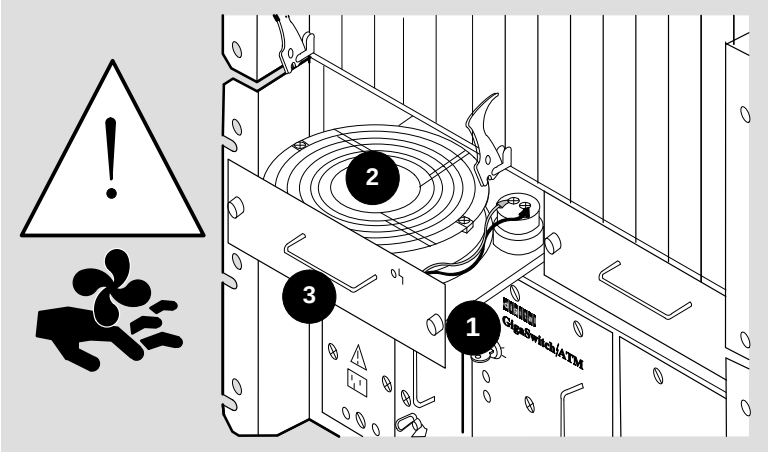
Name	Function
1 Fan tray assembly	Cools the GIGAswitch/ATM system. The system houses two fan tray assemblies. Each fan tray assembly contains two fans.
2 Front end unit (FEU)	Converts primary source power to system 48 Vdc bulk potential and to variable 12 Vdc through 26 Vdc fan power. The FEU also houses the system circuit breaker.
3 Power status assembly (PSA)	Provides monitoring and control of the cooling and power systems.
4 Slot for backup front end unit (FEU)	Same as FEU.

Perform the following tasks when removing the cooling and power modules.

1. Remove the fan tray assemblies.
2. Remove the front end unit.

2.6.1.1 Removing the Fan Tray Assemblies

Figure 2–11 Fan Tray Assembly



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Refer to Figure 2–11 when completing the following steps to remove the fan tray assemblies from the GIGAswitch/ATM system.

1. Locate the two fasteners 1 that attach the selected fan tray assembly 2 to the GIGAswitch/ATM system and the handle 3.

2. Release the two fasteners [1] that attach the selected fan tray assembly to the system.

3. Grasp the handle [3] and slide the fan tray assembly [2] out of the unit enough to see if the fan is rotating.

4. Wait for the fan to stop rotating.

5. Slide the fan tray assembly out of the unit. Grasp the handle [3] with one hand and support the bottom of the fan tray assembly with your other hand.

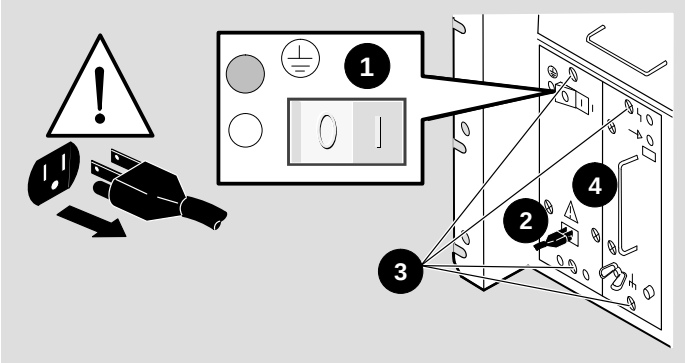
6. Repeat steps 1 through 5 to remove the other fan tray assembly.

2.6.1.2 Removing the FEU

Caution

Remove FEU after removing all logic modules (see Section 9.1.1). The power cord provides the ground required for ESD protection.

Figure 2–12 Removing the FEU



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Refer to Figure 2–12 when completing these steps to remove a front end unit (FEU).

1. Locate the power switch [1], the power cord [2], the four screws [3] that fasten the selected module to the GIGAswitch/ATM system, and the handle [4] of the selected module.

2. Place the power switch [1] in the O (OFF) position and remove the power cord [2] from the primary power outlet and the power connector.

3. Remove the four screws [3] on the module using a number 2 cross–point screwdriver.
4. Slide the module out of the unit. Grasp the handle [4] with one hand and support the bottom of the module with your other hand.
5. Repeat steps 1 through 4 to remove the other module (if installed).

3

Installing the GIGAswitch/ATM System

Note

Complete the procedures described in Chapter 2 before proceeding with this chapter.

This chapter describes the following procedures for installing the empty GIGAswitch/ATM system:

- Installing the GIGAswitch/ATM system in the rack
- Attaching the upper plenum to the GIGAswitch/ATM system
- Installing the system modules

3.1 Installing the GIGAswitch/ATM System in the Rack

Perform the following tasks when installing the GIGAswitch/ATM system in the rack.

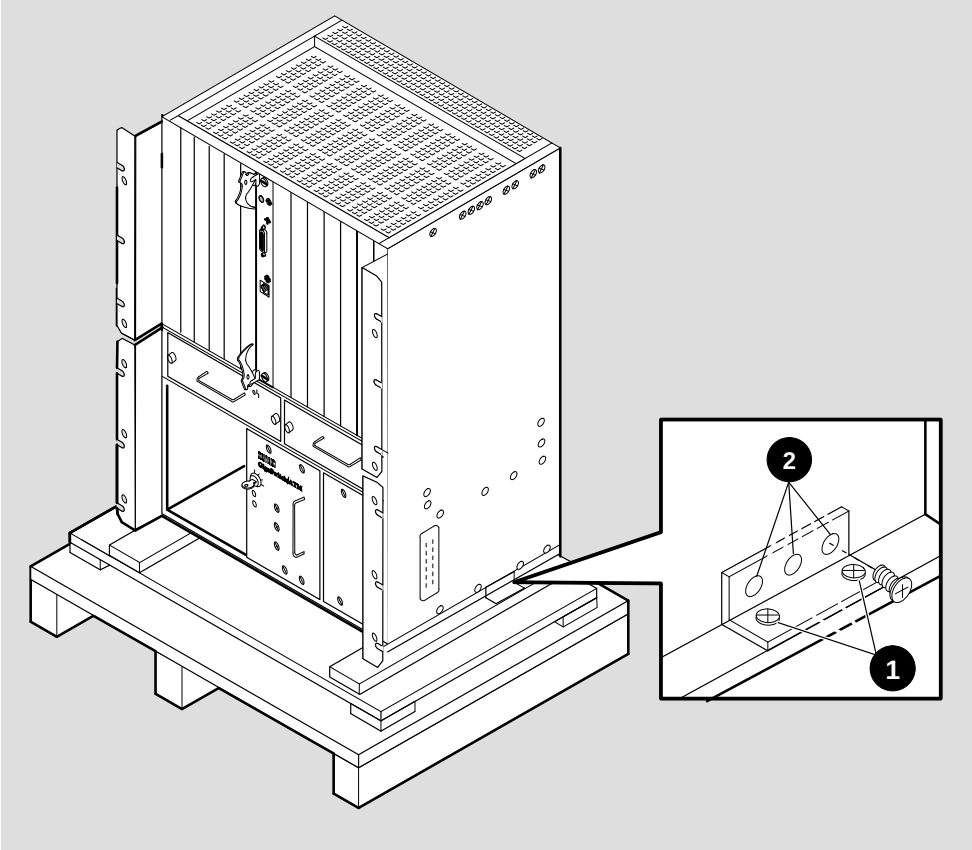
1. Remove the GIGAswitch/ATM system from the pallet.
2. Place the GIGAswitch/ATM system on the lower plenum.
3. Attach the GIGAswitch/ATM system to the rack.

These tasks should take 45 minutes and require the following tools:

- Adjustable wrench
- Number 2 cross–point screwdriver
- ESD equipment

3.1.1 Removing the GIGAswitch/ATM System from the Pallet

Figure 3–1 Removing the System from the Pallet



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Refer to Figure 3–1 when completing the following steps to remove a GIGAswitch/ATM system from the pallet.

1. Locate the four screws [1] (two on each side) attaching the brackets to the pallet, and the six screws [2] (three on each side) attaching the brackets to the GIGAswitch/ATM system.

2. Loosen the four screws [1] attaching the brackets to the pallet using the adjustable wrench.

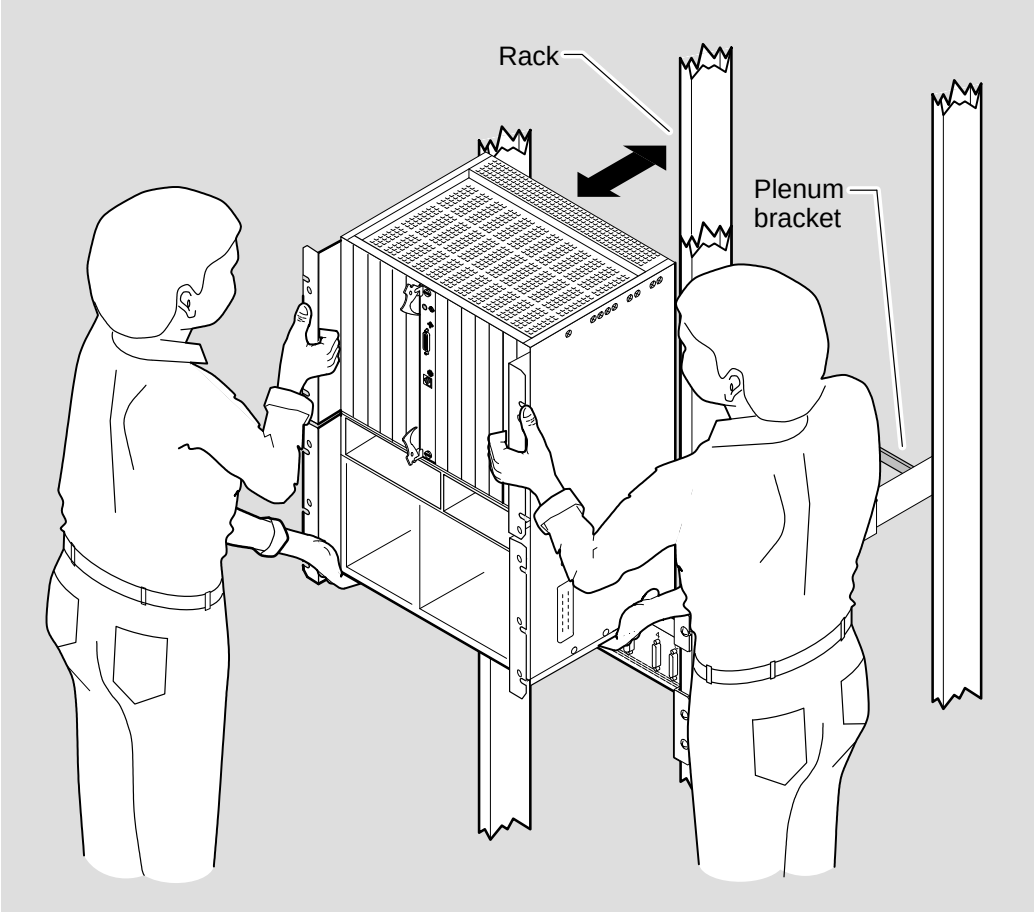
3. Remove the six screws [2] attaching the brackets to the GIGAswitch/ATM system using the adjustable wrench.

3.1.2 Placing the GIGAswitch/ATM System on the Lower Plenum

Warning

The empty GIGAswitch/ATM system weighs 50.0 kg (110 lbs). Use two people to lift the unit.

Figure 3–2 Placing the System on the Lower Plenum



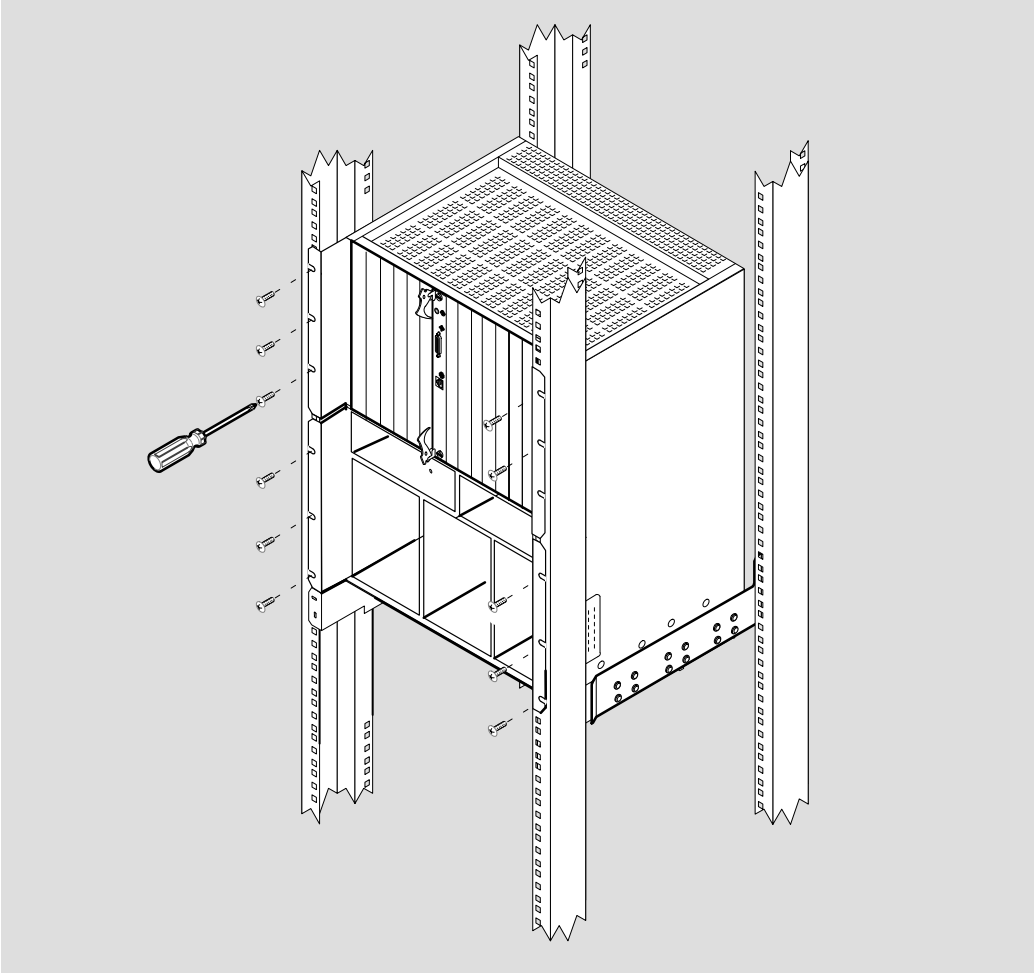
Refer to Figure 3–2 when performing the following steps to place the GIGAswitch/ATM system on the lower plenum.

1. Lift the empty GIGAswitch/ATM system to the height of the lower plenum in the rack using two people.

2. While supporting the GIGAswitch/ATM system from the bottom, slide the empty GIGAswitch/ATM system into the rack, placing it onto the lower plenum.

3.1.3 Attaching the GIGAswitch/ATM System to the Rack

Figure 3–3 Attaching the System to the Rack



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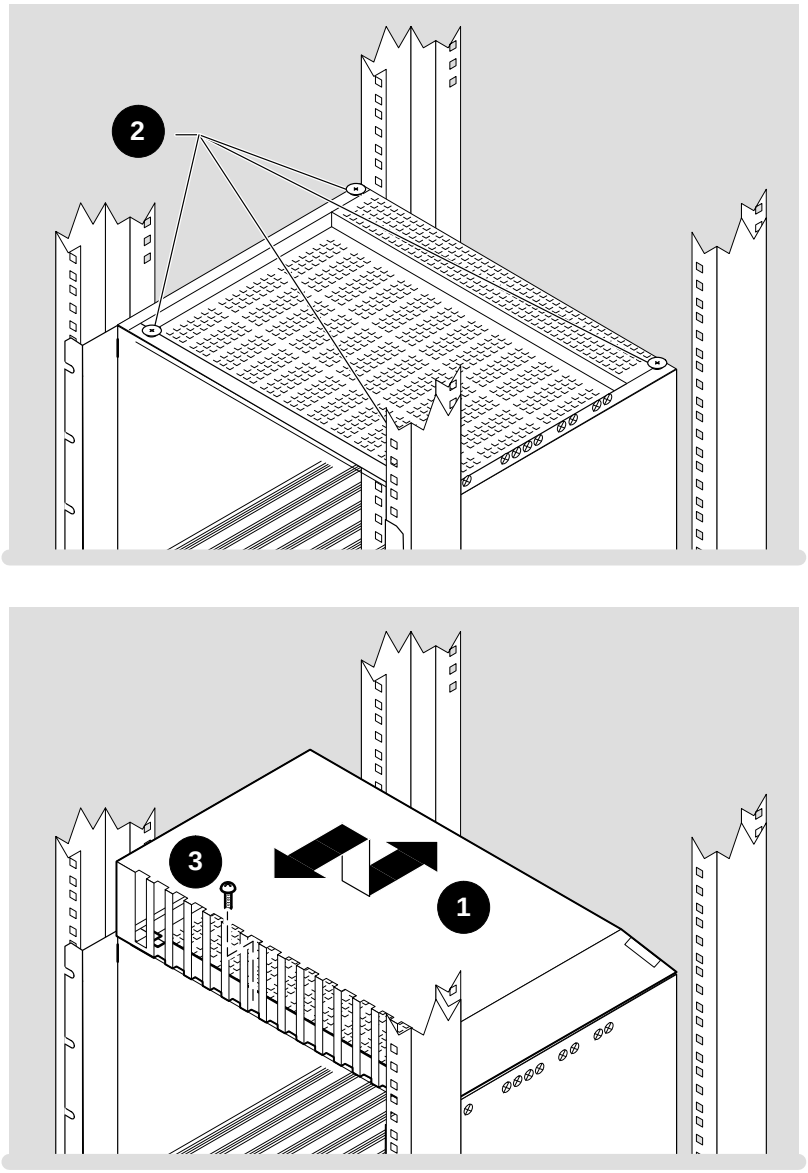
Refer to Figure 3–3 when performing the following tasks to attach the GIGAswitch/ATM system to the rack.

1. Locate the GIGAswitch/ATM system [1], the 12 clip nuts (not shown) designated for the GIGAswitch/ATM system, and the 12 screws [2].
2. Align the holes in the GIGAswitch/ATM system with the corresponding clip nuts on the rack.
3. Partially start the screws [2] using a number 2 cross–point screwdriver.
4. Finish tightening the screws [2] using a number 2 cross–point screwdriver.

3.2 Attaching the Upper Plenum

Figure 3–4 Attaching the Upper Plenum



Refer to Figure 3–4 when performing the following steps to attach the upper plenum to the GIGAswitch/ATM system.

1. Locate the upper plenum [1], the four shoulder screws [2], and the mounting screw [3].

2. Place the upper plenum [1] on the GIGAswitch/ATM system. Slide the upper plenum in until it catches under the four shoulder screws [2].

3. Install the mounting screw [3] to attach the upper plenum [1] to the GIGAswitch/ATM system using a number 2 cross–point screwdriver.

3.3 Installing the System Modules

Perform the following procedures when installing the system modules.

1. Install the FEUs.

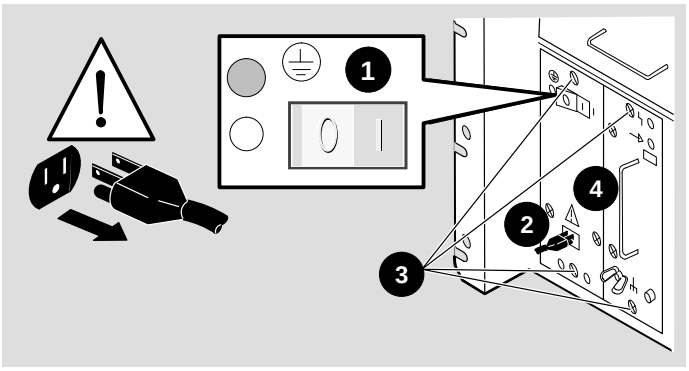
2. Install the fan tray assemblies.

Caution

Install the FEU before installing any logic modules. The power cord provides the ground required for ESD protection.

3.3.1 Installing the FEU

Figure 3–5 Installing the FEU



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Refer to Figure 3–5 when performing the following procedures to install the FEU.

1. Locate the power switch [1], the power cord [2], the four screws [3] that fasten the selected module to the GIGAswitch/ATM system, and the handle [4] of the selected module.

2. Align the selected module with the module guides of the slot designated for the module.

3. Grasp the handle [4] and slide the module into the unit.

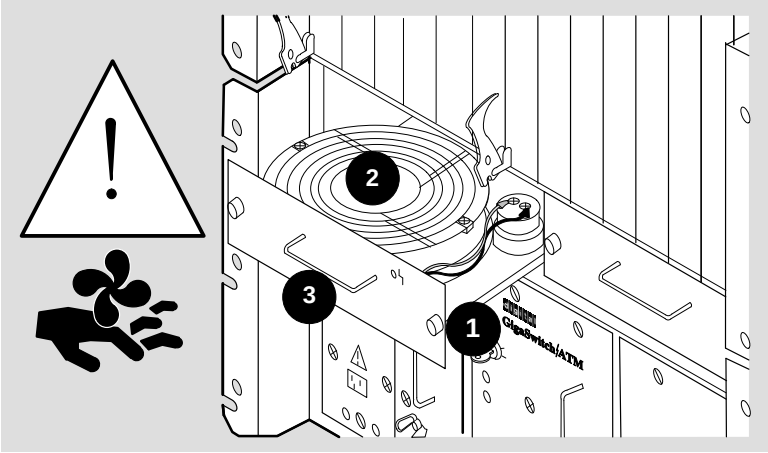
4. Tighten the four screws [3] using a number 2 cross–point screwdriver.

5. Place the power switch [1] in the 0 (OFF) position.

6. Plug the power cord [2] into the power connector and then into the connector for the primary power source.

3.3.2 Installing the Fan Tray Assemblies

Figure 3–6 Installing the Fan Tray Assembly



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Refer to Figure 3–6 when performing the following procedure to install the fan tray assemblies.

1. Locate the two fasteners [1] that attach the selected fan tray assembly [2] to the GIGAswitch/ATM system, and the handle [3] of the selected fan tray assembly.

2. Align the fan tray assembly (LED to the upper right of the handle) [2] with module guides of the slot designated for fan tray assembly.

3. Slide the fan tray assembly [2] into the GIGAswitch/ATM system.

4. Tighten the two fasteners [1].

5. Repeat steps 1 through 4 to install the other fan tray assembly.

Part II

Configuration and Testing

Part II contains information for configuring and testing the GIGAswitch/ATM system:

- Chapter 4 describes the procedures that you must complete before configuring the GIGAswitch/ATM system. These procedures include setting up the hardware for different types of access.
- Chapter 5 describes the clock management module (CMM) commands.
- Chapter 6 describes the procedures for initiating the MSTs, and provides instructions for evaluating the results of the MSTs.
- Chapter 7 describes the procedures for upgrading the firmware.

4

Preparing to Configure the System

This chapter describes the following procedures that should be completed before configuring the GIGAswitch/ATM system:

1. Setting up the hardware
2. Setting up the bootp and tftp servers
3. Setting up security and password protection
4. Setting up the OBM utility

The GIGAswitch/ATM system uses a Telnet/TCP/IP/Ethernet port or a console port for out–of–band management (OBM) that permits access to the switch configuration parameters and allows the setup and teardown of permanent virtual circuits (PVCs).

If you do not need to upgrade the software, you can use the OBM interface from the console port located on the clock management module (CMM) by performing the tasks described in Table 4–1. If you have a console attached to the switch, the status of the system load is displayed on the screen when you first power up the system.

If you have the latest firmware (V2.0 or later) installed, you do not have to set up the bootp server; you can use the `set_download_info` command at the console prompt and enter the switch IP address, switch net mask, tftp server IP address, and the control file name. If you do not change your configuration, the bootp is bypassed the next time that you start up the system.

4.1 Setting Up the Hardware

Refer to Chapter 3 for information about installing the GIGAswitch/ATM system. Refer to Figure 4–1 when completing the steps described in Table 4–1 and Table 4–2 to set up the hardware for either asynchronous or remote OBM access.

Figure 4–1 Hardware Setup

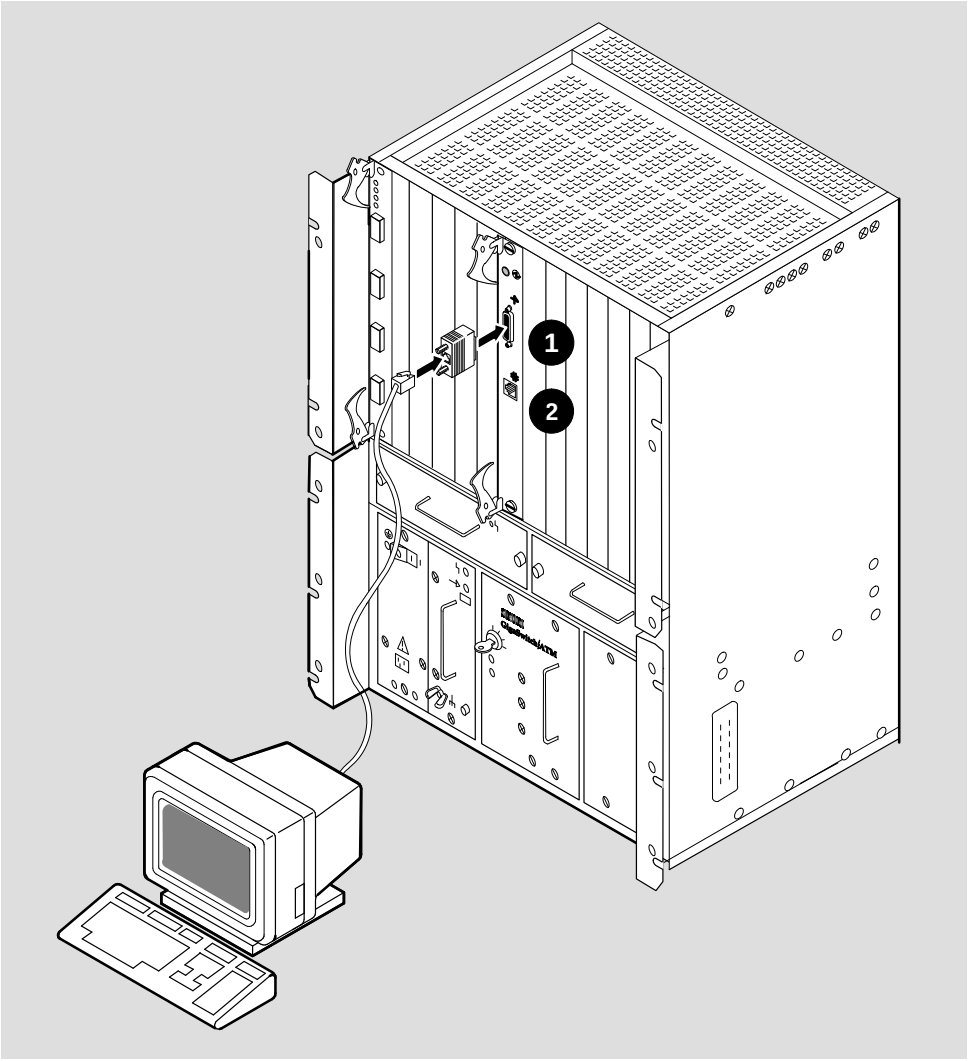

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Table 4–1 Setting Up the Hardware for Asynchronous Access

Step	Action
1	Locate the RS–232 connection [1] on the clock management module (CMM).
2	Connect a terminal to the RS–232 port using a shielded RS–232 cable.
3	Press the <Ctrl/O> key sequence at the prompt so that you can connect to the Master line card and use the console commands (described in *GIGAswitch/ATM System Management*).
4	Type `obm` at the console prompt (`GIGAswitch/ATM->`). OBM displays the announcement message.

Table 4–2 Setting Up the Hardware for Ethernet Access

Step	Action
1	Locate the Ethernet connector 2 on the CMM. It is below the RS–232 connection 1.
2	Connect a twisted–pair Ethernet cable and Ethernet repeater between the Ethernet port on the CMM and your Ethernet network.
3	Determine the Box Ethernet address for the GIGAswitch/ATM system; the Box Ethernet address is marked on the CMM in the following format: 08–00–2b–xx–xx–xx (6 bytes)
4	The GIGAswitch/ATM system requires a single IP address for remote OBM access, firmware updates, and access to diagnostic services in both the Master and Slave line cards. The IP address becomes the Master line card's IP address. (The Master line card is the line card in the first slot, unless it is not running the latest firmware and there is another line card that is doing so.)
5	Set up the Ethernet and IP addresses with or without the bootp server. If you have a bootp server, set up the bootp server with the Ethernet address and assigned IP address from steps 3 and 4. During initialization, the CMM elects the line card in the first slot as the Master line card. The Master line card gets its IP address from the bootp server. Section 4.3.2 describes how to set up the bootp server. If you do not have a bootp server, you can set up the IP address using the OBM interface from the console. Follow the steps described in Table 4–1 and set the IP address from step 4 using OBM. Once the IP address is set, you have remote OBM access and you can use the `ping` command. If you have a bootp server configured to respond to bootp requests from the GIGAswitch/ATM system, the values assigned by the bootp server override the IP address set using OBM.
6	Type `telnet` *`ip–address`* `5000` at the operating system prompt, where *ip–address* is the IP address from step 4. or Type `telnet` *`ip–address`* at the operating system prompt, where *ip–address* is the IP address from step 4. Type `obm` at the console prompt (`GIGAswitch/ATM–>`). OBM displays the announcement message.

4.2 Setting Up the Hardware for SLIP Access

Refer to Chapter 3 for information about installing the GIGAswitch/ATM system. Refer to Figure 4–1 when completing the steps described in Table 4–3 to set up the hardware for serial line IP (SLIP) access.

Table 4–3 Setting Up the Hardware for SLIP Access

Step	Action
1	Assign two IP addresses, one to the switch and another to the host system that connects to the switch. The assigned SLIP IP addresses must be different from the existing Ethernet/IP addresses.
2	Connect a terminal to the console port 1 on the CMM using a shielded RS–232 cable.
3	The CMM responds with the `CLK>` prompt. Enter console forwarding mode by pressing the <Ctrl/O> key sequence.
4	Invoke the OBM utility on the GIGAswitch/ATM system and select the Management Parameter Selection Menu.
5	Select the “Set Box SLIP IP address and Host IP address” option and enter the two assigned IP addresses. Enter y when the switch asks, “Commit IP address to non–volatile storage, y or n? (n):”.
6	Configure the SLIP interface on the host system. Consult the host system documentation for information about configuring the SLIP interface. (Refer to Section 4.4 for an example of the setup on a Digital UNIX system.)
7	Set the keyswitch position on the switch to 1 (Security Enabled). Remote access through SLIP is available only if the keyswitch is set to position 1.
8	Press the Break key on the terminal. CMM enters local mode.
9	Enter `SL` at the `CLK>` prompt. The SLIP mode is stored in nonvolatile RAM and enters SLIP mode automatically on powerup. (**NOTE:** CMM enters SLIP mode only if the IP addresses for SLIP are configured according to the above steps. If the SLIP command is entered at the `CLK>` prompt and the SLIP IP addresses are not set up, the CMM stays in local mode and displays the `CLK>` prompt.)
10	Disconnect the terminal from the CMM console port and connect it to the serial communication port on the host system.
11	Verify the SLIP access by using the `ping` command on the host system. (Specify the SLIP IP address of the GIGAswitch/ATM system in the `ping` command).
12	You can access the switch (TELNET or SNMP) using the SLIP IP address. However, you can access only the Master line card using SLIP. Telnet access to the Slave line cards is not supported through the SLIP interface. All the switch management operations do not require accessing the Slave line cards. Telnet access to the Slave line cards through Ethernet is provided only for debugging or servicing (such as reading error logs from the Slave line cards).

4.3 Setting Up the Servers

The bootp and tftp servers are used to upgrade software and to assign an IP address to the GIGAswitch/ATM system. The bootp server must be set up to respond to bootp requests from the GIGAswitch/ATM system. Refer to your operating system documentation for the specific commands that you need to set up and start a server.

4.3.1 Setting Up the tftp Server

This section describes the procedure for setting up tftp locally on your Digital UNIX system.

1. Log in as root or superuser. Go to the root directory using the `cd /` command and create the `tftpboot` directory using the `mkdir` command.

2. Copy the image files to the `/tftpboot` directory on your server using the `cp` command. (These are the same files created by the `tar` command described in Section 7.1.) Make sure that these files have the correct permission (world has read access) using the `ls -l` command. If you need to change the permission, use the `chmod` command.

3. In the same directory, create a control file named `AN3_VER`*xx*, where *xx* is the version number for your firmware (for example, V2.0 would be 20). The control file contains the following lines:

```
000250F0B/tftpboot/LC15V20.BIN
LC15V20.ROM
QLC15     LC15V20.ROM     LC15V20.BIN
QLCV2     LC20V20.ROM     LC20V20.BIN
```

   where the following table identifies the location of the fields in the control file:

Line	Position	Field
1	1–6	Application Firmware Version Number.
1	7	Force Flag (0 or F).
1	8	Startup Mode Flag (0, L, or F).
1	9	Boot ROM Load Flag (0 or B).
1	10–*n*	Application Image Filespec for 4–port 155 Mb/s line card.
2	1–*n*	Kernel Image Filespec for 4–port 155 Mb/s line card.
3–*n*		Three fields on each line separated by spaces indicate the hardware type, the ROM file name, and the application file name.

   All flag values must be specified as uppercase characters. Comment lines start with a number sign (#). Blank lines are also considered comment lines.

   If you have firmware V2.0, the first two lines are ignored. Otherwise, you should use the first two lines to upgrade your firmware.

The Application Firmware Version Number field contains six numeric characters that identify the internal version number of the application image. For example, 250 would be specified as 000250. Refer to the firmware release notes for the appropriate internal version number. The boot code uses the Application Firmware Version Number to determine if a downline load of a new firmware version is necessary. Each time the switch is rebooted, a bootp request is broadcast and the server responds with name of the control file. (You can use the `set_download_info` command to bypass the bootp server if you have the latest firmware images loaded on your switch.) The switch reads the control file and determines if it has the most current firmware, and downline loads the new firmware if required. If no bootp server responds within 15 seconds, the switch boots with the firmware loaded in its Flash ROMs and uses the default startup flag (run the diagnostics).

An `F` (Force Flag) value forces the load of the application portion of the firmware using the file specified in the Application Image Filespec field of the control file. A `0` value (the normal value) in the field only loads the application if the firmware version number in the control file is larger than the application version number in Flash. The `F` flag is used to back up to an older version of the application firmware.

A `0` (the normal value) in the Startup Mode Flag field causes the switch to perform the self–test diagnostics when the switch is booted. The `F` (fast) flag bypasses self–test, reducing the startup time of the switch by two minutes. The `F` mode should only be used after the switch has passed diagnostics. To run diagnostic self–test, the control file must be edited and the switch must be rebooted. Diagnostics should be run whenever the switch hardware is reconfigured. The `L` flag loads the kernel but does not start the application, providing a more isolated environment for the diagnostics. Invoke the diagnostics with the following command:

```
GIGAswitch/ATM-> diag_selftest()
```

This mode is intended for diagnostics to allow reading of error logs in the Master and Slave line cards in the event the switch reboots continuously in user mode, and to facilitate running diagnostics on each line card. The cost of using the `L` flag is that the switch must be rebooted after the diagnostics complete (with the Startup Flag field modified to `0` or `F` before the reboot).

The Boot ROM Load Flag field causes the kernel image portion of the firmware to be loaded from the file specified on the second line of the control file if the `B` flag is present. A `0` value (the normal value) means that the kernel is not altered and the second line of the control file is ignored.

The Application Image Filespec and the Kernel Image Filespec identify the files containing the respective images for the 4–port 155 Mb/s line card (DAGGL–AA or DAGGL–AB). Note that the application requires the full file specification on Digital UNIX systems; including the absolute path name, other systems might allow just the file name if the file resides in the default tftp directory (`/tftpboot`).

The third line and any subsequent lines should contain three fields separated by spaces to indicate the hardware type, the ROM file name, and the application file name. The following table indicates the entries that you might see for different hardware types:

QLC15	LC15V20.ROM	LC15V20.BIN
QLCV2	LC20V20.ROM	LC20V20.BIN

where QLC15 is the 4–port 155 Mb/s line card and QLCV2 is the 4–port modular line card (DAGGL–BA).

The files in `/tftpboot` for Version 2.0 are:

File	Description
AN3_VER20	Load control file
LC15V20.ROM	Kernel image for 4–port 155 Mb/s line card
LC15V20.BIN	Application image for 4–port 155 Mb/s line card
LC20V20.ROM	Kernel image for 4–port modular line card
LC20V20.BIN	Application image for 4–port modular line card

4.3.2 Setting Up the bootp Server

This section describes the procedure for setting up a Digital UNIX system as the bootp server.

1. Log in as root or superuser.
2. Verify that the following lines are in the `/etc/inetd.conf` file using the `more` command.

   ```
   bootps  dgram  udp   wait   root   /usr/sbin/bootpd      bootpd  –d
   tftp    dgram  udp   wait   root   /usr/sbin/tftpd       tftpd –r /tftpboot
   ```

   If these lines do not exist or are commented out (preceded by a number sign), edit the file and include these lines or remove the number sign. After editing the file, you must stop and restart the inetd process by:

   a. Determining the process ID (PID) of the inetd process using the `ps –aux | grep inetd` command.

   b. Stopping the inetd process using the `kill –9` *`pid`* command, where *`pid`* is the PID from the preceding command.

   c. Restarting the inetd process using the `/usr/sbin/inetd &` command.

3. On the server system, the LOAD control flags in the bootp/tftp load control file control the downline load of both the kernel image and the application image. The entry in the bootp server's `/etc/bootptab` file that corresponds to the switch's Ethernet address contains the name of the load control file, the startup flag, and the file specifications of the load images. (The switch's Ethernet address is printed on the handle of the CMM in slot 7 or can be determined using the `A` CMM command.) Note that the downline load occurs over the Ethernet, not over the ATM links.

   Check the firmware upgrade documentation for the name and location of the firmware image and any release information used for setting up this file. Set up the `/etc/bootp-tab` file to include the information for the GIGAswitch/ATM system in the following format:

node:ht=*hw–type*:ha=*hw–addr*:ip=*ip–addr*:sm=*subnet–mask*:gw=*gw–addr*:hd=*home–dir*:bf=*boot–file*

where

node is the unique node name of the GIGAswitch/ATM system.

hw–type is the hardware type. For Ethernet, the value is 1.

hw–addr is the hardware address (MAC or Ethernet address) for the switch.

ip–addr is the IP address for the switch.

subnet–mask is the subnet mask if subnets are configured. This field is optional and must be specified if the assigned IP address is a Class C address. The specified value must be compatible with your bootp/tftp server. If the subnet mask is not specified, the GIGAswitch/ATM system uses 255.255.0.0 as the default value.

gw–addr is the default gateway address. This optional field is used as the inet address of the default router if specified.

home–dir is the home directory of the boot file.

boot–file is the name of the boot file that points to the binary image of the firmware.

Make sure the home directory reflects the tftp path and directory specified in the `/etc/inetd.conf` file. The home directory is found on the local host. For example, a switch node named `an23` with Ethernet address `08–00–2B–12–34–56` and IP address `16.20.111.222` would have the following entry in the `/etc/bootptab` file:

an23:ht=1:ha=08002B123456:ip=16.20.111.222:hd=/tftpboot:bf=AN3_VER20

The control file is located in the `/tftpboot` directory by default and contains pointers to the image files. You must modify the control file if you change the file names or the directory. Uppercase file names are used for compatibility with DOS. You can rename the files with lowercase file names if your bootp server supports lowercase file names.

4. See if the `/tftpboot` directory exists. If it does not exist, follow the instructions in Section 4.3.1 for setting up the tftp server. Verify that the directory specified by the boot file is `/tftpboot` and that the specified control file exists in this directory.

5. Modify the local `/etc/hosts` file to include the workstation and GIGAswitch/ATM system information for the switch. For example, the `/etc/hosts` file might list the GIGAswitch/ATM system as follows:

   Inet Address Host Name Full inet name Comments

   16.17.18.19 an29 an2lc10.nac.lkg.dec.com # GIGAswitch/ATM system

6. Apply power to the GIGAswitch/ATM system to verify that the bootp server can respond to downline load requests. Determine the directory with the latest time–stamp from the directory listing of `/usr/adm/syslog.dated` using the `ls` command. Determine if there is a `daemon.log` file in the directory with the latest time–stamp using the `ls /usr/adm/syslog.dated/`*`latest–date`* command, where *`latest–date`* is the directory with the latest time–stamp from the preceding command. If there is a `daemon.log` file, then you can verify that the bootp requests are coming from the target GIGAswitch/ATM system by using the `tail –f /usr/adm/syslog.dated/`*`latest–date`*`/daemon.log` command.

7. Confirm that the host address in the `/etc/hosts` file is correct and that the GIGAswitch/ATM system can receive the correct IP address through the bootp server by executing one of the following commands:

   ```
   #ping ip–addr
   #ping node–name
   ```

   where *ip–addr* is the IP address and *node–name* is the node name of the GIGAswitch/ATM system. Use the <Ctrl/C> key sequence to end the display.

8. Create a remote connection to the console for the GIGAswitch/ATM system using the following command:

   ```
   #telnet node–name
   ```

   where *node–name* is the node name for the GIGAswitch/ATM system. Your host must be on the network. The `help` command displays information about available console commands. Use the `logout` command to end the remote connection. Display network information, such as IP addresses, by executing the `ifShow` command. To identify the host that serviced the last request, execute the `hostShow` command. Refer to *GIGAswitch/ATM System Management* for more information about some useful console commands.

You can now set up the OBM session using the OBM interface.

4.4 Setting Up the SLIP Interface

You can set up the SLIP interface for the GIGAswitch/ATM system using the OBM menus. The following example describes the setup procedure for Alpha systems running the Digital UNIX operating system.

This procedure assumes that you have already configured the GIGAswitch/ATM console port to run in SLIP mode and have connected a suitable null modem cable between the Alpha and GIGAswitch/ATM systems.

Note

Not all null modem cables work correctly. Use DECconnect BC16E cables with null modem connectors.

1. The sl device must be listed in the `/sys/conf/HOSTNAME` configuration file. The following example configures two sl devices:

```
pseudo–device   sl      2
```

2. Enter the host information into the `/etc/hosts` file for both the local and remote nodes of the SLIP connection to facilitate subsequent setup procedures. The following example shows the format of the entries. The `_sl` piece is optional, but it helps differentiate this interface as a SLIP port.

   ```
   16.24.96.100     localhost_sl
   16.24.96.101     remotehost_sl
   ```

   Be sure that there is not an IP address or subnet conflict with existing interfaces on the system (ln0, fta0, and so forth).

3. Configure the SLIP interface using the `ifconfig` command as follows:

   ```
   ifconfig sl0 localhost_sl remotehost_sl netmask 255.255.255.0 up
   ```

   Substitute the dot notation IP address if you did not add this information to the `hosts` file.

4. Assign a serial line to the network interface.

   ```
   slattach tty00
   ```

   The tty line is attached to the first available network interface that has already been configured with the local and remote addresses of each end of the SLIP connection using the `ifconfig` command. In this case, sl0 will be chosen.

   You can omit the full path because the command defaults to `/dev` for the tty.

   You can use the third parameter to specify the baud rate. The default is 9600.

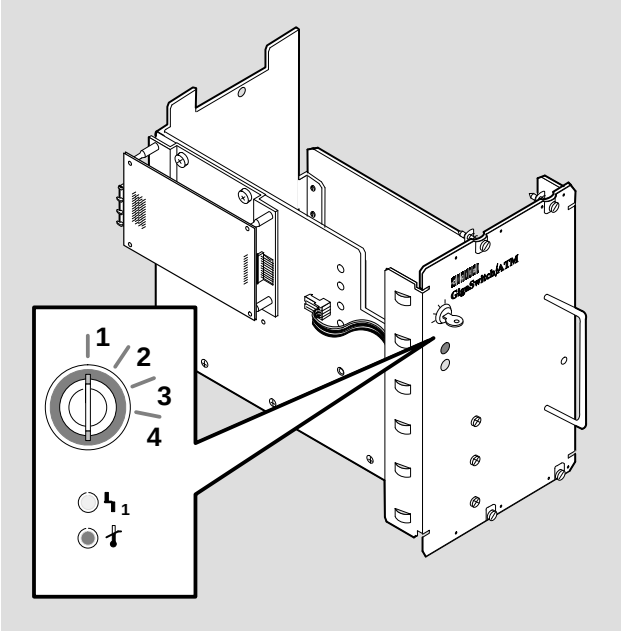
5. Accessing the remote system over the SLIP connection is the same as connecting to a system over the network. In this case, you would enter one of the following:

   ```
   # telnet remotehost_sl
   # telnet 16.24.96.101
   ```

4.5 Setting Up Security and Password Protection

The keyswitch controls the ability to secure your system and provide password protection using in–band management commands issued from any GIGAswitch/ATM system management station or out–of–band (OBM) management commands issued through the terminal or modem interface for the GIGAswitch/ATM system. Figure 4–2 and the corresponding table identify the security switch and the positions of the security switch.

Figure 4–2 Security Switch



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Position	Security Mode
1	Security Enabled
2	Security Disabled
3	Security Disabled
4	Security Disabled

If the keyswitch is set to position 1 (security enabled):

- Switch security and password protection are enabled.
- Telnet and SLIP access are enabled.
- The OBM utility can be invoked by default using the Telnet or console ports.
- Telnet access using port 5000 is not supported.
- Telnet access to Slave line cards is not supported.

If the keyswitch is set to position 2, 3, or 4 (security disabled):

- Switch security and password protection are disabled.

- SLIP access is disabled.
- Telnet access using port 5000 is supported.

Note

The keyswitch should be set to position 1 at all times to provide system security.

Password protection is supported with the use of the keyswitch. If the keyswitch position is set to 1, switch security is enabled and password protection is enabled. If the keyswitch is in a position other than 1, switch security is disabled. You should NOT turn the keyswitch position from 1 unless you forget the password.

Password protection for two accounts is provided. These accounts have the following default passwords.

Account	Default Password
user	username
manager	managername

When you try to connect to the GIGAswitch/ATM system, the console login prompt (`GIGAswitch/ATM login:`) appears. If you forget the password, you can disable switch security by turning the keyswitch from 1 to some other position. The console login prompt does not disappear immediately. You must reboot the switch in order to disable the login prompt. As long as the console prompt (`GIGAswitch/ATM->`) appears, you can change the password without knowing the current password. Once you finish changing the password, Digital recommends that you turn the keyswitch back to 1 for security purposes.

You can change passwords by using the console command or the OBM menus. To change the passwords from the console, use the `setpasswd` command. To change the passwords from the OBM utility, select 5 (System Utility Menu) from the Main Menu and select 2 (Change Passwords) from the GIGAswitch/ATM System Utility Menu.

Using the `setpasswd` command or the OBM interface, you can change the password for the user or the manager account. Once you make a selection, you are asked to enter the old password. After you enter the old password within the time limit, you are prompted for a new password. The password length must be between 8 and 40 characters. Verification of the new password is required. The password is updated after the switch is rebooted.

4.6 Setting Up the OBM Session

This section describes how to set up the OBM session. *GIGAswitch/ATM System Management* describes the OBM interface and its menus in more detail.

To connect to the OBM agent in the GIGAswitch/ATM system where security is disabled, use one of the following commands on the remote management station:

```
> telnet ip–address 5000
> telnet node–name 5000
```

where *ip–address* is the IP address of the GIGAswitch/ATM system and *node–name* is the node name of the GIGAswitch/ATM system.

Note that if your switch is in secure mode, the `GIGAswitch/ATM login:` console login prompt appears instead of the console prompt. If your system has security enabled, use one of the above commands without specifying 5000. For example:

```
> telnet node–name
```

Refer to Section 4.5 for more information about setting up security on your system. To use the OBM interface from the console, follow the steps described in Table 4–1.

After entering the `obm` console command, the OBM agent prints out this message:

```
+=======================================+
     Digital GIGAswitch/ATM Switch

          Out–of–Band Management
               Interface

               Appl Vers: V2.0

  Appl Build: Thu Feb 15 12:59:05 EDT 1996

        Date: Feb 16 15:04:45 1996


+=======================================+



         Digital ATM Switch Main Menu

1. Management Parameter Menu
2. Virtual Circuit Configuration Menu
3. Switch Configuration Menu
4. SNMP Parameters Menu
5. System Utility Menu
6. Routing/Signaling Configuration Menu
7. Disconnect Session

Input <Control–D> to terminate session
Enter selection:
```

4.7 Gathering Information for Configuration

Before you configure your system, make sure the information about your configuration is available. Before you can have ATM connections between the hosts and the switch, you must set up PVCs on your hosts. The following worksheet can help you gather information about your hosts for setting up PVCs. You also might want to include information about bandwidth and flow control. You do not need this information for setting up SVCs.

Table 4–4 PVC Configuration Worksheet

Host (name)	Port #	Slot #	VCI	Host (name)	Port #	Slot #	VCI

5

Using CMM Commands

This chapter describes the clock management module (CMM) local mode commands, such as SL, A, CO, B, E, CL, T, DO, DE, SD, H, and <Ctrl/O>. Press the Return key after each command. Use these commands by connecting a terminal to the CMM. When you first power on the GIGAswitch/ATM system, you are in local mode on the CMM. The Help Screen appears with the following prompt:

```
CLK>
```

5.1 Obtaining Information About CMM Commands

The H command displays the Clock Card Console Port Help Screen.

```
CLK>H

          *** GIGAswitch/ATM Clock Management Module Console Port ***
                Copyright (c) 1994 Digital Equipment Corporation


 Clock Management Module Console Port Help Screen

   ^O    Enter LC Forwarding Mode
    SL   Enter SLIP Mode
    A    Show Ethernet Addresses
    CO   Show Slot Configuration
    B    Show Box Configuration (Fans, Power, etc.)
    E    Retrieve Error Log
    CL   Clear Error Log
    T    Show/Modify Real Time Clock Contents
    DO   DOwnload Code Image
    DE   Set Default Soft Switch Settings
    SD   Show Default Soft Switch Settings
    H    Show Help Screen


CLK>
```

5.2 Changing to Line Card Forwarding Mode

To transfer control to the Master line card, press the <Ctrl/O> key sequence. After entering line card forwarding mode, you can use the console commands described in *GIGAswitch/ATM System Management*. To switch back to local mode on the CMM, press the Break key.

5.3 Using SLIP Mode

This section explains how to enter and leave SLIP mode if your hardware has been set up for SLIP access. Refer to Section 4.2 for more information about setting up SLIP support.

5.3.1 Entering SLIP Mode

The SL command causes the CMM console mode, which is stored in nonvolatile RAM, to be set to SLIP. Thus, SLIP mode is entered automatically when the system is powered up.

```
CLK>SL
```

If the IP addresses for SLIP have not been configured as described in Table 4–3, the CMM stays in local mode and displays the CLK> prompt.

5.3.2 Leaving SLIP Mode

To leave SLIP mode, perform the following steps.

1. Connect a terminal to the CMM console port.
2. Press the Break key (F4 key on VT300 terminals).
3. The CMM enters local mode and displays the CLK> prompt.
4. At the CLK> prompt, you can execute any of the local mode commands.

5.4 Displaying Ethernet Addresses

The A command displays the Ethernet addresses for the GIGAswitch/ATM system as shown in the following example.

```
CLK>A

                    GIGAswitch/ATM Ethernet Address Assignments

Switch Address: 08-00-2B-A5-AC-80
```

5.5 Displaying Slot Configuration

The CO command displays the slot configuration for the GIGAswitch/ATM system as shown in the following example of a single mode setting.

```
CLK>CO

                        GIGAswitch/ATM Slot Configuration

Slot    Card Type
 1        -
 2        -
 3        -
 4        -
 5*     Quad Line Card (V 2.0)
 6        -
 7      Clock Card
          -
 8        -
 9        -
10        -
11        -
12        -
13        -
14        -


CLK>
```

The asterisk (*) indicates the current Master line card.

5.6 Displaying Box Configuration

The B command displays the box configuration for the GIGAswitch/ATM system as shown in the following example:

```
CLK>B

                          GIGAswitch/ATM Box Configuration

 Clock Card:
     FW Revision: 1.74
     HW Revision: B.3

 Power System Controller:
     FW Revision: 2.0
     HW Revision: C.1
     HW Status: ok
     Key switch position is 1 (secure access)

 Cabinet temperature is normal
 Left fan: ok
 Right fan: ok

 Left front end unit:
     Status: ok
     Source: AC line
 Right front end unit is not present

CLK>
```

5.7 Retrieving Error Logs

The E command retrieves the CMM error log (a circular list of 12 entries) and displays the twelfth entry. The error logs are stored in Flash memory on the CMM and are preserved over power cycles of the switch. After each error log entry is displayed, the user is prompted to continue or abort the display. Answering Y or pressing the Return key causes the next entry to be displayed. The following example shows a typical error log entry:

```
Entry #      = 3
               Logged by Diagnostic Firmware, Revision 1.70
               THU 02/15/96 10:04:00

Entry status = 0000  [0=valid, 1=wrt_err, 2=invalid, 3=empty, 4=crc_err]
Entry CRC    = FABE3788
Write Count  = 1
FRU Mask     = GIGAswitch/ATM CMM
Error ID     = Ethernet Address ROM Test
Test Data:
               Subtest: Start Address Test
               Returned Status       = Block A <> Block B
               Expected Value        = 00CB
               Actual Value          = 00CF
               Power Enable Register = 0080

Display next entry? (Y to continue)>
```

The information displayed varies depending upon whether the log entry was generated by the diagnostic or the operational firmware and the nature of the error.

5.8 Clearing Error Logs

The CL command clears CMM error logs. When you enter this command, you are asked to verify your decision to clear error logs as indicated by this display:

```
CLK>CL
  Clear Error Log:  Are You Sure? [N]
```

If you respond with Y, the error log entries are deleted and you are notified that the log is cleared.

5.9 Displaying Time

The T command displays the time.

```
CLK>T

Current = WED 02/14/96 16:40:17. Change to >

CLK>
```

The new date and time must match the displayed format (DDD mm/dd/yy HH:MM:SS) or you will receive an error message about illegal input of the date and time.

5.10 Loading Code Images

The DO command is used to downline load code images. Chapter 7 contains more information about this command and its use when upgrading firmware.

5.11 Modifying Switch Settings

The DE command is used to modify the switch settings. You can set the power option, line card startup mode, console output mode, console baud rate, and UID mode. These settings are preserved over power cycles of the switch. To modify the setting, you would use the DE command and the appropriate option to make that change. After you use this command, the settings are displayed to show your changes.

5.11.1 Changing the Available Power

The GIGAswitch/ATM system has two 110/220 volt power supply options, 15 amps and 20 amps. The 15–amp supply will power a switch with up to 11 line cards. If 12 or 13 line cards are loaded in the switch, a 20–amp supply is required. The current versions of the power supplies do not identify themselves, so this information must be entered manually with the DE/PWRL (for 15 amps) or DE/PWRH (for 20 amps) commands at the CLK> prompt.

To modify the available power for the GIGAswitch/ATM system, use the /PWRL (to decrease the power) or the /PWRH (to increase the power) option. Either 950 Watts or 1300 Watts, respectively, is displayed as the value for the decreased power or increased power.

The default value is a 15–amp supply (or one 48 V supply). Entering the DE/PWRH command tells the CMM that a 20–amp supply (or two 48 V supplies) is present and resets the switch so that all the line cards can participate in the master election.

5.11.2 Modifying the Line Card Startup Mode

To modify the line card startup mode, use the DE/SM0, DE/SMF, DE/SML, or DE/SMN commands. The /SM0 option is for normal startup mode with self–test, the /SMF option is for fast load startup mode without self–test, and the /SML and /SMN options are for diagnostics.

5.11.3 Modifying the Console Output Mode

To modify the console output mode, use the DE/OMQ (quiet mode) or DE/OMV (verbose mode) commands.

5.11.4 Modifying the Console Baud Rate

To modify the console baud rate, use the DE/BR=*n* command, where *n* specifies your baud rate. The baud rate can be 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, or 115200.

5.11.5 Modifying the UID Mode

To modify the UID mode, use the /UIDS (single) or /UIDM (multiple) options. Single mode is the default option and should not be changed.

5.12 Displaying Switch Settings

The SD command allows you to display the switch settings. You can display the power option, line card startup mode, console output mode, console baud rate, and UID mode. The output of this command resembles the following display:

```
CLK>SD

                    GIGAswitch/ATM Soft Switch Settings

Total Available Power  = 950 Watts    [/PWRL, /PWRH]
Line Card Startup Mode = 0            [/SM0, /SMA, /SMD, /SMF, /SML, /SMN]
Line Card Output MOde  = Verbose      [/OMQ, /OMV]
Console Baud Rate      = 9600         [/BR=nnnn]
Switch–wide Resets     = Disabled

UID Mode               = Single       [/UIDS, /UIDM]
Local Diagnostics      = Disabled
Line Card Mfg Mode     = Disabled

CLK>
```

6

Testing the System

This chapter describes the various screens associated with the following procedures:

- Initiating the module self–test (MST)
- Evaluating the results of the MST

Before you initiate the MST, read Chapter 4 for information about connecting the out–of–band management (OBM) terminal to the OBM port. The OBM terminal and the associated cables are supplied by the customer.

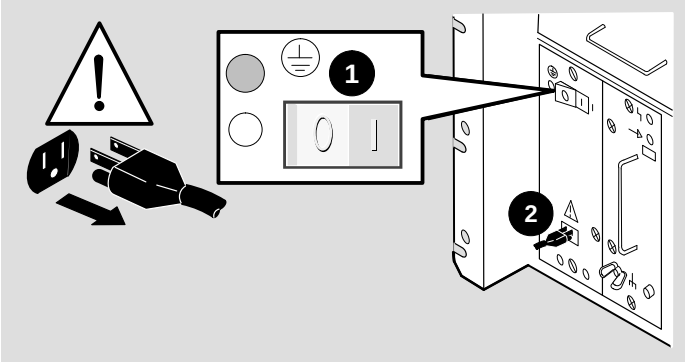
6.1 Initiating the MST

The following methods are used to initiate the MST.

- Applying power to the GIGAswitch/ATM system
- Rebooting the GIGAswitch/ATM system

6.1.1 Applying Power to the GIGAswitch/ATM System

Figure 6–1 Applying Power to the System



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Refer to Figure 6–1 when completing these steps to apply power to the GIGAswitch/ATM system.

1. Locate the power switch [1], the power cord, and the power connector [2].

   Note that some power cords are shipped separately in country kits.

2. Place the power switch [1] in the 0 (OFF) position.

3. Plug the power cord into the power connector [2] and then into the connector for the primary power source.

4. Place the power switch [1] in the 1 (ON) position.

6.1.2 Rebooting the GIGAswitch/ATM System

This section contains the displays and selections required to reboot the GIGAswitch/ATM system from the OBM terminal. After initiating an OBM session, the Main Menu appears and you should follow these steps to reboot the GIGAswitch/ATM system.

Action	Results
Look for Main Menu.	Main Menu appears.
Type 3 to select Switch Configuration Menu.	Switch Configuration Menu appears.
Type 7 to select Reboot Switch Software.	Question confirming action appears.
Respond with y to reboot switch.	OBM session is disconnected and the switch reboots automatically.

The following displays show the OBM interface menus used for each step.

```
          Digital ATM Switch Main Menu

1. Management Parameter Menu
2. Virtual Circuit Configuration Menu
3. Switch Configuration Menu
4. SNMP Parameters Menu
5. System Utility Menu
6. Disconnect Session

Input <Control–D> to terminate session
Enter Selection: 3


         3 Switch Configuration Menu

1. Display Slot Configuration
2. Disable Port
3. Enable Port
4. Read/Modify System Timeout
5. Read/Modify Switch OAM Support
6. Read/Modify SDH/SONET Support
7. Reboot Switch Software
8. Main Menu

Input <Control–D> to terminate operation
Enter Selection: 7

Switch Reboot will disconnect this OBM session and disconnect all
circuits as well.  The GIGAswitch/ATM will reboot automatically.

Are you sure you want to perform this action, y or n? (n): y
```

If you reply with y, the switch reboots at this point and the following menu appears:

```
          *** GIGAswitch/ATM Clock Management Module Console Port ***
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 Clock Management Module Console Port Help Screen

   ^O    Enter LC Forwarding Mode
    SL   Enter SLIP Mode
    A    Show Ethernet Addresses
    CO   Show Slot Configuration
    B    Show Box Configuration (Fans, Power, etc.)
    E    Retrieve Error Log
    CL   Clear Error Log
    T    Show/Modify Real Time Clock Contents
    DO   DOwnload Code Image
    DE   Set Default Soft Switch Settings
    SD   Show Default Soft Switch Settings
    H    Show Help Screen


CLK>
```

6.2 Evaluating the Results of the MST

This section helps you evaluate the results of the MST by identifying each light–emitting diode (LED) and describing its purpose on the following components:

- Line card
- Clock card
- Cooling and power modules

6.2.1 4–Port Modular Line Card LEDs

Each line card contains two sets of LEDs. The LED at the top of the module is called the Module LED, the four LEDs below the Module LED (labeled 1 through 4) are called Link LEDs, and the two LEDs below each port are called Physical layer (PHY) LEDs.

The PHY LEDs display Physical layer information. Refer to *ATM Modular PHY Cards Installation* for information about the PHY LEDs.

The Module LED (topmost LED) displays the mode for the Link LEDs. When the Module LED is green, the four Link LEDs display the status of the lines and the type of end node [an ATM end node (UNI) or an ATM switch (NNI)] connected at the remote end. The end node information (switch versus end node) is intended to help the system manager connect cables. When the Module LED is amber, the four Link LEDs display information about self–test failures that occur when booting the line cards.

During switch initialization, the Module and Link LEDs indicate the progress of the loading procedure for the Flash and RAM with the following sequence:

1. The Module LED turns amber when power is applied to the module.
2. The Module LED flashes green to indicate that the firmware is loading.
3. The Module LED flashes amber to indicate that the diagnostics are running.
4. The Module LED turns solid green to indicate that the firmware is executing or solid amber to indicate that diagnostics has failed.

The transmit line uses the upper receptacle and the receive line uses the lower receptacle of each port.

You can perform a simple loopback test for the ports on a line card by connecting a cable between two ports to see whether the left LEDs below the connected ports light up. For example, if you want to test the top two ports (1 and 2), connect the transmit line (the upper line of the port) of port 1 to the receive line (the lower line of the port) of port 2. Then, attach the receive line of port 1 to the transmit line of port 2. When you make the first connection, the LED for port 1 should light up as an indicator. When you make the second connection, the LED for port 2 should light up as an indicator.

Figure 6–2 shows the LEDs and Table 6–1 describes the meaning of each LED condition for the 4–port modular line card.

Figure 6–2 LEDs for 4–Port Modular Line Card

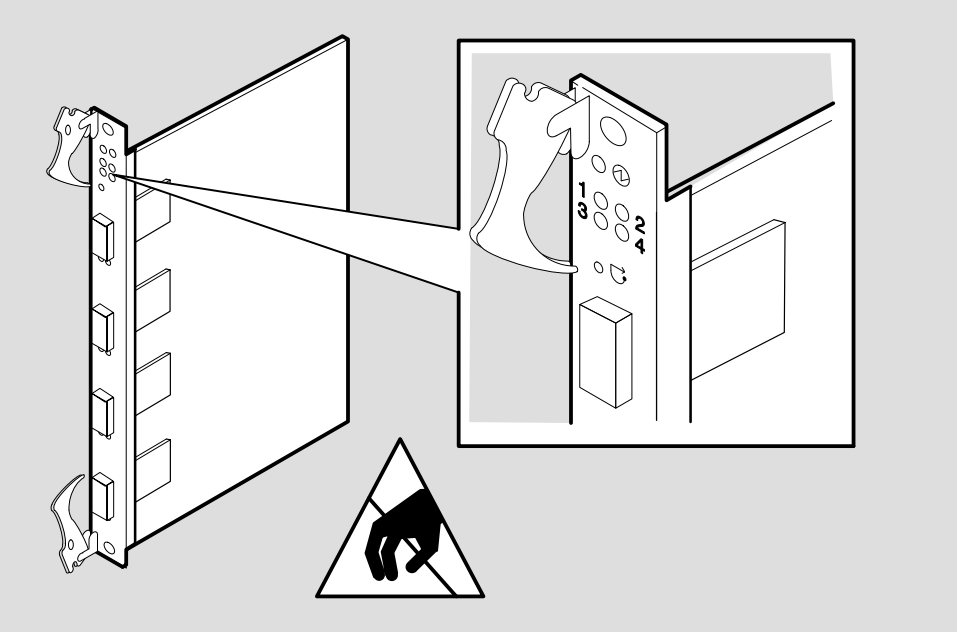

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Table 6–1 LED Conditions for 4–Port Modular Line Card

LED Condition	Meaning
The topmost or Module LED displays the mode for the four Link LEDs as follows:	
Off	Module is powered down.
Flashing Green	System initialization is in progress. The four Link LEDs display the progress of the firmware load as described in Section 6.2.3.
Flashing Amber	Self–test is in progress.
Green	Self–test completed successfully. The four Link LEDs display the type of line, one for each port.
Amber	Self–test has completed and an error was detected. The four Link LEDs display diagnostic codes as described in Section 6.2.4.
If the Module LED is green, the Link LEDs display the following information for each line:	
Flashing Green	Testing is in progress; Receive signal is present.
Solid Green	Testing has completed; Receive and Transmit signals are synchronized. Line error rate is less than the threshold.
Flashing Amber	Suspected remote end node is a Digital switch; testing is in progress to confirm. If a loopback cable is connected between two ports on the same switch, the LEDs stay flashing amber.
Solid Amber	Established that remote end is a Digital switch (other than itself).

6.2.2 4–Port 155 Mb/s Line Card LEDs

Each line card contains two sets of LEDs. The LED at the top of the module is called the Module LED, the four LEDs below the Module LED (labeled 1 through 4) are called Link LEDs, and the two LEDs below each port are called Physical layer (PHY) LEDs.

The PHY LEDs display Physical layer information. The two PHY LEDs are labeled Port Status LED (left LED below the port) and FRU (field–replaceable unit) LED (right LED below the port).

The Module LED (topmost LED) displays the mode for the Link LEDs. When the Module LED is green, the four Link LEDs display the status of the lines and the type of end node [an ATM end node (UNI) or an ATM switch (NNI)] connected at the remote end. The end node information (switch versus end node) is intended to help the system manager connect cables. When the Module LED is amber, the four Link LEDs display information about self–test failures that occur when booting the line cards.

During switch initialization, the Module and Link LEDs indicate the progress of the loading procedure for the Flash and RAM with the following sequence:

1. The Module LED turns amber when power is applied to the module.
2. The Module LED flashes green to indicate that the firmware is loading.
3. The Module LED flashes amber to indicate that the diagnostics are running.
4. The Module LED turns solid green to indicate that the firmware is executing or solid amber to indicate that diagnostics has failed.

The transmit line uses the upper fiber receptacle and the receive line uses the lower fiber receptacle of each port.

You can perform a simple loopback test for the ports on a line card by connecting a fiber optic cable between two ports to see whether the Port Status LEDs light up. For example, if you want to test the top two ports (1 and 2), connect the transmit line (the upper line of the port) of port 1 to the receive line (the lower line of the port) of port 2. Then attach the receive line of port 1 to the transmit line of port 2. When you make the first connection, the LED for port 1 should light up as an indicator. When you make the second connection, the LED for port 2 should light up as an indicator.

Figure 6–3 shows the LEDs and Table 6–2 describes the meaning of each LED condition for the 4–port 155 Mb/s line card.

Figure 6–3 LEDs for 4–Port 155 Mb/s Line Card

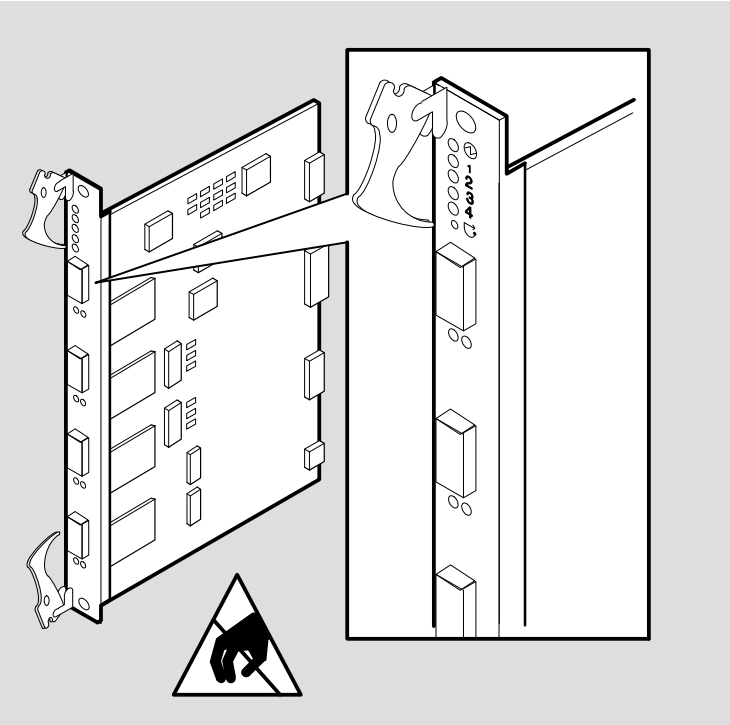

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Table 6–2 LED Conditions for 4–Port 155 Mb/s Line Card

LED Condition	Meaning
The left or Port Status LED below each link displays the following information:	
Off	Port is waiting for a connection.
Green	Port is active (connected, with link established).
Flashing Green	Port is disabled by management.
Amber	Port is inactive due to excessive media errors.
The right or FRU LED below each link displays the following information:	
Amber	PHY card has a hardware fault.

(continued on next page)

LED Condition	Meaning
The topmost or Module LED displays the mode for the four Link LEDs as follows:	
Off	Module is powered down.
Flashing Green	System initialization is in progress. The four Link LEDs display the progress of the firmware load as described in Section 6.2.3.
Flashing Amber	Self–test is in progress.
Green	Self–test completed successfully. The four Link LEDs display the type of line, one for each port.
Amber	Self–test has completed and an error was detected. The four Link LEDs display diagnostic codes as described in Section 6.2.4.
If the Module LED is green, the Link LEDs display the following information for each line:	
Flashing Green	Testing is in progress; Receive signal is present.
Solid Green	Testing has completed; Receive and Transmit signals are synchronized. Line error rate is less than the threshold.
Flashing Amber	Suspected remote end node is a Digital switch; testing is in progress to confirm. If a loopback cable is connected between two ports on the same switch, the LEDs stay flashing amber.
Solid Amber	Established that remote end is a Digital switch (other than itself).

6.2.3 Determining Firmware Load Progress on the 4–Port Line Cards

When the Module LED flashes green, it indicates that the line card is loading firmware. The four Link LEDs indicate the load progress as described in Table 6–3.

Table 6–3 LED Indications of Firmware Load Progress

LED 1	LED 2	LED 3	LED 4	Condition
Amber	Off	Off	Off	Bootp request timed out and response was not received.
Green	Off	Off	Off	Bootp successful and response was received.
Green	Amber	Off	Off	Kernel image download was attempted and failed.
Green	Green	Off	Off	Kernel image download succeeded.
Green	Green	Amber	Off	Application image download was attempted and failed.
Green	Green	Green	Off	Application image download succeeded.
Green	Green	Green	Amber	Decompression of application image to RAM failed; application image version does not match kernel version.
Green	Green	Green	Green	Application image has loaded from Flash to RAM.

After all the Link LEDs turn green to indicate that the application image has loaded from the Flash to the RAM, application initialization starts. The Module LED turns green and the remaining four LEDs turn off. After the application initialization is complete, the Module LED stays green and the Link LEDs indicate the link status described in Table 6–1 or Table 6–2.

6.2.4 Using the Diagnostic LEDs on the 4–Port Line Cards

When the Module LED is amber, the four Link LEDs are used to report self–test failures when booting the line cards. The Link LEDs indicate the failures listed in Table 6–4.

Table 6–4 LED Indications for Diagnostics on 4–Port Line Cards

LED 1	LED 2	LED 3	LED 4	Condition
Off	Off	Amber	Off	Boot ROM corrupted
Off	Amber	Off	Amber	Problem with Line 1
Off	Amber	Off	Green	Problem with Line 2
Off	Amber	Amber	Off	Problem with Line 3
Off	Amber	Amber	Amber	Problem with Line 4
Off	Off	Off	Amber	CPU fail 1
Off	Off	Off	Green	CPU fail 2
Off	Off	Amber	Amber	RAM fail
Off	Off	Green	Off	Bad UART 1
Off	Off	Green	Amber	Bad UART 2
Off	Off	Green	Green	Ethernet problem
Amber	Off	Amber	Amber	Xilinx load failed
Amber	Amber	Off	Off	Queue RAM failed
Amber	Amber	Off	Amber	Queue RAM failed
Amber	Amber	Off	Green	Cell RAM failed
Amber	Green	Off	Off	Credit RAM fail 1
Green	Off	Off	Amber	Credit RAM fail 2
Green	Off	Off	Green	Front unit load failed

6.2.5 1–Port 622 Mb/s MMF Line Card LEDs

Each line card contains two sets of LEDs. The LED at the top of the module is called the Module LED, the LED below the Module LED (labeled 1) is called the Link LED, the set of three LEDs below the Link LED (labeled i) are called Information LEDs, and the two LEDs above the port are called Physical layer (PHY) LEDs.

The PHY LEDs display Physical layer information. The two PHY LEDs are the Port Status LED (left LED above the port) and the FRU (field–replaceable unit) LED (right LED above the port).

The Module LED (topmost LED) displays the mode for the Link LEDs. When the Module LED is green, the Link LED displays the status of the line and the type of end node [an ATM end node (UNI) or an ATM switch (NNI)] connected at the remote end. The end node information (switch versus end node) is intended to help the system manager connect cables. When the Module LED is amber, the Link LEDs display information about self–test failures that occur when booting the line cards.

During switch initialization, the LEDs indicate the progress of the loading procedure for the Flash and RAM with the following sequence:

1. The Module LED turns amber when power is applied to the module.
2. The Module LED flashes green to indicate that the firmware is loading.
3. The Module LED flashes amber to indicate that the diagnostics are running.

4. The Module LED turns solid green to indicate that the firmware is executing or solid amber to indicate that diagnostics has failed.

The transmit line uses the upper fiber receptacle and the receive line uses the lower fiber receptacle of the port.

You can perform a simple loopback test for the ports on a line card by connecting a fiber optic cable between two ports to see whether the Port Status LEDs light up. For example, if you want to test the top two ports (1 and 2), connect the transmit line (the upper line of the port) of port 1 to the receive line (the lower line of the port) of port 2. Then attach the receive line of port 1 to the transmit line of port 2. When you make the first connection, the LED for port 1 should light up as an indicator. When you make the second connection, the LED for port 2 should light up as an indicator.

Figure 6–4 shows the LEDs and Table 6–5 describes the meaning of each LED condition for the single–port 622 Mb/s line card.

Figure 6–4 LEDs for 1–Port 622 Mb/s Line Card

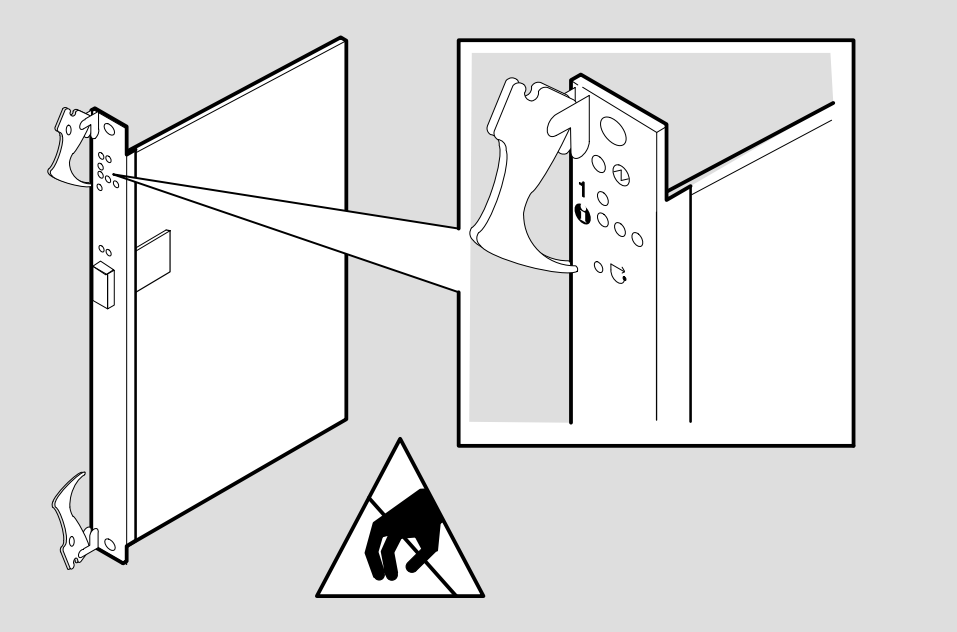

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Table 6–5 LED Conditions for 1–Port 622 Mb/s Line Card

LED Condition	Meaning
The left or Port Status LED above the link displays the following information:	
Off	Port is waiting for a connection.
Green	Port is active (connected, with link established).
Flashing Green	Port is disabled by management.
Amber	Port is inactive due to excessive media errors.
The right or FRU LED above the link displays the following information:	
Amber	PHY card has a hardware fault.
The topmost or Module LED displays the mode for the four LEDs below it as follows:	
Off	Module is powered down.
Flashing Green	System initialization is in progress. The Link LED and Information LEDs display the progress of the firmware load as described in Section 6.2.6.
Flashing Amber	Self–test is in progress.
Green	Self–test completed successfully. The Link LED displays the type of line for the port.
Amber	Self–test has completed and an error was detected. The Link LED and Information LEDs display diagnostic codes as described in Section 6.2.7.
If the Module LED is green, the Link LED displays the following information for the line:	
Flashing Green	Testing is in progress; Receive signal is present.
Solid Green	Testing has completed; Receive and Transmit signals are synchronized. Line error rate is less than the threshold.
Flashing Amber	Suspected remote end node is a Digital switch; testing is in progress to confirm. If a loopback cable is connected between two ports on the same switch, the LEDs stay flashing amber.
Solid Amber	Established that remote end is a Digital switch (other than itself).

6.2.6 Determining Firmware Load Progress on the 622 Mb/s Line Card

When the Module LED flashes green, it indicates that the line card is loading firmware. The LEDs indicate the load progress as described in Table 6–6. (The Link LED is LED 1 and the three Information LEDs are LED 2 through LED 4 from left to right.)

Table 6–6 LED Indications of Firmware Load Progress on 622 Mb/s Line Card

LED 1	LED 2	LED 3	LED 4	Condition
Amber	Off	Off	Off	Bootp request timed out and response was not received.
Green	Off	Off	Off	Bootp successful and response was received.
Green	Amber	Off	Off	Kernel image download was attempted and failed.
Green	Green	Off	Off	Kernel image download succeeded.
Green	Green	Amber	Off	Application image download was attempted and failed.
Green	Green	Green	Off	Application image download succeeded.
Green	Green	Green	Amber	Decompression of application image to RAM failed; application image version does not match kernel version.
Green	Green	Green	Green	Application image has loaded from Flash to RAM.

After all the Link LEDs turn green to indicate that the application image has loaded from the Flash to the RAM, application initialization starts. The Module LED turns green and the remaining four LEDs turn off. After the application initialization is complete, the Module LED stays green and the Link LEDs indicate the link status described in Table 6–5.

6.2.7 Using the Diagnostic LEDs on the 1–Port 622 Mb/s Line Card

When the Module LED is amber, the four LEDs below it are used to report self–test failures when booting the line cards. These LEDs indicate the failures listed in table. (The Link LED is LED 1 and the three Information LEDs are LED 2 through LED 4 from left to right.)

Table 6–7 LED Indications for Diagnostics on 622 Mb/s Line Card

LED 1	LED 2	LED 3	LED 4	Condition
Off	Off	Amber	Off	Boot ROM corrupted
Off	Off	Off	Amber	CPU fail 1
Off	Off	Off	Green	CPU fail 2
Off	Off	Amber	Amber	RAM fail
Off	Off	Green	Off	Bad UART 1
Off	Off	Green	Amber	Bad UART 2
Off	Off	Green	Green	Ethernet problem
Amber	Off	Amber	Amber	Xilinx load failed
Amber	Amber	Off	Off	Queue RAM failed
Amber	Amber	Off	Amber	Queue RAM failed
Amber	Amber	Off	Green	Cell RAM failed
Amber	Green	Off	Off	Credit RAM fail 1
Green	Off	Off	Amber	Credit RAM fail 2

6.2.8 Using the Diagnostic Services

The GIGAswitch/ATM system provides various error logging and diagnostic capabilities. These diagnostic services are not required for configuring the GIGAswitch/ATM system.

6.2.8.1 Using the Network Port for Diagnostic Services

The GIGAswitch/ATM system has a network diagnostic port that provides remote access to the shell (command interface) in the control processor of the line cards using Telnet and TCP/IP over Ethernet. The network diagnostic port can be used to access both the Master line card and all Slave line cards. To access the Slave line cards, set the keyswitch position so that security is disabled (see Section 4.5). Once you are logged into the shell, you can perform line card diagnostic operations.

Any host system with Telnet capability that can connect to the same Ethernet network as the GIGAswitch/ATM system can be used to access the diagnostic port. To access the diagnostic port for a particular line card, use this command at the prompt on the selected workstation:

```
$ telnet ip–address port–number
```

where *ip–address* is the IP address defined for the GIGAswitch/ATM system in dotted decimal notation and *port–number* is the Telnet port number for a Slave line card in a particular slot (see Table 6–8). Do not supply a port number when you are connecting to the Master line card. When connected to a Slave line card, the Telnet session is in line mode and echoes characters after a line is typed. You can change the character echo mode by typing the Telnet escape character, which is a caret followed by a right bracket (`^]`), and the command mode character at the `telnet>` prompt.

Table 6–8 Telnet Port Numbers for Line Cards

Slot #	Telnet Port #
1	8215
2	8471
3	8727
4	8983
5	9239
6	9495
7	Clock management module is not accessible.
8	10007
9	10263
10	10519
11	10775
12	11031
13	11287
14	11543

The following command returns a message indicating the name and address of the line card that is providing the shell and a prompt.

```
% telnet 16.17.18.19

Trying 16.17.18.19...
Connected to an22.nac.lkg.dec.com.
Escape character is '^]'.
->
```

In this example, 16.17.18.19 is the IP address of the GIGAswitch/ATM system in the `/etc/bootptab` file and an22.nac.lkg.dec.com is the domain name selected in the `/etc/hosts` table. The prompt `->` indicates that the shell on the line card is now ready to accept commands. The shell command, `help`, displays information on the commands available from the shell.

6.2.8.2 Producing Line Card Error Logs

You can display or create a file of log and status information contained in the internal line card logs. The error log is a nonvolatile log that is retained through power cycles and keeps only entries that result from the detection of errors. The status log is factory configured to collect certain routine status information on the operation of the switch. It is in volatile memory and only contains information since the last powerup. Each log is a ring buffer that contains the most recent entries.

To print the contents of the error log, type this line at the shell prompt:

```
-> alog_printError(mode, num-entries)
```

where *mode* is 1, 2, 3 or 4 and *num–entries* is the number of log entries that you want to display. The four modes correspond to FIRST, NEXT, ALL, and LAST. FIRST mode gets the oldest messages (for the number of specified entries), NEXT mode gets the entries starting from the current pointer and increments by the specified number of entries, ALL mode gets the complete log that fits within the buffer, and LAST mode gets the latest messages (for the number of specified entries).

For example, the following command requests FIRST mode for three entries and it is followed by a sample display.

```
-> alog_printError(1, 3)
LOGERR in alog.c at 370.  Module: 20 Code: 1
   TimeStamp Master StartNum: 2 Time-seconds: 42 Time-nsec: 230000000
   ErrMsg: Powerup log entry. Master UID:  8: 0:2b:22:3b:70  Master StartNum: 2
LOGERR in alog.c at 370.  Module: 20 Code: 1
   TimeStamp Master StartNum: 2 Time-seconds: 42 Time-nsec: 830000000
   ErrMsg: Powerup log entry. Master UID:  8: 0:2b:22:3b:70  Master StartNum: 2
LOGERR in alog.c at 385.  Module: 20 Code: 1
   TimeStamp Master StartNum: 3 Time-seconds: 31 Time-nsec: 700000000
   ErrMsg: Master UID:  8: 0:2b:22:3b:70  Master StartNum: 3
value = 3 = 0x3
```

To display the status log, type this command at the prompt.

```
-> alog_printStatus(mode, num-entries)
```

where *mode* is 1, 2, or 3 and *num–entries* is the number of log entries that you want to display. The three modes correspond to FIRST, NEXT, and ALL. FIRST mode gets the oldest messages for the specified number of entries, NEXT mode gets the entries starting from the current pointer and increments by the specified number of entries, and ALL mode gets the complete log that fits within the buffer. The log printed to the screen is similar to the example for the error log.

A file of the log contents can also be made using the shell scripting capability on the client workstation. Before establishing the Telnet connection to the line card, type the following command in the client shell:

```
% script atmErrorLog.txt
```

This command causes the commands printed to the screen by the line card to also be saved into the `atmErrorLog.txt` file. The procedure can be used for both error and status logs. Turn off the scripting by typing `exit` in the client shell after logging out of the Telnet session to the line card.

6.2.8.3 Producing CMM Error Logs

The CMM error log is a circular list of 12 error log entries. The error logs are stored in Flash memory on the CMM and are preserved over power cycles of the switch. The `E` command entered at the `CLK>` prompt displays the twelfth entry. After the error log is displayed, a prompt asks whether you want to continue. Answering `y` or or pressing the Return key causes the next entry to be displayed. The following example shows a typical error log entry:

```
Entry #      = 3
               Logged by Diagnostic Firmware, Revision 1.70
               THU 01/18/96 10:04:00

Entry status = 0000
Entry CRC    = C7CEF802
Write Count  = 1
FRU Mask     = GIGAswitch/ATM CMM
Error ID     = Ethernet Address ROM Test
Test Data:
               Subtest: Start Address Test
               Returned Status       = Block A <> Block B
               Expected Value        = 00CB
               Actual Value          = 00CF
               Power Enable Register = 0080
```

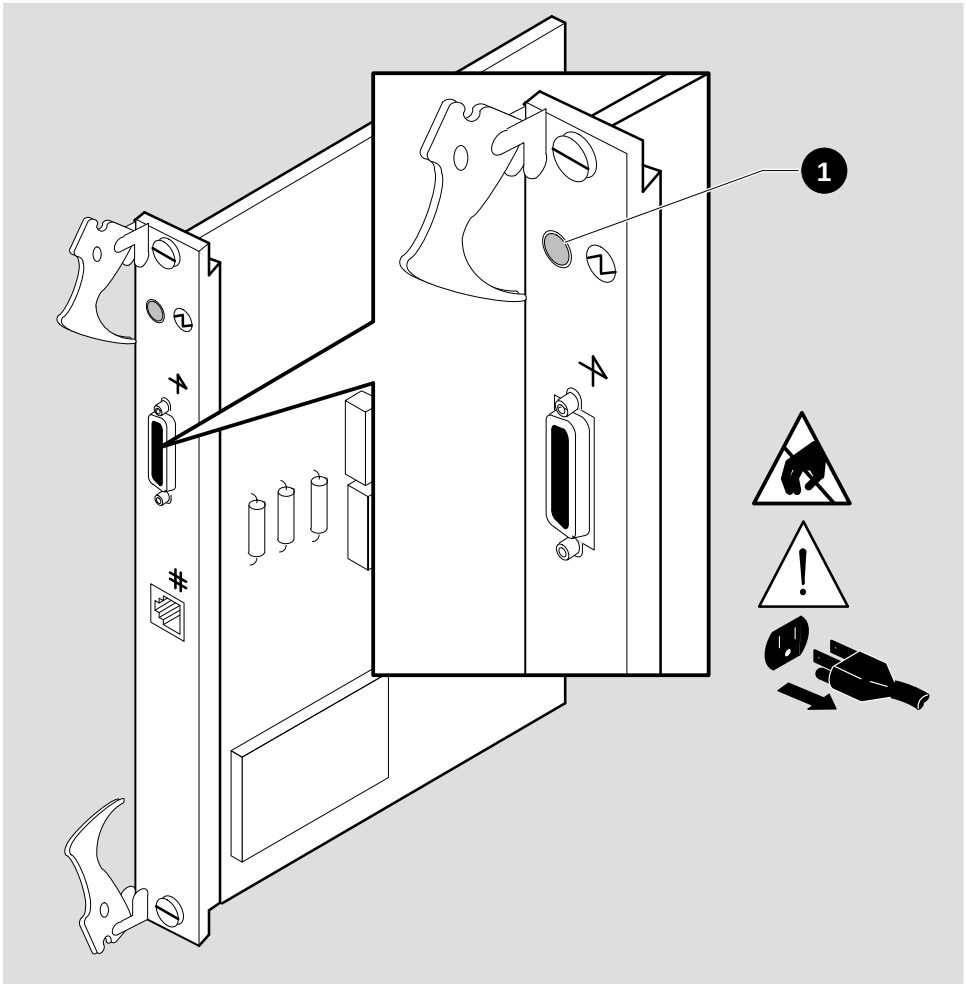
The information displayed varies depending upon whether it was generated by the diagnostic or the operational firmware.

6.2.9 Clock Card LED

During power–up diagnostics, the clock card LED is amber. If the CMM boot diagnostics fail, the LED changes to flashing amber. If the CMM boot diagnostics complete successfully, the LED changes to solid green. If a higher level failure occurs (such as master election error or buffer exhaustion), the LED changes from green to amber and the GIGAswitch/ATM system reboots. Check the CMM error log for more information about the failure.

Figure 6–5 shows the LED for the clock card.

Figure 6–5 Clock Card LED



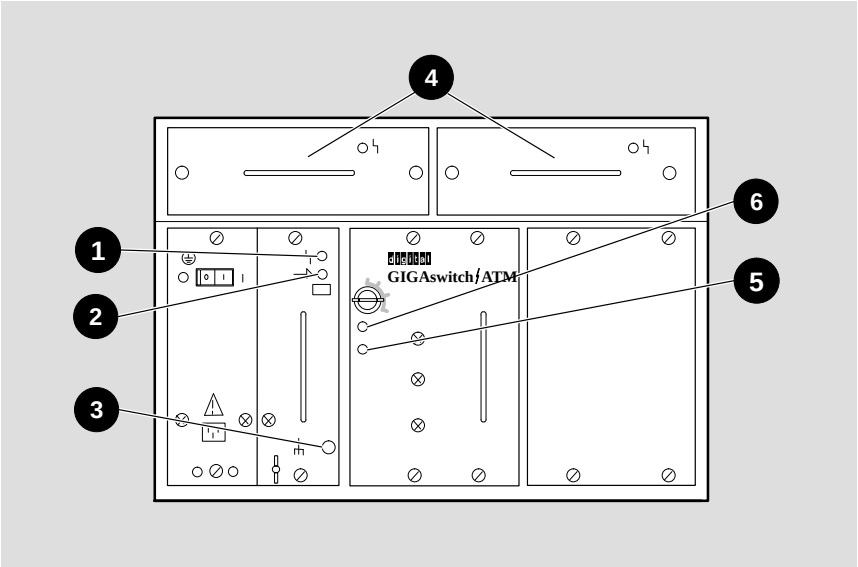
The following table describes the meaning of each LED condition for the clock card LED.

Event Number	Event	LED Condition	Meaning
1	Clock card startup	Solid amber	MST in progress
2	Clock card MST	Flashing amber Solid green	MST failed MST passed

6.2.10 Cooling and Power Modules LED Summary

Figure 6–6 shows the LEDs for the cooling and power modules.

Figure 6–6 Cooling and Power Modules LEDs



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The following table describes the meaning of each LED condition for the associated number from Figure 6–6.

Name	Condition
1 Front end unit (FEU)	Steady amber = MST failure
2 Front end unit (FEU) OK	Steady green = MST passed
3 Power	Off = Source power is not available at the FEU's input On = Source power is available at the FEU's input
4 Fan tray assembly fault	Off = MST passed Steady amber = MST failure
5 System temperature fault	Steady red = system temperature fault Off = system temperature normal
6 PSC card fault	Off = MST passed Steady amber = MST failure

7

Upgrading the Firmware

This chapter describes the procedures for upgrading the firmware for single or multiple line cards. Consult the release notes and READ_ME.TXT files for the firmware release to determine the correct versions.

Note that line card images must be upgraded before CMM images.

7.1 Copying the Firmware

The GIGAswitch/ATM firmware image is located in the release area of the Digital FTP site (ftp.digital.com). The name of the firmware image is in the READ_ME.TXT file found in the /pub/DEC/GIGAswitchATM directory. Copy the image to your system using these commands:

```
# ftp ftp.digital.com

username: anonymous
password: your_internet_address

ftp> cd /pub/DEC/GIGAswitchATM
ftp> bin
ftp> get image_name.tar image_name.tar
ftp> bye
```

To unpack the new image:

```
# tar –xvf image_name.tar
```

This command creates a subdirectory (named after the image) within your current working directory and unpacks files into this subdirectory.

7.2 Loading the Firmware for the Line Card

The firmware for the line card is divided into two components, the kernel and the application, which are loaded separately. The kernel consists of the operating system, protocol stack, and basic control routines. The application contains the diagnostics and higher level functions such as management, signaling, and routing. Some firmware releases only require an upgrade to the application image. Other releases require updating both kernel and application images. Updating the kernel image is a two–step loading procedure.

Note

The bootp (if used) and tftp servers must be set up correctly to upgrade the line card firmware. Refer to Section 4.3 for more information about setting up your servers.

7.2.1 Upgrading the Kernel and Application Images

To downline load both the kernel and application images when upgrading a 4–port 155 Mb/s line card (DAGGL–AA or DAGGL–AB) to V2.0 firmware, set the first two lines of the control file (see Section 4.3.1) to:

```
000250F0B/tftpboot/app_image.bin
kernel_image.rom
QLC15    LC15V20.ROM    LC15V20.BIN
QLCV2    LC20V20.ROM    LC20V20.BIN
```

where 000250 is the internal version number of the application image (check the firmware release notes for the appropriate version number), F is the application Force flag, B is the boot ROM load flag, `/tftpboot/app_image.bin` is the application file and `kernel_image.rom` is the kernel image file. Note that downline loading a new kernel image requires downline loading a new application image (however, downline loading a new application does not necessarily require a new kernel).

The remaining lines in the control file are used by the appropriate modules to download the proper images for that module. For example, the QLCV2 line directs the downloading of the correct images for the 4–port modular line card (DAGGL–BA).

After setting up the control file, reboot the switch. If the kernel version displayed by the Master line card is not V2.0 or later, reboot the switch again. If the kernel version is still incorrect, make sure your control file is set up properly and try rebooting again.

Upgrading the firmware for the Master line card that is controlled by using the `force_image_reload` console command or the `DE/SML` CMM command. Once the Master line card has upgraded firmware, the Master line card checks the application image on the Slave line cards for mismatched versions. If there is a mismatch, the Master line card triggers a download of the image identified in the control file to the affected line cards from the nearest source (another slot in the system or an external host system).

7.2.2 Loading the Firmware to Multiple Line Cards

If you are trying to download to multiple line cards, use the procedures described in Section 7.2.1. Use the `DE/SML` CMM command to cause the new firmware to be loaded automatically to all the line cards. After the download completes, use the `DE/SM0` CMM command to resume normal loading.

If you have a system with five or more line cards, you might see the following error message during download.

```
TFTP Transfer Timed out
```

If this message appears, perform the procedure described in this section only when you are upgrading firmware. If the GIGAswitch/ATM system already has the V2.0 firmware, it is not necessary to reload the system.

1. Use the `SD` CMM command to verify that the line card startup mode is L (forced download). If it is not, use the `DE/SML` CMM command to set the line card startup mode to L.

2. Power down the system and reboot the system with three line cards. All three line cards will load the new firmware.

3. Power down the system, keep the Master line card in the system and remove the other two line cards. Install two more line cards and reboot the system. Repeat these steps for all the line cards.

4. Use the `DE/SM0` CMM command to set the line card startup mode to 0 (normal with self–test).

5. Insert all the line cards into the system and reboot the system.

7.2.3 Line Card LED Indications During Switch Initialization

During initialization, the Module and Link LEDs at the top of each line card are used to indicate progress in the loading of Flash and RAM. The top LED turns amber when power is applied to the module. (If this LED does not turn amber on the twelfth and thirteenth modules in a switch, refer to the `DE/PWRH` CMM command and use the appropriate power supply because the current power supply might not be adequate.) Once loading of firmware starts, the LED flashes green. When diagnostics start, the LED flashes amber. Once the switch firmware starts executing, the LED becomes solid green.

The Link LEDs indicate load progress. LED 1 turning green indicates that the bootp response was received, and amber indicates that the bootp request timed out without a response. If the control file requests that new versions of the kernel or application be loaded into Flash, LEDs 2 and 3 indicate the success or failure of those loads, respectively. Green means success, amber means failure. Similarly, LED 4 indicates that RAM has been loaded with the decompressed kernel and application images.

7.3 Loading the Firmware for the CMM

Before upgrading the clock management module (CMM) firmware, verify that the current revision level is the one listed in the latest firmware release notes. The current revision level can be determined by using the `B` command on the CMM's local console. If the CMM firmware is not at the revision level stated in the release notes, you must upgrade to that revision before proceeding further. Also, remember that you must upgrade the line card firmware before upgrading the CMM firmware.

The CMM firmware is downline loaded over the serial line console connection of the CMM. To load a new firmware version from a UNIX system, change directory to the location of the new firmware. Invoke the `tip` utility, specifying the serial line connection to the CMM. The serial line must be configured in the `/etc/remote` file, for example:

```
lport0:dv=/dev/tty01:br#9600:pa=none:
```

The cable connected to this `tty01` is now defined as `lport0`. You can choose any name.

If it does not exist, create the `/var/spool/locks` directory. To connect to the CMM attached to `lport0`, use the command:

```
tip lport0
```

Once the `tip` session is started, the clock responds with a command menu and a `CLK>` prompt. Note that only a single tip or Telnet user can be active at one time. If the CMM is already running, you must press the Return key to display the `CLK>` prompt. If the `/etc/remote` file is incorrect, `tip` responds with this message:

```
tip: unknown host lport0
```

Correct the `/etc/remote` file and/or the `/var/spool/locks` directory before proceeding further.

1. Enter the Download Code Image command:

   ```
   CLK>DO
   Transmit S–Records at SDLL> prompt:
   SDLL>
   ```

   The CMM is now waiting for an S–Record file.

2. Return to the host system by entering a tilde followed by a right angle bracket (~>).

   ```
   SDLL>~>
   ```

3. The host system prompts you for the file name of the firmware you wish to load (for example, CMMV1_74.X).

   ```
   Local File Name?  :
   ```

Note

If your system does not support this method of loading the CMM with the `tip` utility, refer to Section 7.3.1 for an alternate procedure.

The downline load of the CMM firmware takes about three minutes. During that time, the current record number of the firmware image file being loaded is displayed, so you see an integer value increasing from 1 to several thousand. When the load is completed, the following messages are displayed:

```
Termination Record Received.  Count=00000xxx
RAM download complete
Flash programming complete
```

where *xxx* is the number of S–records in hexadecimal format. There are delays between each line in the above display. It takes about 30 seconds to complete the Flash programming after the RAM is loaded. After the Flash is programmed, the switch is automatically rebooted to run the new firmware. At the `CLK>` prompt, enter the `B` command to display the switch configuration information, including the CMM Firmware Version number. Verify that the version number loaded is correct by using the `B` CMM command.

7.3.1 Alternate Downline Load Procedure

This procedure requires a serial port from the Alpha system connected to the GIGAswitch/ATM CMM Serial Port via the `tip` utility. In this instance, tty01 (DEC423 connector) is used, but any serial port on the Alpha (such as tty00, a 25–pin RS232) could be used just as easily.

1. Configure a serial port on the Alpha system to allow a `tip` session:
   a. Add the following line to `/etc/remote`:

      ```
      tipcsl:dv=/dev/tty01:br#9600:pa=none:
      ```

   b. If it does not exist, create the `/var/spool/locks` directory.
2. Connect the tty01 port (DEC423 connector) to the serial port on the CMM.
3. Power on the GIGAswitch/ATM system.
4. Initiate a `tip` session to the switch using the following command:

   ```
   # tip tipcsl
   CLK>
   ```

5. Enter the Download Code Image command:

   ```
   CLK>DO
   Transmit S–Records at SDLL> prompt:
   SDLL>
   ```

   The CMM is now waiting for an S–Record file.

6. Exit the `tip` session by entering a tilde followed by a period (~.).

   ```
   SDLL>~.
   #
   ```

7. Download the S–Record CMM file as follows:

   ```
   # cat CMMVn_nn.X > /dev/tty01
   ```

   where *n_nn* is the version number of the CMM firmware.

8. When the system prompt (#) returns, connect to the GIGAswitch/ATM system using `tip` and press the Return key to terminate the load process:

   ```
   # tip tipcsl
   <Return>
   ```

   The CMM responds with the following text and then reboots the switch:

   ```
   Termination Record Received.  Count = 00000E65
   RAM download complete
   Flash programming complete
   ```

9. Verify that the new version is correct, using the `B` command.

7.3.2 CMM LED Indications During Switch Initialization

During power–up diagnostics, the CMM LED is amber. If the CMM boot diagnostics fail, the LED remains flashing amber. The LED turns green after the CMM diagnostics complete successfully, usually 10 seconds after powerup. In the event of a higher level failure (such as master election error or buffer exhaustion), the LED turns from green to amber and the switch reboots. Check the CMM error log for information about the failure.

Part III

Service

Part III contains information for replacing the field replaceable units (FRUs)

- Chapter 8 describes the procedures you must complete before replacing the GIGAswitch/ATM modules. Failure to perform these procedures can result in harm to personnel or equipment. These procedures include setting up electrostatic discharge (ESD) protection and evaluating the need for removing and applying power.
- Chapter 9 describes the procedures for replacing the cooling and power modules and the logic modules. Cooling and power modules include modules of the fan tray assembly, front end unit (FEU), power status assembly (PSA), and power system controller (PSC) families. Logic modules include modules of the line card and clock card families.
- Chapter 10 describes the procedures for removing the GIGAswitch/ATM system.
- Chapter 11 describes the procedures for replacing the logic backplane, crossbar modules, and power backplane after all the modules are removed from the selected backplane.

8

Preparing to Replace Modules

This chapter lists the prerequisites for replacing the GIGAswitch/ATM modules and describes the following procedures:

- Setting up ESD protection
- Removing power from the system

GIGAswitch/ATM modules include the following:

- Logic modules
- Cooling and power modules

The following table summarizes the prerequisites for removing logic modules. They identify slot limitations, which modules must be removed before performing the replacement procedure for the desired module, and whether or not power must be removed or ESD equipment used.

Module	ESD Required?	Power Removed?	Slot Limitations?	Other Modules Removed?
Line card	Yes	Yes	1 through 6, 8 through 14	None
Clock card	Yes	Yes	7	None
Logic backplane	Yes	Yes	N/A	All logic modules§
Crossbar module	Yes	Yes	N/A	None§

§ The GIGAswitch/ATM system also needs to be removed from the rack prior to logic backplane or crossbar module replacement if the rear of the rack is not accessible.

8.1 Setting Up ESD Protection

Protect the logic module against damage from electrostatic discharge (ESD) by using:

- Static–free containers for long–term storage.
- Grounded ESD wrist strap while installing and removing modules.
- Grounded ESD mat for temporary storage.

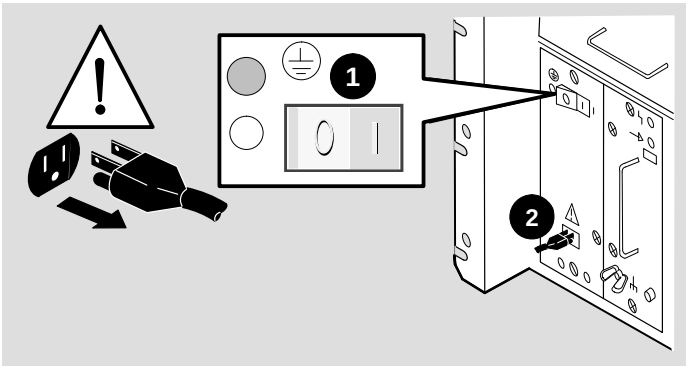
8.1.1 Using ESD Equipment

The Portable Static–Dissipative Field Service Kit (Part No. 29–26246) is used to protect ESD sensitive modules against damage. Complete the following steps to set up and maintain a static–free area.

1. Ground the unit. The unit is grounded through the power cord when it is connected between the unit and the primary power source.
2. Lay out the static–dissipative work surface (ESD mat) on a flat surface.
3. Connect the ground cord assembly to the ESD mat and to an unpainted surface on the unit.
4. Wear the ESD wrist strap and attach it to the ground cord assembly.

8.2 Removing Power

Figure 8–1 Removing Power from the System



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Refer to Figure 8–1 when completing the following steps to remove the power from the GIGAswitch/ATM system.

1. Locate the power switch [1] and the power connector [2].
2. Place the power switch [1] in the 0 (OFF) position.
3. Do not remove the power cord from the power connector [2]. The power cord provides the ground for ESD protection.
4. Repeat steps 1 and 2 for any alternate power supply.

9

Replacing Modules

Caution

Read Chapter 8 before attempting to replace any module in the GIGAswitch/ATM system.

This chapter describes the following procedures for replacing the GIGAswitch/ATM system.

- Replacing a logic module
- Replacing a blank handle
- Replacing a fan tray assembly
- Replacing an FEU
- Replacing a PSA
- Replacing a PSC card

9.1 Replacing a Logic Module

Note

Appendix D contains the recommended location for the modules.

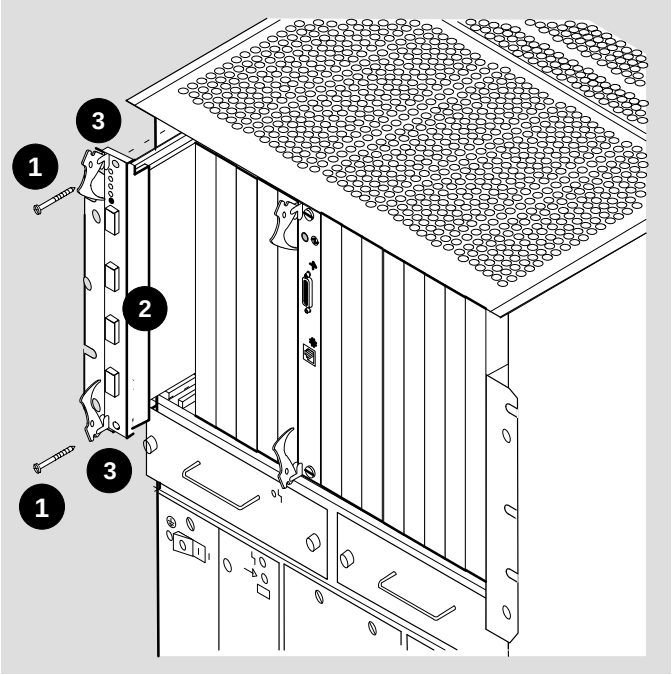
Complete the following steps to replace a logic module:

1. Set up the ESD equipment. See Chapter 8.
2. Wear the grounded ESD wrist band.
3. Unpack the replacement module. Leave the module in the ESD bag.

4. Place the ESD bagged replacement module on a flat surface.
5. Place the empty container on the ESD mat.
6. Remove the module to be replaced from the chassis. See the procedure in Section 9.1.1.
7. Place the module to be replaced in the empty container.
8. Remove the replacement module from the ESD bag.
9. Install the replacement module in the chassis. See the procedure in Section 9.1.2.
10. Remove the module to be replaced from the container and place it in the ESD bag.
11. Place the ESD bagged module in the container.
12. Remove the ESD wrist band.

9.1.1 Removing the Logic Module

Figure 9–1 Removing the Logic Module



LKG-9222-94I

Refer to Figure 9–1 when completing the following steps to remove the logic modules from the GIGAswitch/ATM system. A line card module is shown in the illustration, but the same procedure is used for removing a clock card module.

1. Locate the two screws [1] that fasten the selected module [2] to the GIGAswitch/ATM system and the ejectors [3] used to seat the module.
2. Set up the ESD equipment.
3. Slip on ESD wrist band.
4. Loosen the upper and lower screws [1].
5. Move the ejectors [3] outward to unseat the module [2] from the unit.
6. GENTLY slide the module [2] out of the unit.
7. Place module in a static proof bag.

   When replacing a 4–port modular line card (DAGGL–BA) or a 1–port 622 Mb/s line card (DAGGL–CA), note that any installed options must be removed (refer to Section 9.1.1.1). For example, the 48V option of the power module (DAGPL–AB) is a common option that must be removed using the procedure described in Section 9.1.1.2.
8. Place bagged module on a flat surface or on another bagged module. The modules can be stacked four modules high.
9. Repeat steps 4 through 7 to remove the rest of the line card modules.

See Section 9.1 for the complete replacement procedure.

9.1.1.1 Removing Line Card Options

The procedures for installing and removing the options for the line cards are provided with the document that is shipped with the line card. Refer to that document for the proper instructions.

9.1.1.2 Removing the 48V Power Module Option

Follow these steps to remove the 48V power module option (DAGPL–AB).

1. Carefully place a thin flat blade screwdriver between the power module and the line card on the inner edge of one set of pins.
2. GENTLY insert the screwdriver without touching the line card surface so that the power module is eased away from the line card.

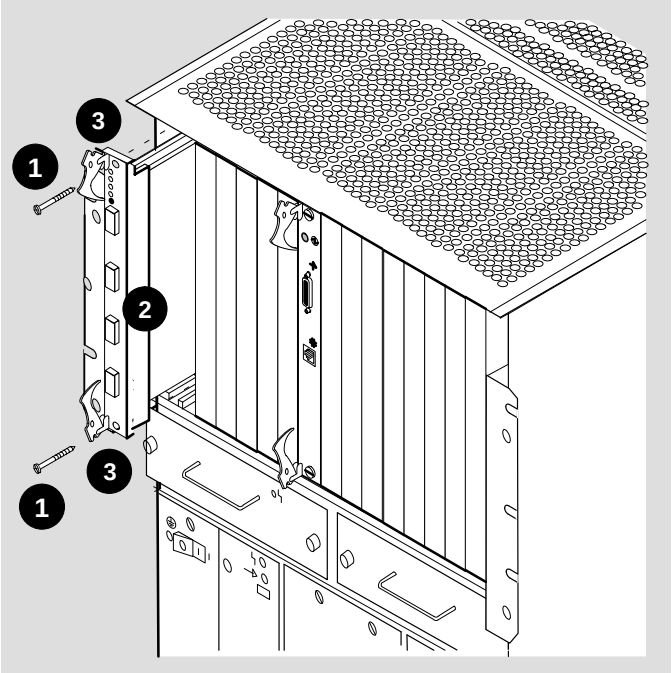
Note

Do not insert the screwdriver more than 2.54 cm (1 in).

3. Repeat steps 1 and 2 for the other set of pins.
4. Gently pull the power module off the line card.

9.1.2 Installing the Logic Module

Figure 9–2 Installing the Logic Module



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Refer to Figure 9–2 when completing the following steps to install the logic module. A line card module is shown in the illustration, but the same procedure is used for installing a clock card module.

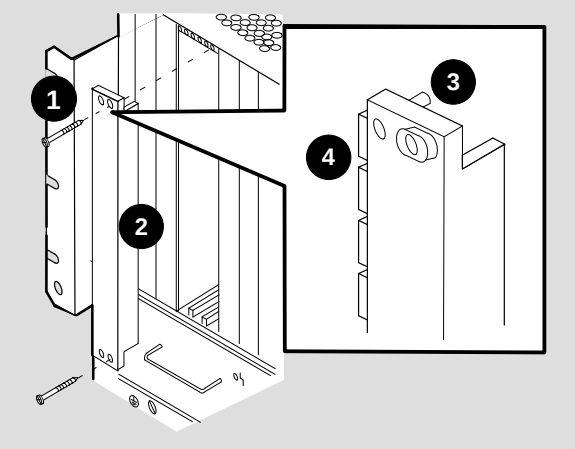
1. Locate the screws [1] that fasten the selected module [2] to the GIGAswitch/ATM system and the ejectors [3] used to seat the module.
2. Set up the ESD equipment (see Chapter 8).
3. Wear the ESD wrist band.
4. Align the module (module LEDs at the top) with the upper and lower guides, and GENTLY slide the module into the unit.
5. Move the ejectors [3] inward to seat the module [2] in the unit.
6. Tighten the upper and lower screws [1] using a number 2 cross–point screwdriver.

See Section 9.1 for the complete replacement procedure.

9.2 Replacing a Blank Handle

9.2.1 Removing a Blank Handle

Figure 9–3 Removing Blank Handles



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Refer to Figure 9–3 when completing the following steps to remove a blank handle from the GIGAswitch/ATM system.

1. Locate the screws [1] that fasten the selected blank handle [2] to the GIGAswitch/ATM system, the guide pins [3], and the EMI shield [4].

Caution

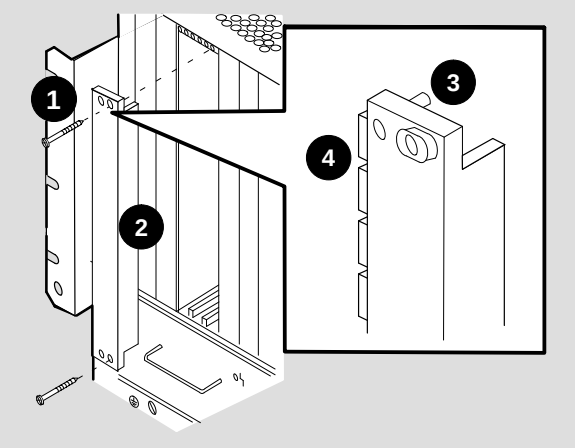
Be careful not to damage the EMI shield.

2. Loosen the upper and lower screws that fasten the selected blank handle to the system using a number 2 cross–point screwdriver.

3. Lift the blank handle [2] away from the GIGAswitch/ATM system.

9.2.2 Installing a Blank Handle

Figure 9–4 Installing Blank Handles



LKG-9325-94I

Refer to Figure 9–4 when completing the following steps to install a blank handle.

1. Locate the screws [1] that fasten the selected blank handle [2] to the GIGAswitch/ATM system, the guide pins [3], and the EMI shield [4].

Caution

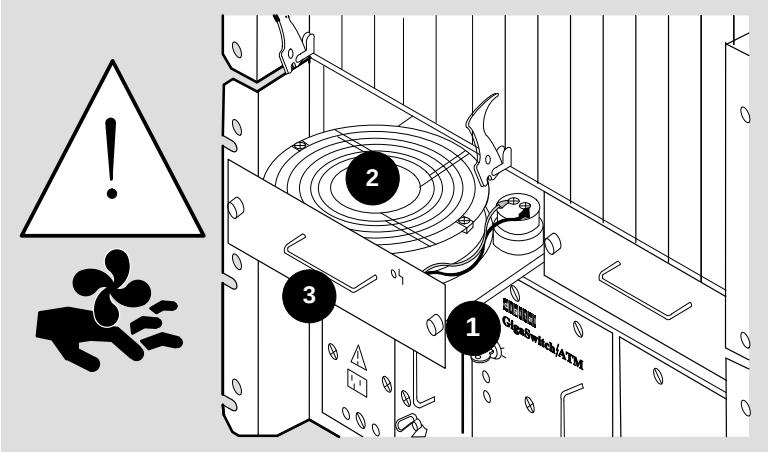
Be careful not to damage the EMI shield.

2. Align the upper and lower guide pins [3] on the blank handle (EMI shield [4] facing left) with the associated holes in the card cage.
3. Tighten the upper and lower screws [1] using a number 2 cross–point screwdriver.

9.3 Replacing a Fan Tray Assembly

9.3.1 Removing the Fan Tray Assemblies

Figure 9–5 Removing Fan Tray Assemblies



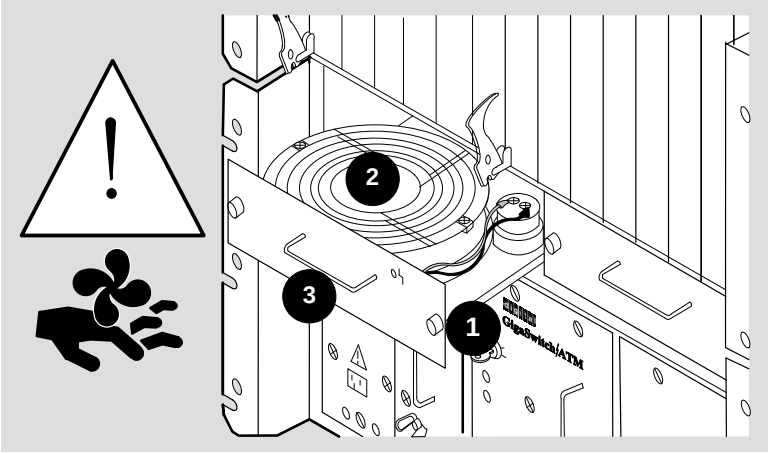
LKG-9224-94I

Refer to Figure 9–5 when completing the following steps to remove the fan tray assemblies from the GIGAswitch/ATM system.

1. Locate the two fasteners [1] that attach the selected fan tray assembly [2] to the GIGAswitch/ATM system and the handle [3].
2. Release the two fasteners [1] that attach the selected fan tray assembly to the system.
3. Grasp the handle [3] and slide the fan tray assembly [2] out of the unit enough to see if the fan is rotating.
4. Wait for the fan to stop rotating.
5. Slide the fan tray assembly out of the unit. Grasp the handle [3] with one hand and support the bottom of the fan tray assembly with your other hand.
6. Repeat steps 1 through 5 to remove the other fan tray assembly.

9.3.2 Installing the Fan Tray Assemblies

Figure 9–6 Installing Fan Tray Assemblies



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Refer to Figure 9–6 when completing the following steps to install the fan tray assemblies.

1. Locate the two fasteners [1] that attach the selected fan tray assembly [2] to the GIGAswitch/ATM system, and the handle [3] of the selected fan tray assembly.
2. Align the fan tray assembly (LED to the upper right of the handle) [2] with the module guides of the slot designated for fan tray assembly.
3. Slide the fan tray assembly [2] into the GIGAswitch/ATM system.
4. Tighten the two fasteners [1].
5. Repeat steps 1 through 4 to install the other fan tray assembly.

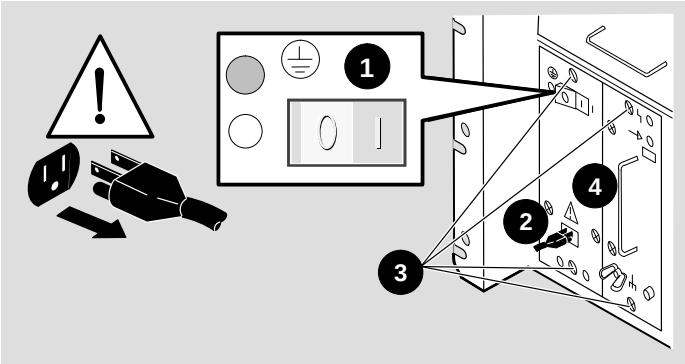
9.4 Replacing the FEU

9.4.1 Removing the FEU

Caution

Remove the FEU after removing all logic modules. The power cord provides the ground required for ESD protection.

Figure 9–7 Removing the FEU



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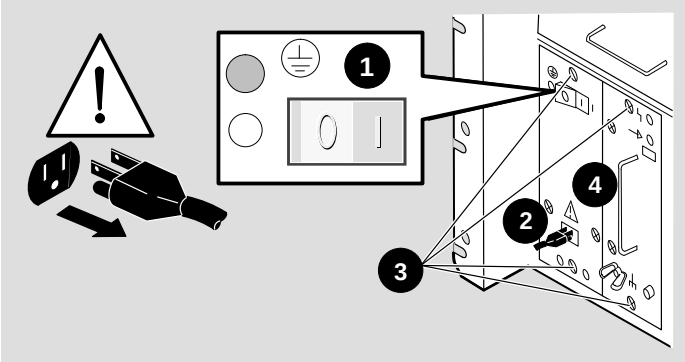
Refer to Figure 9–7 when completing these steps to remove a front end unit (FEU).

1. Locate the power switch [1], the power cord [2], the four screws [3] that fasten the selected module to the GIGAswitch/ATM system, and the handle [4] of the selected module.
2. Place the power switch [1] in the 0 (OFF) position and remove the power cord [2] from the primary power outlet and the power connector.
3. Remove the four screws [3] on the module using a number 2 cross–point screwdriver.
4. Slide the module out of the unit. Grasp the handle [4] with one hand and support the bottom of the module with your other hand.
5. Repeat steps 1 through 4 to remove the other module if installed.

9.4.2 Installing the FEU

Figure 9–8 Installing the FEU



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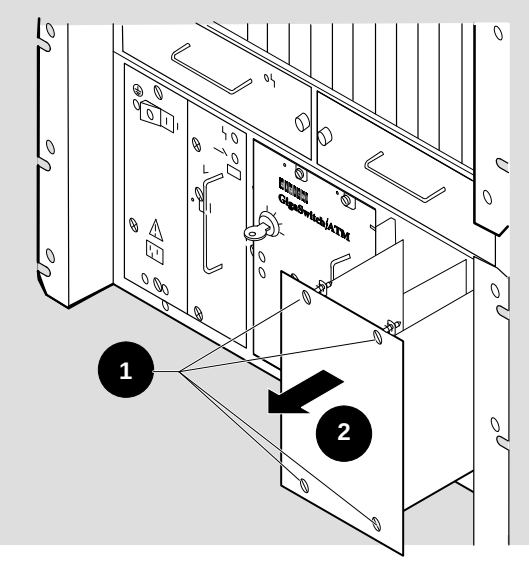
Refer to Figure 9–8 when completing these steps to install a front end unit (FEU).

1. Locate the power switch [1], the power cord [2], the four screws [3] that fasten the selected module to the GIGAswitch/ATM system, and the handle [4] of the selected module.
2. Align the selected module with the module guides of the slot designated for the module.
3. Grasp the handle [4] and slide the module into the unit.
4. Tighten the four screws [3] using a number 2 cross–point screwdriver.
5. Place the power switch [1] in the 0 (OFF) position.
6. Plug the power cord [2] into the power connector and then into the connector for the primary power source.

9.5 Replacing a Power Supply Filler Panel

9.5.1 Removing a Power Supply Filler Panel

Figure 9–9 Removing the Power Supply Filler Panel



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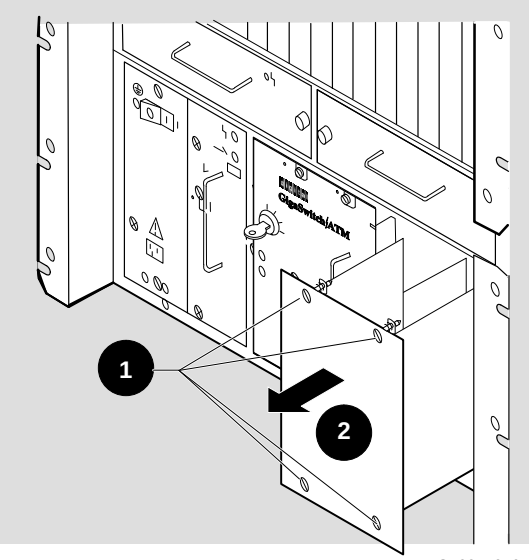
Refer to Figure 9–9 when completing these steps to remove a power supply filler panel.

1. Locate the screws [1] that fasten the power supply filler panel [2] to the GIGAswitch/ATM system.
2. Remove the two upper and the two lower screws [3] using a number 2 cross–point screwdriver.
3. Lift the power supply filler panel [2] away from the GIGAswitch/ATM system.

9.5.2 Installing a Power Supply Filler Panel

Figure 9–10 Installing the Power Supply Filler Panel



LKG–09749–94I

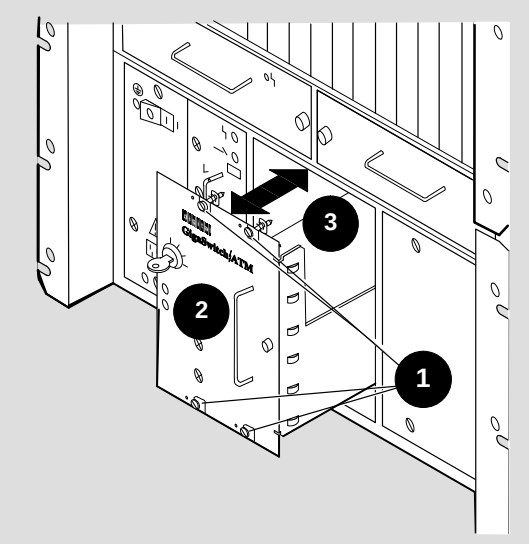
Refer to Figure 9–10 when completing these steps to install a power supply filler panel.

1. Locate the screws [1] that fasten the power supply filler panel [2] to the GIGAswitch/ATM system.
2. Align the power supply filler panel with the associated holes in the system.
3. Tighten the two upper and two lower screws [3] using a number 2 cross–point screwdriver.

9.6 Replacing a PSA

9.6.1 Removing the PSA

Figure 9–11 Removing the PSA



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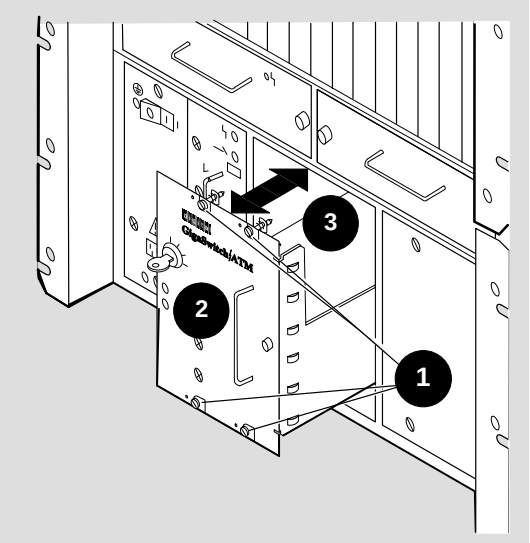
Refer to Figure 9–11 when completing the following steps to remove the power status assembly (PSA).

1. Locate the four screws [1] that fasten the module to the GIGAswitch/ATM system, the handle [2] of the module, and the slot [3] designated for the module.
2. Remove the four screws [1] on the module using a number 2 cross–point screwdriver.
3. Slide the module out of the unit. Grasp the handle [2] with one hand and support the bottom of the module with your other hand.

9.6.2 Installing the PSA

Figure 9–12 Installing the PSA



LKG-9225-94I

Refer to Figure 9–12 when completing the following steps to install the power status assembly (PSA).

1. Locate the four screws [1] that fasten the module to the GIGAswitch/ATM system, the handle [2] of the module, and the slot [3] designated for the module.
2. Align the module with the module guides of the slot [3] designated for the module.
3. Slide the module into the unit. Grasp the handle [2] with one hand and support the bottom of the module with your other hand.
4. Tighten the four screws [1] using a number 2 cross–point screwdriver.

Proceed to Chapter 5 to test the system.

9.7 Replacing a PSC Card

Complete the following procedures to replace a power system controller (PSC) card.

1. Remove the PSA.
2. Remove the PSC card.

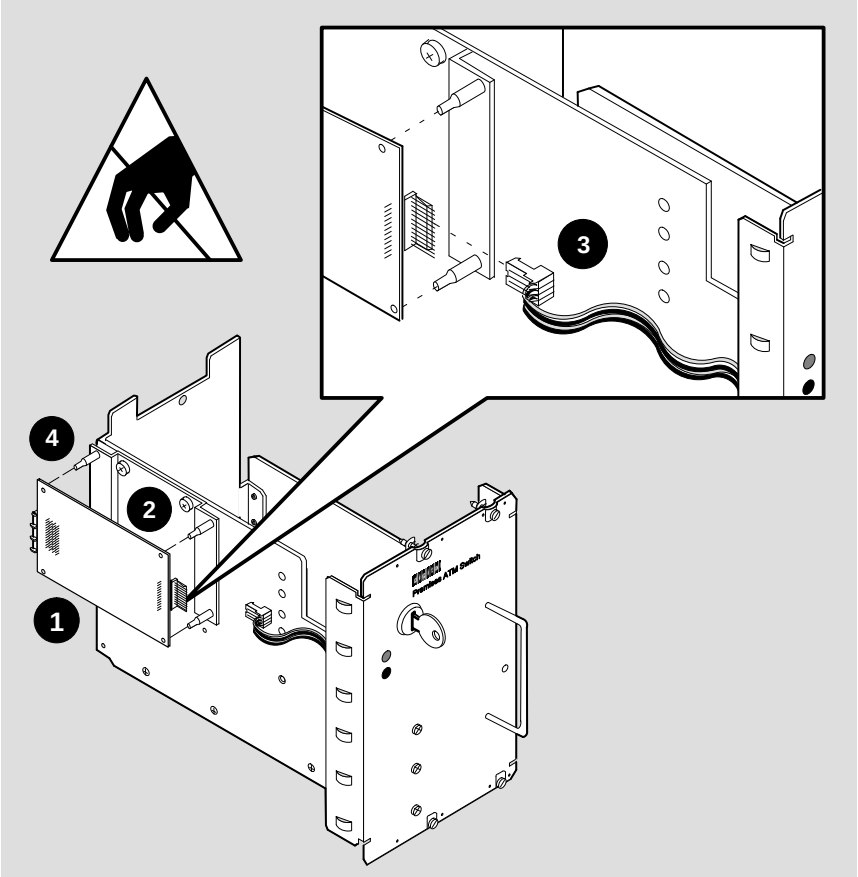
3. Install the PSC card.
4. Install the PSA.

9.7.1 Removing the PSA

Section 9.6.1 describes how to remove the power status assembly (PSA).

9.7.2 Removing the PSC Card

Figure 9–13 Removing the PSC Card



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Once the power status assembly (PSA) has been removed, refer to Figure 9–13 when completing the following steps to remove the power system controller (PSC).

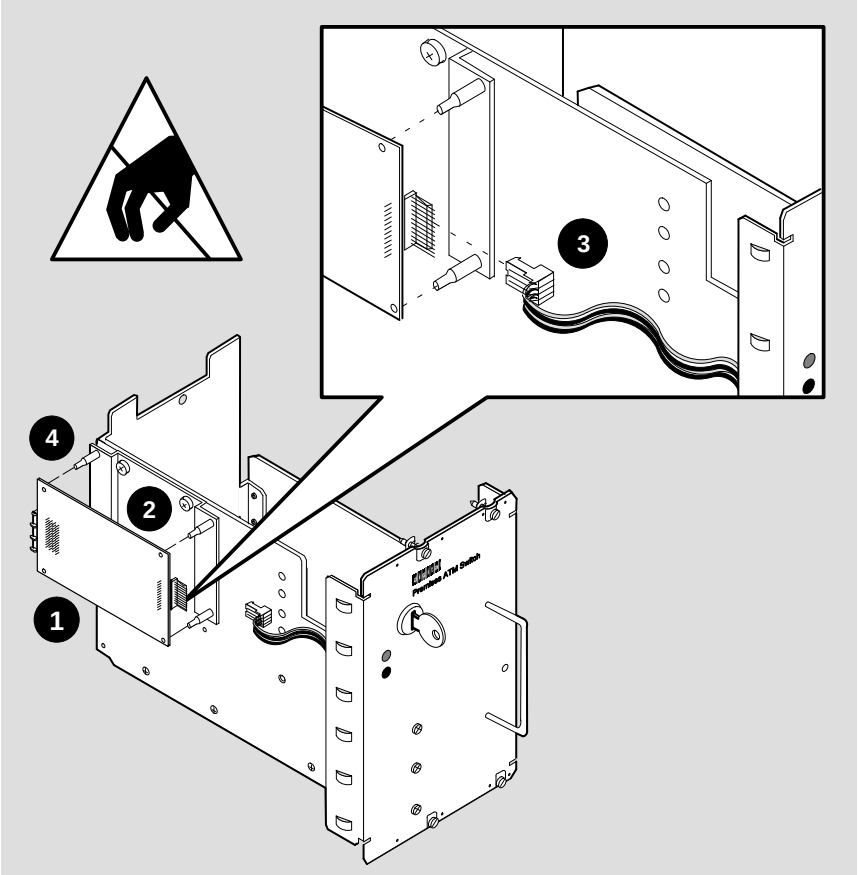
1. Locate the PSC card [1], the PSA [2], the cable for the LEDs [3] on the PSA, the cable for the security switch, and the standoffs [4].

2. Unplug the cables from the PSC card [1].

3. Unsnap the PSC card [1] from the standoffs [4] on the PSA [2], and pull the PSC card away from the PSA.

9.7.3 Installing a PSC Card

Figure 9–14 Installing the PSC Card



LKG-9230-94I

Refer to Figure 9–14 when completing the following steps to install a power system controller (PSC).

1. Locate the PSC card [1], the PSA [2], the cable for the LEDs [3] on the PSA, the cable for the security switch, and the standoffs [4].

2. Align the holes in the PSC card [1] with the standoffs on the PSA [2] and snap the PSC card onto the standoffs [4]. The components on the PSC card face in.

Note

The top three pins remain disconnected, the 4–wire connector plugs into the next four pins below them, and the 5–wire connector plugs into the bottom five pins.

3. Follow the PSC Connector Installation Instructions that is on the label attached to the sheet metal on the side of the PSA. Starting from the fourth pin from the top, plug the cable for the LEDs [3] from the PSA onto the PSC card [1] as shown in the figure. Then, plug the cable for the security switch into the bottom five holes.

9.7.4 Installing the PSA

Refer to Section 9.6.2 for a description of the power status assembly (PSA) installation.

10

Removing the System from the Rack

Warning

Remove system modules from the unit to make it light enough for two people to lift the unit. See Chapter 9 for removal procedures.

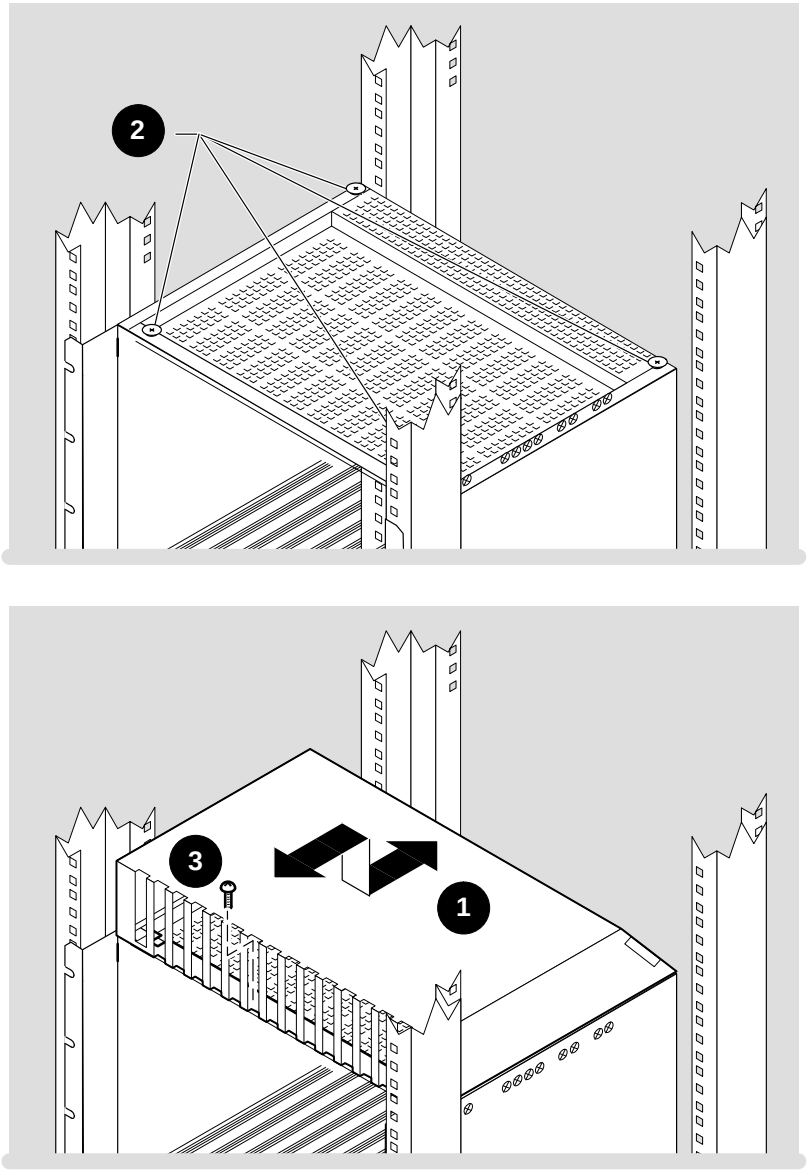
This chapter describes how to remove the upper plenum. It also describes how to detach and lower the GIGAswitch/ATM system from the rack.

These procedures should take 45 minutes and require the following tools:

- Number 2 cross–point screwdriver
- ESD equipment
- Static proof containers for modules

10.1 Removing the Upper Plenum

Figure 10–1 Removing the Upper Plenum



Refer to Figure 10–1 when completing the following steps to remove the upper plenum.

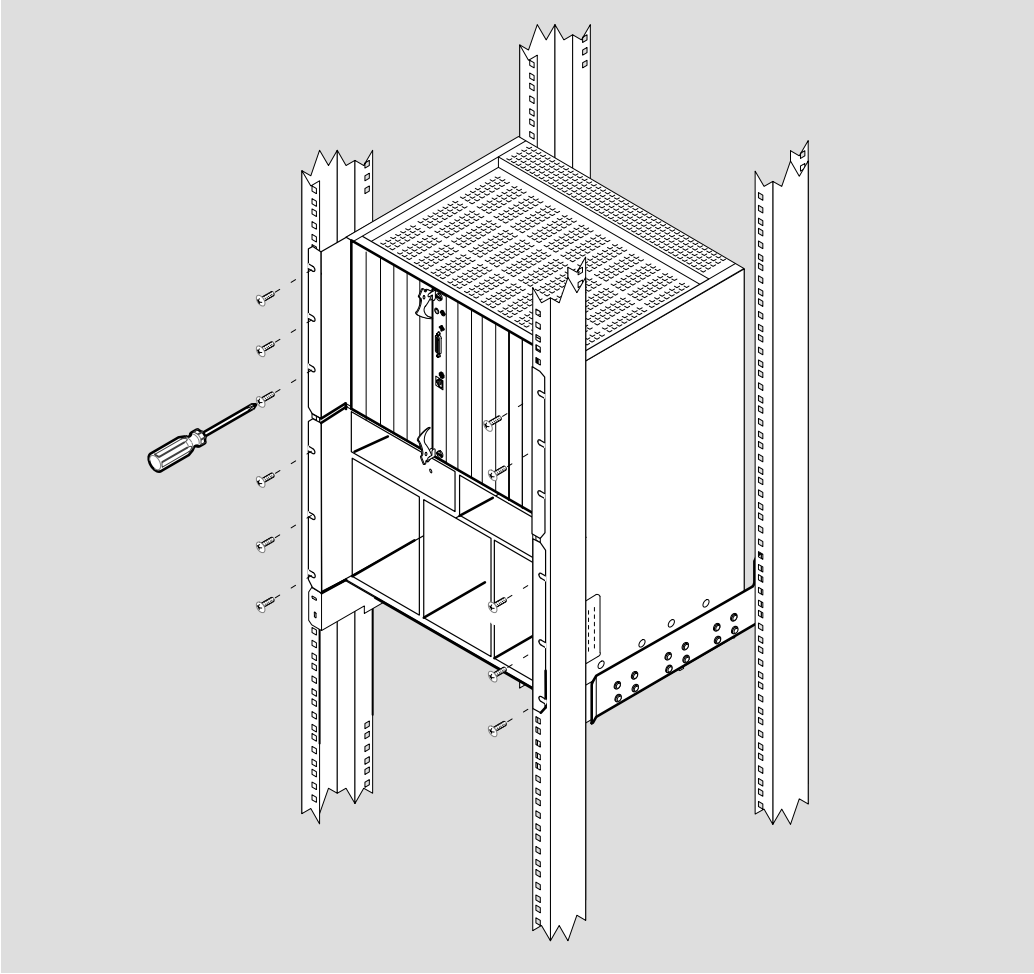
1. Locate the upper plenum [1], the four shoulder screws [2], and the mounting screw [3].

2. Remove the mounting screw [3] that attaches the upper plenum [1] to the GIGAswitch/ATM system using a number 2 cross–point screwdriver.

3. Pull the upper plenum away from the rack.

10.2 Detaching the Empty GIGAswitch/ATM System from the Rack

Figure 10–2 Detaching the System from the Rack



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Refer to Figure 10–2 when completing the following steps to detach the GIGAswitch/ATM system from the rack.

1. Locate the GIGAswitch/ATM system [1] and the 10 screws [2].

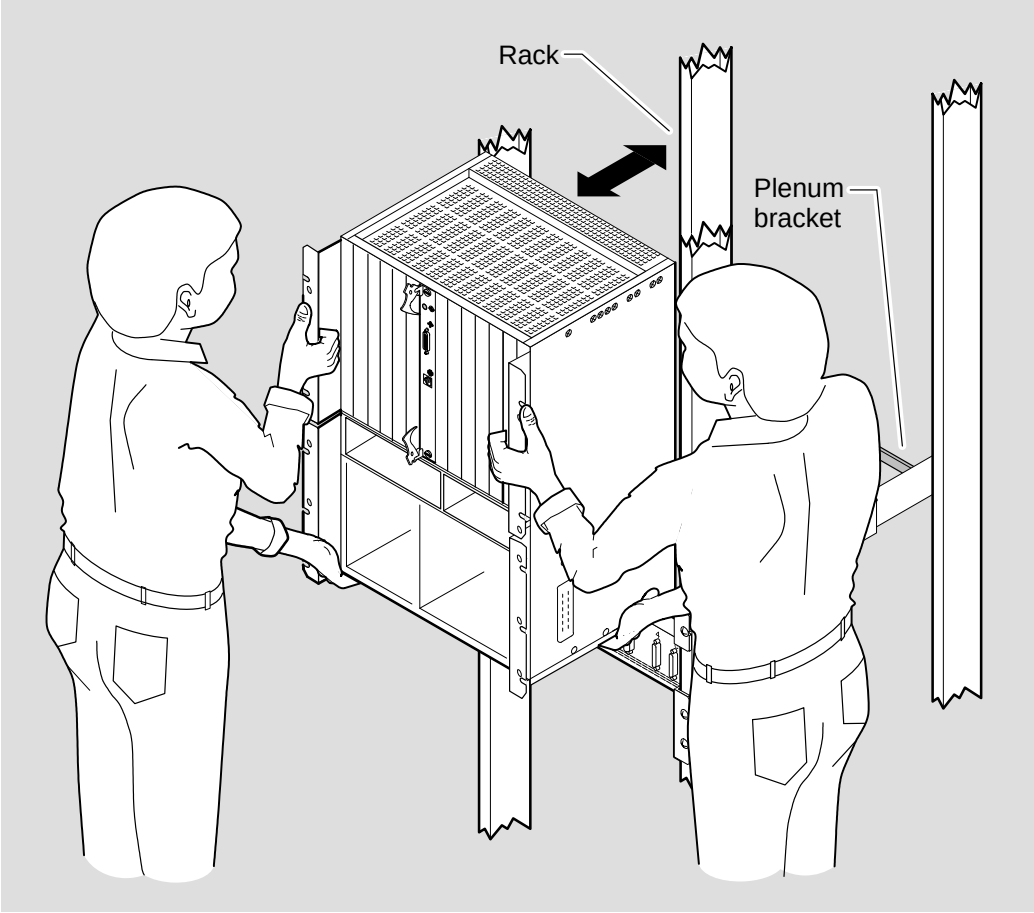
2. Remove the 10 screws [2] using a number 2 cross–point screwdriver.

10.3 Lowering the Empty GIGAswitch/ATM System

Warning

The empty GIGAswitch/ATM system weighs 50.0 kg. Use two people to lift the unit.

Figure 10–3 Lowering the Empty System



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Refer to Figure 10–3 when completing the following procedure to lower the system.

1. Pull the empty GIGAswitch/ATM system away from the rack.
2. Lower the empty GIGAswitch/ATM system and place it on a flat surface.

11

Replacing Backplanes

Because of the complexity involved in backplane removal, make sure that you eliminate all other possible causes for your equipment failure before performing this procedure.

Replacing the logic backplane is not recommended. Return your unit if this problem occurs.

Caution

Read Chapter 8 before attempting to replace a power backplane as described in this chapter.

Note

The modules from the selected backplane should already be removed. (See Chapter 9 for information about removing the modules.)

This chapter describes the following procedures for replacing the power backplanes.

- Accessing the backplanes
- Replacing the power backplane
- Replacing the crossbar modules
- Restoring the system

These procedures should take 60 minutes and require the following tools:

- Number 2 cross–point screwdriver
- Thin flat blade (4.41 mm (3/16 in)) screwdriver
- 1/2 in socket wrench

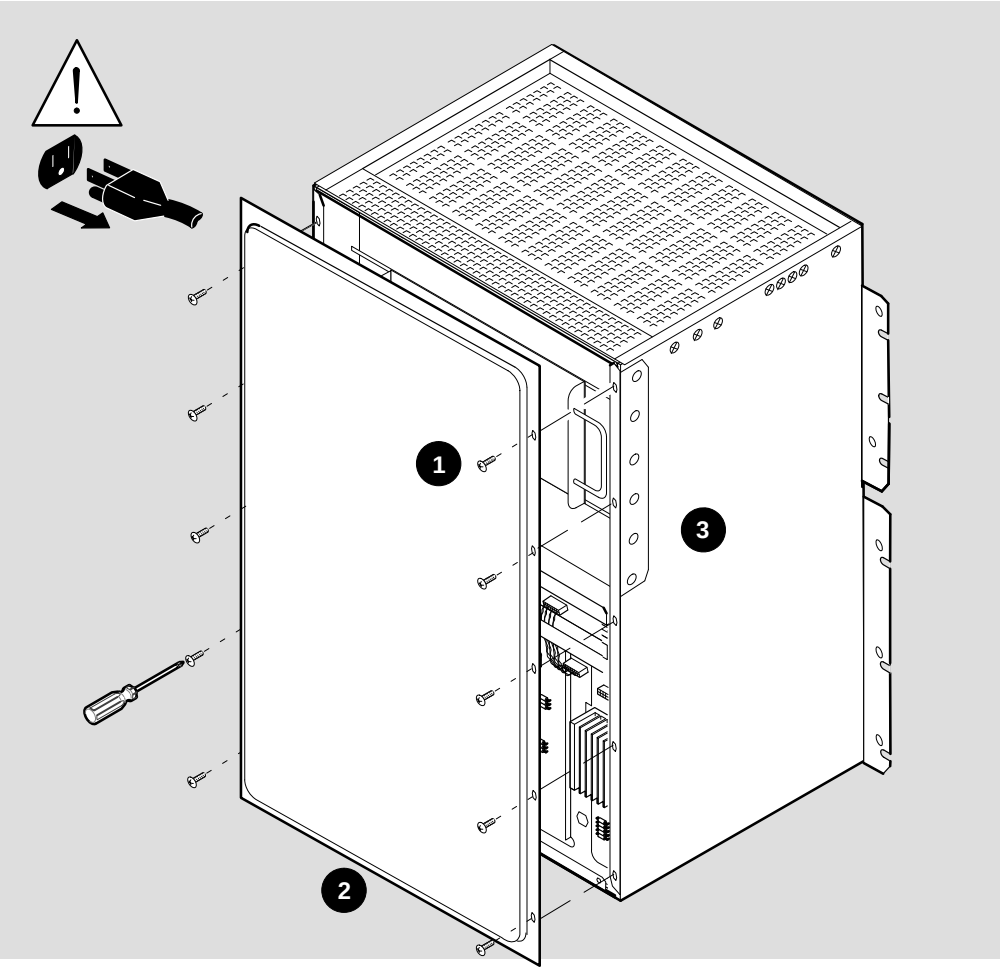
11.1 Accessing the Backplanes

This section contains the following procedures.

- Removing the back door
- Installing the back door

11.1.1 Removing the Back Door

Figure 11–1 Removing Back Door



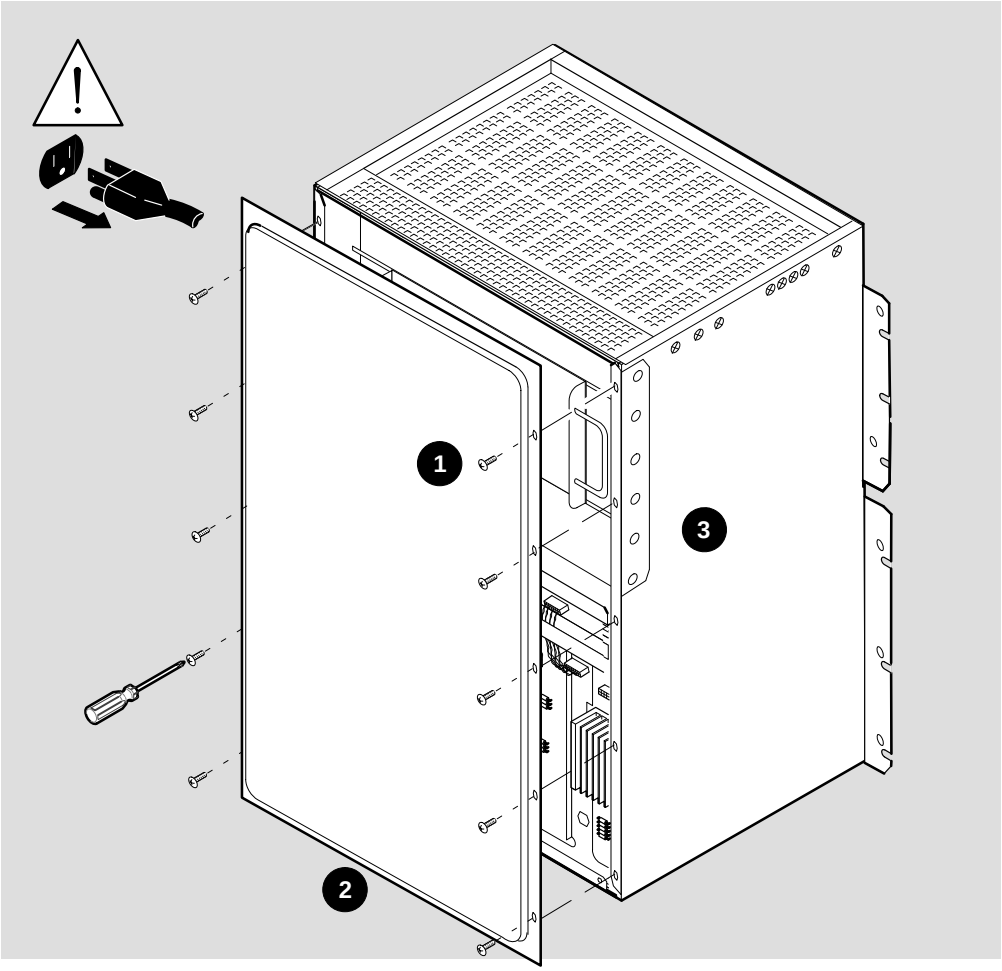
LKG-09744–94I

Refer to Figure 11–1 when completing the following steps to remove the back door from the GIGAswitch/ATM system.

1. Locate the screws [1] that fasten the back door to the GIGAswitch/ATM system [3] and the lower lip [2] used to remove the back door.
2. Remove the screws [1] for the back door using a number 2 cross–point screwdriver.
3. Grasp the lower lip [2] and pull the back door up far enough to clear the keyhole slots in the back door.
4. Pull the back door away from the GIGAswitch/ATM system [3].

11.1.2 Installing the Back Door

Figure 11–2 Installing Back Door



LKG-09744–94I

Refer to Figure 11–2 when completing the following steps to install the back door.

1. Locate the screws [1] that fasten the back door to the GIGAswitch/ATM system [3] and the lower lip [2].
2. Align the keyslots on the back door with the screws on the GIGAswitch/ATM system [3] and press down.
3. Tighten the screws using a number 2 cross–point screwdriver.

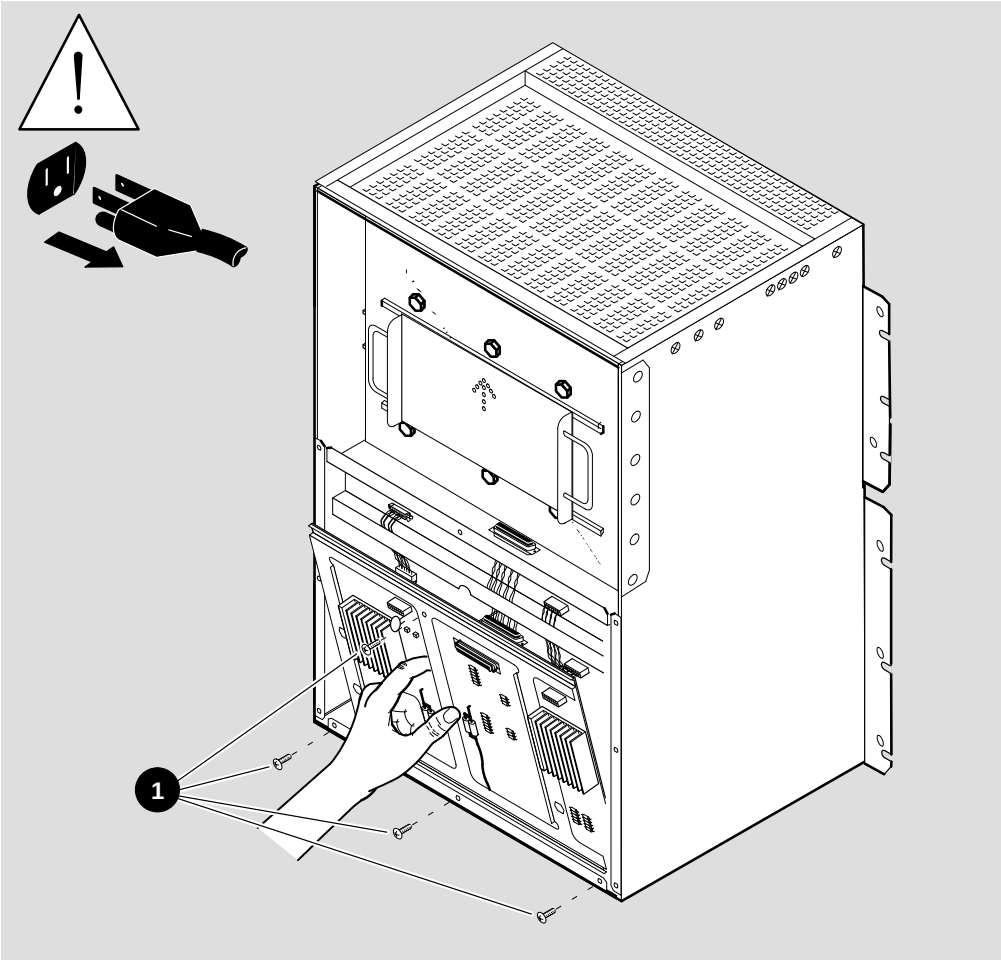
11.2 Replacing the Power Backplane

11.2.1 Removing the Back Door

Remove the back door (see Section 11.1.1).

11.2.2 Removing the Power Backplane

Figure 11–3 Removing the Power Backplane



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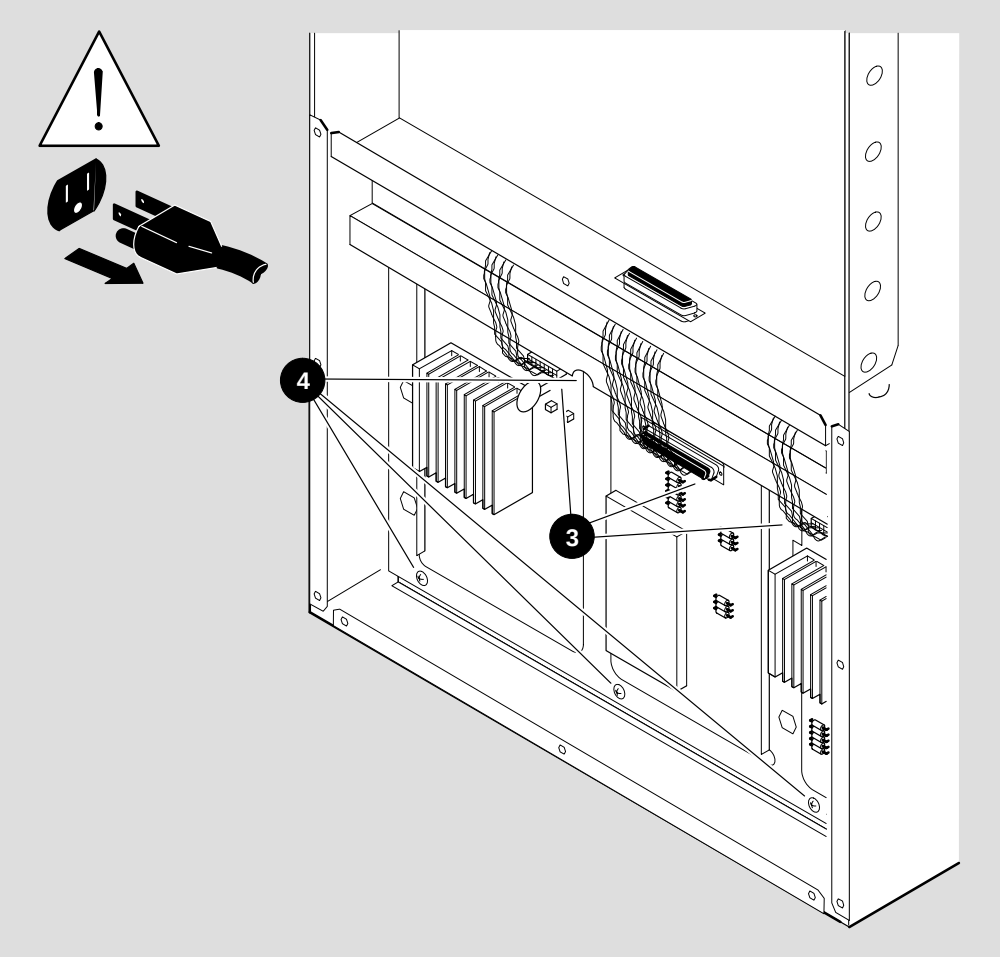


LKG-9320-94I

Refer to Figure 11–3 when completing the following steps to remove the power backplane from the GIGAswitch/ATM system.

1. Locate the four screws [1] that fasten the power backplane [2] to the GIGAswitch/ATM system and the three cables [3] used to connect the power backplane to the logic backplane [4] and the fan tray assemblies.

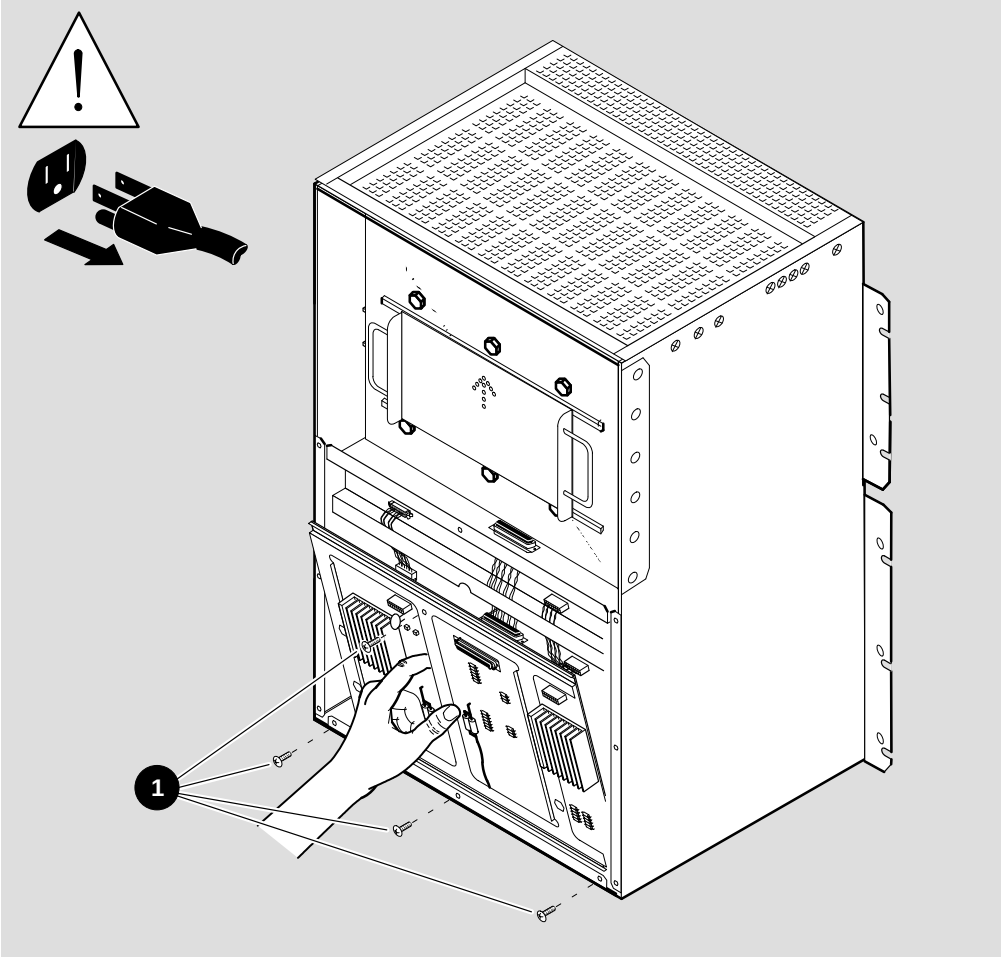
2. Unplug the three cables [3]. Remove the two fan tray assembly cables with the Molex type connectors (squeeze tab) and remove the backplane end. Remove the D connector on the power backplane to backplane bulkhead by loosening the two screws and pulling away from the backplane using a thin flat blade (4.41 mm (3/16 in)) screwdriver.

3. Remove the four screws [1] using a number 2 cross–point screwdriver. Remove the three bottom screws first and then remove the top screw.

4. Drop the top back and lift the power backplane away from the GIGAswitch/ATM system.

11.2.3 Installing the Power Backplane

Figure 11–4 Installing the Power Backplane



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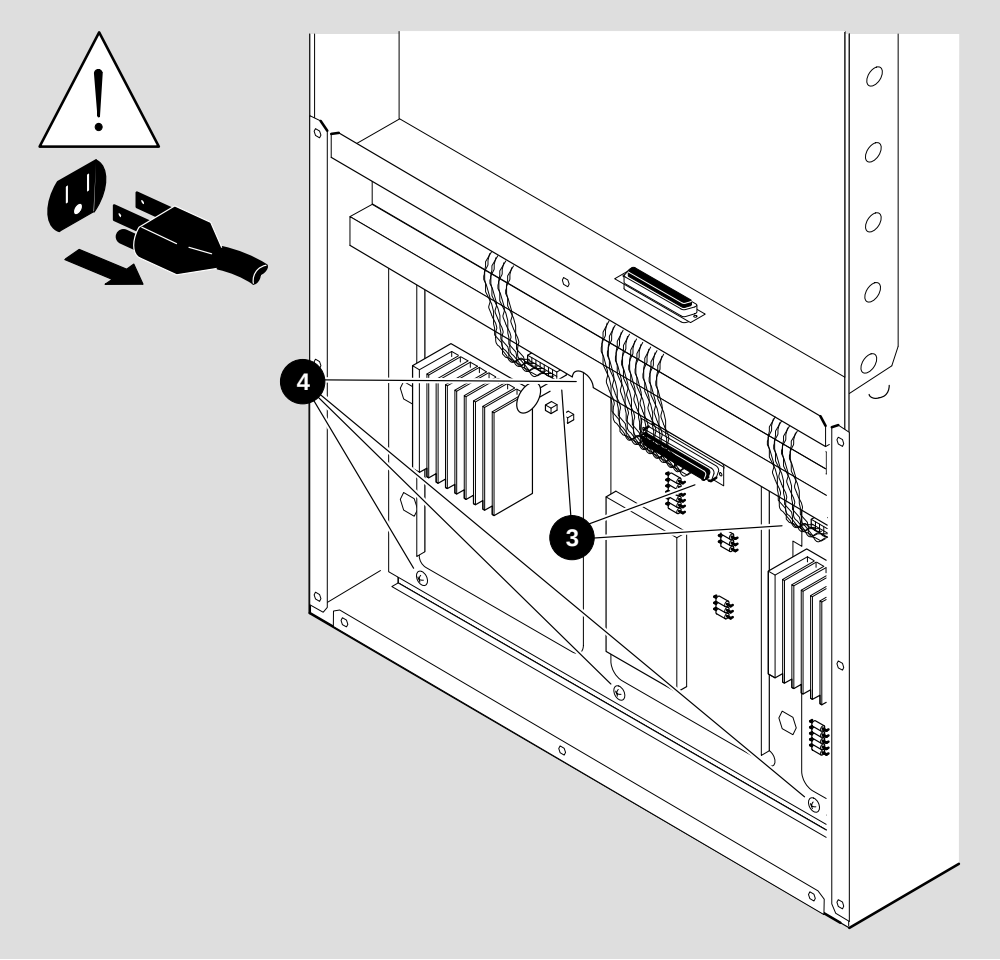

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Refer to Figure 11–4 when completing the following steps to install the power backplane onto the GIGAswitch/ATM system.

1. Locate the four screws [1] that fasten the power backplane [2] to the GIGAswitch/ATM system and the three cables [3] used to connect the power backplane to the logic backplane and the fan tray assemblies.

2. Insert the bottom of the power backplane (lift the cables out of the way) and place the power backplane on the upper and lower alignment pins.

3. Install the four screws [1] using a number 2 cross–tip screwdriver. Install the top screw first, then install the bottom three screws.

4. Install the three cables [3]. Install the two fan tray assembly cables. Install the power backplane to the bulkhead cable and tighten the two screws.

11.2.4 Installing the Back Door

Install the back door (see Section 11.1.2).

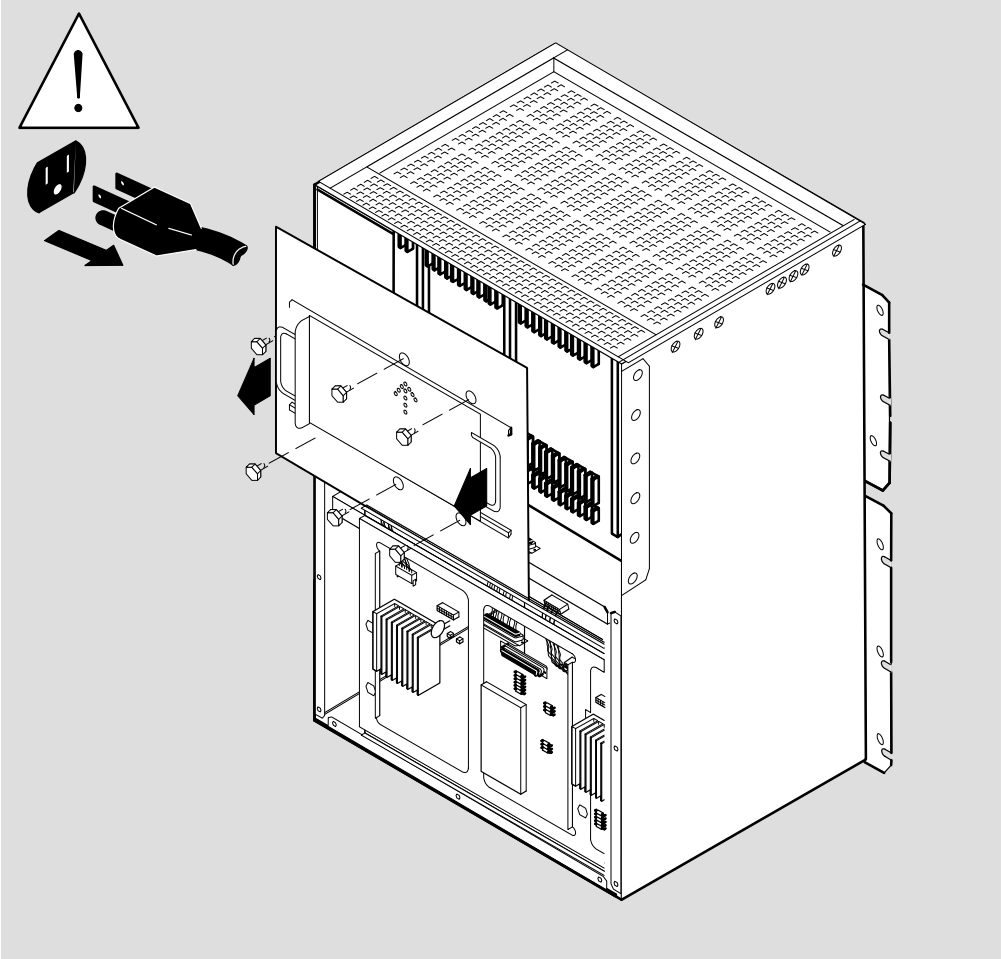
11.3 Replacing the Crossbar Module

11.3.1 Removing the Back Door

Remove the back door (see Section 11.1.1).

11.3.2 Removing the Crossbar Module

Figure 11–5 Removing the Crossbar Module



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Refer to Figure 11–5 when completing the following steps to remove the crossbar module from the GIGAswitch/ATM system.

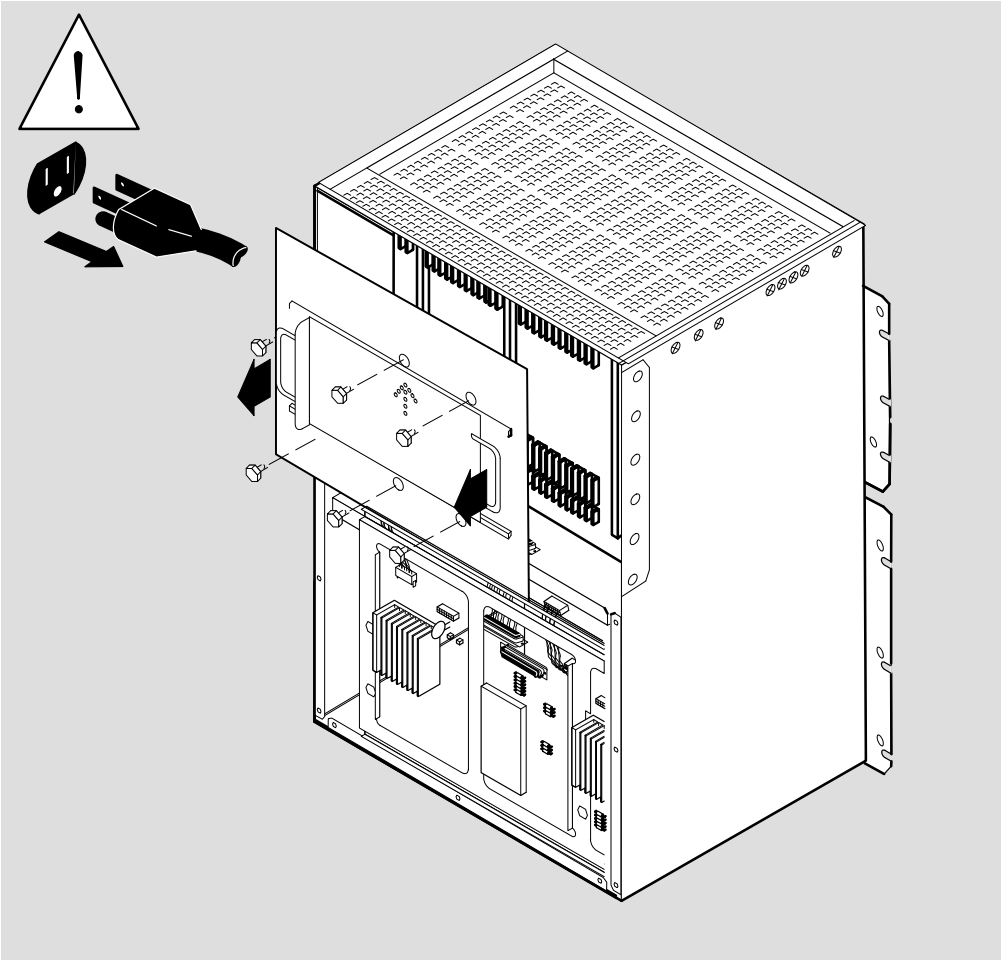
1. Locate the six hex bolts that fasten the crossbar module to the GIGAswitch/ATM system.

2. Loosen each bolt (starting from the top left and continuing clockwise) one revolution at a time using a 1/2 in socket wrench until you do not feel any resistance.

3. Lift the crossbar module away from the GIGAswitch/ATM system using the handles.

11.3.3 Installing the Crossbar Module

Figure 11–6 Installing the Crossbar Module



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Refer to Figure 11–6 when completing the following steps to install the crossbar module onto the GIGAswitch/ATM system.

1. Locate the six hex bolts that fasten the crossbar module to the GIGAswitch/ATM system.

2. Place the crossbar module on the GIGAswitch/ATM system using the handles.

3. Thread each of the six bolts until you feel resistance. Using a 1/2 in socket wrench, tighten each bolt (starting from the top left and continuing clockwise) one revolution at a time.

11.3.4 Installing the Back Door

Install the back door (see Section 11.1.2).

11.4 Restoring the System

To restore the system, install the modules in the selected backplane (see Chapter 7).

Part IV

Reference

Part IV contains reference information.

- Appendix A provides the physical, electrical, and environmental specifications for the GIGAswitch/ATM system.
- Appendix B describes the cooling and power modules in the fan tray assembly, FEU, PSA, and the PSC card families.
- Appendix C describes the logic modules in the line card and clock card families.
- Appendix D provides guidelines for installing additional logic modules.

A

GIGAswitch/ATM System Specifications

This appendix provides the specifications for the GIGAswitch/ATM system. These specifications include:

- Physical specifications for the GIGAswitch/ATM system.
- Electrical specifications for the GIGAswitch/ATM system.
- Environmental specifications for the GIGAswitch/ATM system.

A.1 Physical Dimensions of the GIGAswitch/ATM System

Table A–1 shows the physical specifications for the GIGAswitch/ATM system. Allow 90.0 cm (35.4 in) contiguous vertical space for the installation of the system.

Table A–1 Physical Specifications

Parameter	Min	Typ	Max	Units	Symbol
Mounting type		Rack Mounted		–	–
Height	–	896.2	–	millimeters	mm
	–	35.25	–	inches	in
Width	–	507	–	millimeters	mm
	–	19.95	–	inches	in
Depth	–	508	–	millimeters	mm
	–	20.0	–	inches	in
Weight	–	87.1	–	kilograms	kg
	–	192	–	pounds	lb
Operation clearance (front)	51	–	–	millimeters	mm
	2.0	–	–	inches	in
Operation clearance (rear)	76	–	–	millimeters	mm
	3.0	–	–	inches	in
Operation clearance (side)	0	–	–	millimeters	mm
	0	–	–	inches	in
Service clearance (front)	914	–	–	millimeters	mm
	36.0	–	–	inches	in
Service clearance (rear)	914	–	–	millimeters	mm
	36.0	–	–	inches	in
Service clearance (side)	0	–	–	millimeters	mm
	0	–	–	inches	in
Service clearance (top)	0	–	–	millimeters	mm
	0	–	–	inches	in
Shipping height §	–	1283	–	millimeters	mm
	–	50.5	–	inches	in
Shipping width §	–		–	millimeters	mm
	–	26.0	–	inches	in
Shipping depth §	–		–	millimeters	mm
	–	32.0	–	inches	in
Shipping weight §	–	99.8	120	kilograms	kg
	–	220	264	pounds	lbs

§ Shipping for standard shipping container

A.2 Electrical Information

A.2.1 AC Input Power Requirements

Table A–2 shows the AC input power requirements for the 20 amp front end unit (FEU) when used with the GIGAswitch/ATM system. A single 20 amp power supply will power a fully–loaded system (with 13 line cards).

Table A–2 AC Power Requirements for 20 Amp FEU

Parameter	Min	Typ	Max	Units	Symbol
Nominal Voltage	–	120	–	volts	V
Operational Voltage Range	93	–	264	volts	V
Nominal Frequency	–	50/60	–	hertz	Hz
Frequency Range	47	–	63	hertz	Hz
Number of Phases	–	1	–	none	N/A
120V Single Phase Input Current (Steady State)	–	10	20	amperes	A
120V Single Phase Input Current (Ground G)	–	–	1.0	milliamperes	mA
240V Single Phase Input Current (Steady State)	–	5.0	10	amperes	A
240V Single Phase Input Current (Ground G)	–	–	1.0	milliamperes	mA
Ride–Through Time	100	–	–	milliseconds	ms
Inrush Current	–	–	N/A	amperes peak	A
Start–Up Current	–	–	N/A	rms amperes	A
Start–Up Current Duration	–	–	N/A	seconds	s
Power Consumption	–	1038†	1730	watts	W
Apparent Power	–	1116†	1860	volt amperes	VA
Power Factor	–	.95	–	none	PF
Crest Factor	–	1.37	–	none	CF
Efficiency Factor	–	.83	–	none	

† With maximum load.

Table A–3 shows the AC input power requirements for the 15 amp FEU when used with the GIGAswitch/ATM system. A single 15 amp power supply will power a system containing up to 10 line cards.

Table A–3 AC Power Requirements for 15 Amp FEU

Parameter	Min	Typ	Max	Units	Symbol
Nominal Voltage	–	120	–	volts	V
Operational Voltage Range	93	–	264	volts	V
Nominal Frequency	–	50/60	–	hertz	Hz
Frequency Range	47	–	63	hertz	Hz
Number of Phases	–	1	–	none	N/A
120V Single Phase Input Current (Steady State)	–	8.0	15	amperes	A
120V Single Phase Input Current (Ground G)	–	–	1.0	milliamperes	mA
240V Single Phase Input Current (Steady State)	–	4.0	7.5	amperes	A
240V Single Phase Input Current (Ground G)	–	–	1.0	milliamperes	mA
Ride–Through Time	100	–	–	milliseconds	ms
Inrush Current	–	–	N/A	amperes peak	A
Start–Up Current	–	–	N/A	rms amperes	A
Start–Up Current Duration	–	–	N/A	seconds	s
Power Consumption	–	795†	1325	watts	W
Apparent Power	–	837†	1395	volt amperes	VA
Power Factor	–	.95	–	none	PF
Crest Factor	–	1.37	–	none	CF
Efficiency Factor	–	.83	–	none	

† With maximum load.

Table A–4 shows the DC input power requirements for the 48 volt FEU when used with the GIGAswitch/ATM system. A single DC power supply will power a system containing up to 10 line cards. Two DC power supplies will power a fully–loaded system (with 13 line cards).

Table A–4 DC Power Requirements for 48 Volt FEU

Parameter	Min	Typ	Max	Units	Symbol
Nominal Voltage	–	48	–	volts	V
Operational Voltage Range	40	–	60	volts DC	VDC
DC Power Source Input Current (Steady State)	–	17	25	amperes	A
Ride–Through Time	30	100	–	milliseconds	ms
Start–Up Current	–	–	25	amperes	A
Start–Up Current Duration	–	–	1	seconds	s
Power Consumption	–	800	940†	watts	W

† With maximum load and minimum input source voltage.

A.2.2 Power Cord Types

Table A–5 lists the power cords used in the various country kits available with the 20 amp power supply for the GIGAswitch/ATM system.

Table A–5 Power Cords for 20 Amp Power Supply

Country	Part Number	Country	Part Number
Australia	BN27L–2E	Italy	BN27J–2E
Canada	BN27H–2E	Japan	BN27H–2E
Central Europe	BN27M–2E	New Zealand	BN27L–2E
Denmark	BN27K–2E	South Africa	BN27P–2E
India	BN27P–2E	Switzerland	BN27G–2E
Israel	BN27N–2E	UK/Ireland	BN27Q–2E

Line cords are 2.5 meters in length.

Table A–6 lists the power cords used in the various country kits available with the 15 amp power supply for the GIGAswitch/ATM system.

Table A–6 Power Cords for 15 Amp Power Supply

Country	Part Number	Country	Part Number
Argentina	DEFGX–CD	Italy	DEFGX–AI
Australia	DEFGX–AZ	Korea	DEFGX–BK
Brazil	DEFGX–CE	Mexico	DEFGX–CA
Central Europe	DEFGX–AX	New Zealand	DEFGX–AZ
Chile	DEFGX–CF	Puerto Rico	DEFGX–CB
Denmark	DEFGX–AD	Singapore	DEFGX–CC
Hong Kong	DEFGX–CU	South Africa	DEFGX–BJ
India	DEFGX–BJ	Switzerland	DEFGX–AK
Ireland	DEFGX–AE	Taiwan	DEFGX–BI
Israel	DEFGX–AT	United Kingdom	DEFGX–AE

Line cords are 2.5 meters in length.

A.2.3 DC Power Requirements

Table A–7 shows the DC output power capacity for the 15 amp FEU.

Table A–7 DC Power Capacity for the 15 Amp AC FEU

Parameter	Min	Typ	Max	Units	Symbol
Current at 48 Vdc	–	12	21	amperes	A
Current at 12–26 Vdc	–	3.6	5.0	amperes	A
DC voltage range (48 Vdc)	46.32	–	49.68	volts	Vdc
DC voltage range (12Vdc – 26 Vdc)	11.0	–	27.1	volts	Vdc
Output Watts Available	–	–	1100†	watts	W
Current available at 48 Vdc	–	–	22	amperes	A
Current available at 11–27.1 Vdc	–	–	1.5–5.0	amperes	A

† For input that includes fans and 48V load.

Table A–8 shows the DC output power capacity for the 20 amp FEU.

Table A–8 DC Power Capacity for the 20 Amp AC FEU

Parameter	Min	Typ	Max	Units	Symbol
Current at 48 Vdc	–	12	28	amperes	A
Current at 12–26 Vdc	–	3.6	5.0	amperes	A
DC voltage range (48 Vdc)	46.32	–	49.68	volts	Vdc
DC voltage range (12Vdc – 26 Vdc)	11.0	–	27.1	volts	Vdc
Output Watts Available	–	–	1467†	watts	W
Current available at 48 Vdc	–	–	22	amperes	A
Current available at 11–27.1 Vdc	–	–	1.5–5.0	amperes	A

† For input that includes fans and 48V load.

Table A–9 shows the DC power requirements for the 48 volt FEU.

Table A–9 DC Power Capacity for the DC FEU

Parameter	Min	Typ	Max	Units	Symbol
Current at 48 Vdc	–	12	25	amperes	A
Current at 12–26 Vdc	–	3.6	5.0	amperes	A
DC voltage range (48 Vdc)	40.0	–	60.0	volts	Vdc
DC voltage range (12Vdc – 26 Vdc)	11.0	–	27.1	volts	Vdc
Output Watts Available	940†	–	1500‡	watts	W
Current available at 48 Vdc	–	–	25	amperes	A
Current available at 11–27.1 Vdc	–	–	1.5–5.0	amperes	A

† At 40VDC input source voltage.
‡ At 60VDC input source voltage.

A.3 Environmental Information

Table A–10 shows environmental information for the GIGAswitch/ATM system.

Table A–10 Environmental Information

Parameter	Min	Typ	Max	Units	Symbol
Temperature (Operating)	10 50	–	40 104	degrees Celsius degrees Fahrenheit	°C °F
Altitude	–	1.8	–	degrees Celsius per kilometer	°C/km
	–	1.0	–	degrees Fahrenheit per 1000 feet	°F/1000 ft
Temperature (Nonoperating)	–40 –40	–	66 151	degrees Celsius degrees Fahrenheit	°C °F
Temperature (Storage)	–40 –40	–	66 151	degrees Celsius degrees Fahrenheit	°C °F
Relative Humidity (Operating)	10	–	90	percent relative humidity (noncondensing)	%RH
Relative Humidity (Nonoperating)	<50	–	95	percent relative humidity (noncondensing)	%RH
Relative Humidity (Storage)	<50	–	95	percent relative humidity (noncondensing)	%RH
Maximum Wet Bulb Temperature (Operating)	– –	–	28 82	degrees Celsius degrees Fahrenheit	°C °F
Maximum Wet Bulb Temperature (Storage)	– –	–	146 115	degrees Celsius degrees Fahrenheit	°C °F
Minimum Dew Point Temperature (Operating)	2 36	–	– –	degrees Celsius degrees Fahrenheit	°C °F
Heat Dissipation	– –	800 2730	1250 4265	watts Btu/hr	W Btu/hr
Altitude (Operating)	– –	–	2400 8000	meters above sea level feet above sea level	m ft
Altitude (Nonoperating)	– –	–	4900 16000	meters above sea level feet above sea level	m ft
Mechanical Shock (Operating)	Duration Level		10+3 10g	milliseconds gravities	ms G

(continued on next page)

Table A–10 (Cont.) Environmental Information

Parameter	Min	Typ	Max	Units	Symbol
Vibration Freq Range (Operating)	5	–	500	hertz	Hz
Vibration Level (Operating)	.010– in DB	.25g	peak		
Mechanical Shock (Nonoperating)	Duration Level		29.2 13.67	milliseconds gravities	ms G
Vibration Freq Range (Nonoperating)	10	–	300	hertz	Hz
Vibration Level (Nonoperating)	1.40g	–	.029 gz/hz		
Acoustic Emission (Operating)	–		–	Bels	B
Acoustic Emission (LNPE)	–	5.9	–	decibels	dBA
Acoustic Emission (LPA)	–	46	–	decibels	dBA
Acoustic Emission (Idle/Standby)	–		–	Bels	B
Acoustic Emission (LNPE)	–	5.9	–	decibels	dBA
Acoustic Emission (LPA)	–	46	–	decibels	dBA
Airflow Intake Location	Top–Front				
Airflow Exhaust Location	Bottom Rear				

A.3.1 Ventilation

The GIGAswitch/ATM cooling system is designed to be tolerant of various rack installation configurations. However, to provide adequate ventilation:

- Do not block off the inlet air vents (upper plenum).
- Do not block off the outlet air vents (lower plenum).
- Do not allow the cooling air entering the GIGAswitch/ATM system to rise above 32°C (90°F).

A.3.2 EMI Susceptibility

Table A–11 shows the electromagnetic interference (EMI) susceptibility for the GIGAswitch/ATM system.

Table A–11 EMI Susceptibility

Parameter		Maximum	Units	Symbol
Broadband Conducted EMI	Class A	Composite (FCC/VDE) –3db	Volts dbuv	dbuv
Narrowband Conducted Transients	Frequency Range	10KHZ to 30MHZ	kilohertz, megahertz	kHz, MHz
	V rms into 50 ohms	3VRMS	Volts	V
Narrowband Radiated Susceptibility	Frequency Range	.01MHZ–1GHZ	kilohertz, megahertz	kHz, MHz
	Level	5 Volts/M	Volts per Meter	V/m
ESD Control		15KV	kilovolts	kV

B

Cooling and Power Modules

This appendix provides a description of the cooling and power modules belonging to the following families:

- Fan tray assembly
- Front end unit (FEU)
- Power status assembly (PSA)
- PSC card

B.1 Fan Tray Assembly

The fan tray assembly (70–30578–01) is a member of the fan tray assembly family of cooling modules. The fan tray assembly contains two 5.75 inch fans used to provide convective cooling to the GIGAswitch/ATM system. These variable speed fans are controlled by the PSC card based on ambient temperature.

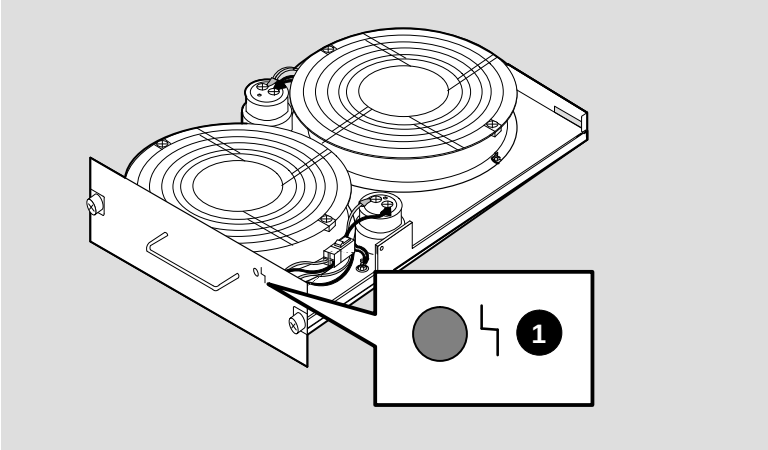
B.1.1 Air Flow

The air above the GIGAswitch/ATM system is drawn from the top of the system, directed on the modules inside the GIGAswitch/ATM system, and exhausted from the bottom of the system.

B.1.2 LED Meaning

Figure B–1 and the associated table identify the LED and its conditions on the fan tray assembly.

Figure B–1 Fan Tray Assembly LED



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Number/Name	Condition
1/Fan tray assembly fault	Off = MST passed Steady Amber = MST failure

B.2 FEU

The front end unit (FEU) (DEFGB–*xx*) is a member of the FEU family of power modules.

B.2.1 Function

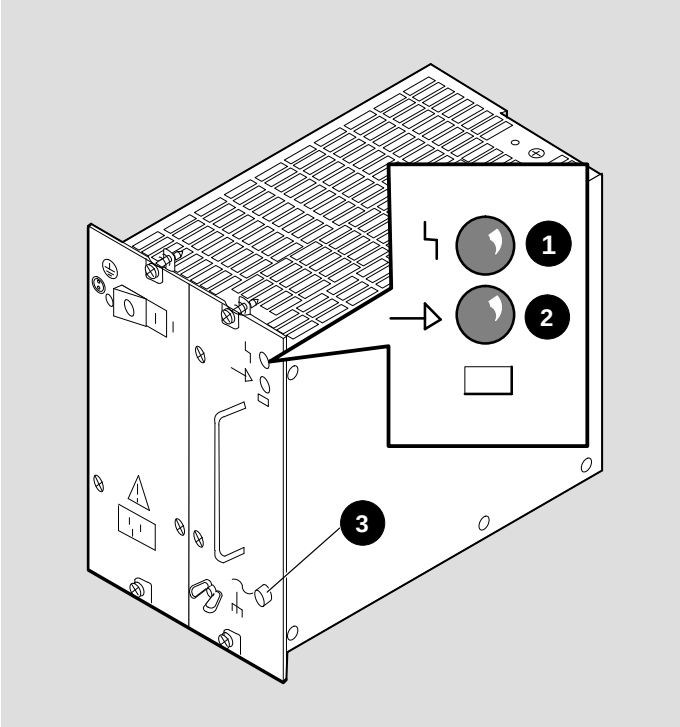
The FEU converts primary source power to system 48 Vdc bulk potential and to a variable 12 Vdc to 26 Vdc fan power. The FEU also houses the system circuit breaker.

The DC FEU allows an input range of 40V to 60V and does not provide redundancy in a system requiring power greater than 940 watts.

B.2.2 LEDs

Figure B–2 and its associated table identify the LEDs and their conditions on the AC FEUs. Figure B–3 and its associated table identify the LEDs and their conditions on the DC FEU.

Figure B–2 AC FEU LEDs



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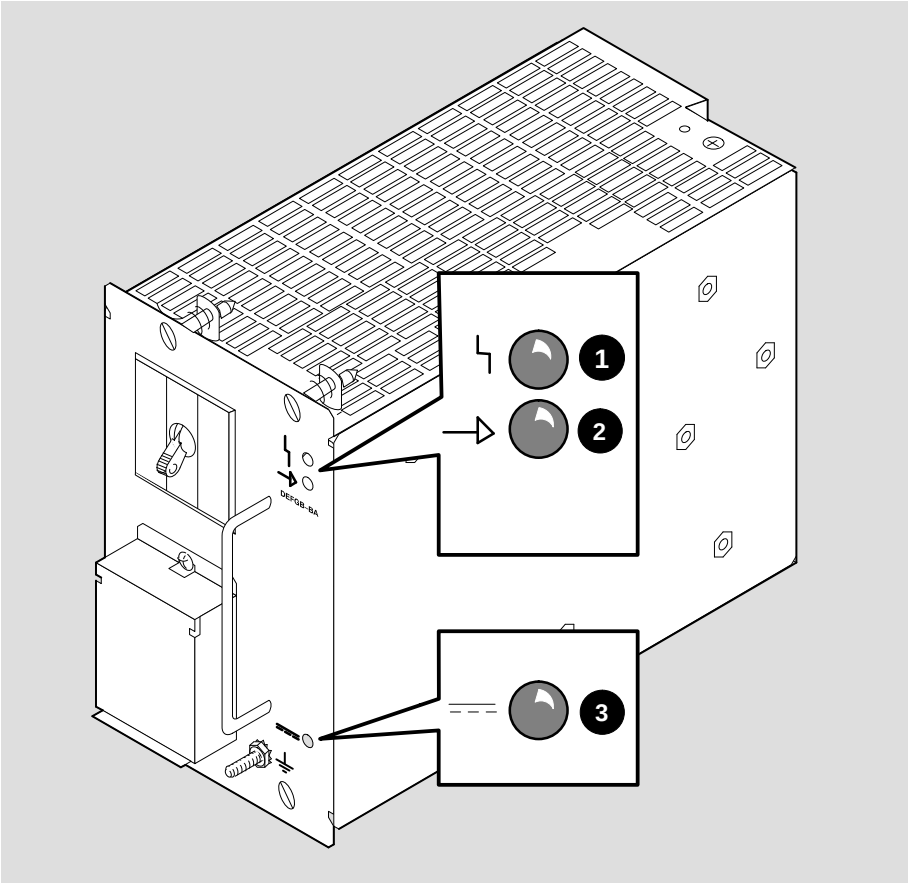
Number/Name	Condition
1/Front end unit (FEU)	Steady Amber = MST failure
2/Front end unit (FEU) OK	On Green = MST passed
3/Power	Off = Source power NOT available at the FEU's input On = Source power is available at the FEU's input

Figure B–3 48 Volts FEU LEDs



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Number/Name	Condition
1/Front end unit (FEU)	Steady Amber = MST failure
2/Front end unit (FEU) OK	On Green = MST passed
3/Power	Off = Source power NOT available at the FEU's input On = Source power is available at the FEU's input

B.3 PSA

The power status assembly (PSA) (70–30585–02) is a module that contains the power system controller (PSC) and system security switch.

B.3.1 Function

The PSA houses the PSC card.

B.3.2 PSC

The PSC card is an FRU that is mounted on the PSA.

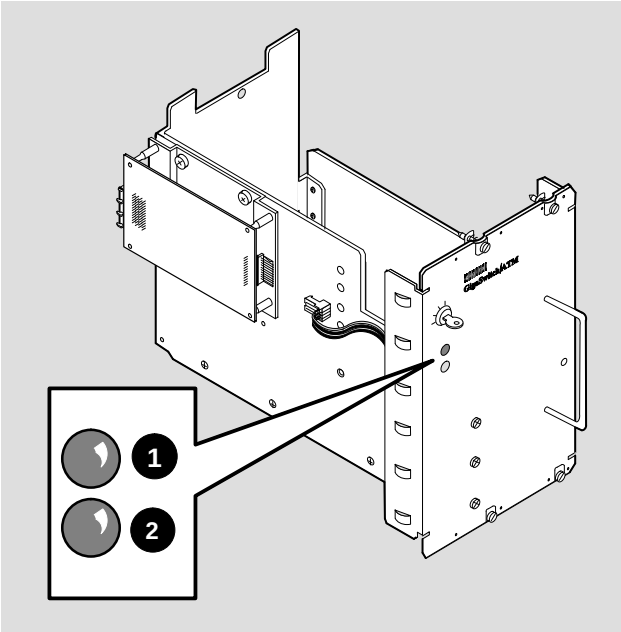
B.3.3 LED Testing

All LEDs are lit for one second during start–up to ensure that the LEDs are operational. After start–up, only those LEDs indicating faults remain lit.

B.3.4 LED Meaning

Figure B–4 and its associated table identify the LEDs on the PSA.

Figure B–4 PSA LEDs



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Number/Name	Condition
1/PSC card fault	Off = MST passed Steady Amber = MST failure
2/System temperature fault	Steady Red = System temperature fault Off = System temperature normal

B.4 PSC Card

The power system controller (PSC) card (54–22132–01) is a member of the FEU family of power modules.

The PSC card is a module that snaps onto standoffs on the PSA. The PSC card automatically plugs into the power backplane when the PSA is installed in the GIGAswitch/ATM system.

B.4.1 Function

The PSC card is that portion of the GIGAswitch/ATM that controls and monitors the 48 Vdc power supply and the fan tray assemblies. The PSC card reports the operational status of the monitored units.

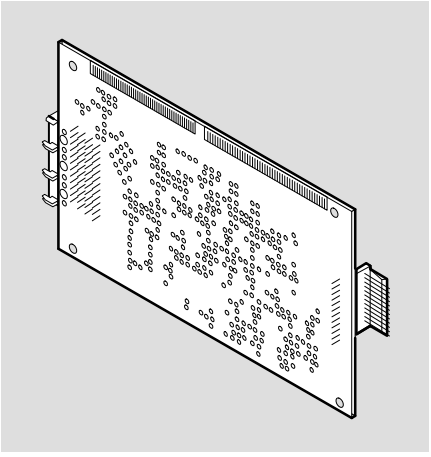
The PSC card performs the following functions:

- MST diagnostics, and fan tests at start–up.
- Temperature and fan speed monitoring.
- Fan speed control to minimize audible noise and to ensure sufficient cooling.
- Power and cooling system status, configuration and fault reporting by way of the serial bus.
- Power failure early warning signaling.
- Power and cooling system LEDs on/off control.

B.4.2 Description

Figure B–5 shows the physical characteristics of the PSC card.

Figure B–5 PSC Card



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C

Logic Modules

This appendix describes the logic modules belonging to the following families:

- Line card
- Clock card
- Crossbar module

C.1 4–Port Modular Line Card

The 4–port modular line card (DAGGL–BA) is a member of the line card family of logic modules.

C.1.1 Function

The line card performs ATM cell forwarding functions among a set of connected ATM links. The line card implements four ports and connects these ports to the crossbar module. This line card supports the use of ATM modular PHY (modPHY) cards. Thus, these ports can use the supported media types implemented by the ATM modPHY cards. Refer to *ATM Modular PHY Cards Installation* for more information about the installation and use of ATM modPHY cards.

C.2 1–Port 622 Mb/s Line Card

The 1–port 622 Mb/s MMF line card (DAGGL–CA) is a member of the line card family of logic modules.

C.2.1 Function

The line card performs ATM cell forwarding functions among a set of connected ATM links. The line card implements one port using an OC–12 (622 Mb/s) link and connects this port to the crossbar module.

C.3 Clock Card

The clock card (F5–23289) is a member of the clock card family of logic modules. The clock card must be included in any GIGAswitch/ATM system configuration.

C.3.1 Application

The clock card performs the following functions:

- Clock generation and distribution
- Terminal or modem interface
- PSC card interface
- PSC card power source

C.3.2 Clock Generation and Distribution

The clock card generates master system clocks and distributes them through the backplane to each of the line cards. This allows resources associated with the backplane (in particular the crossbar module and the backplane bus) to be used in a synchronous and efficient manner.

C.3.3 Terminal or Modem Interface

The clock card provides the GIGAswitch/ATM system user with a standard terminal or modem interface conforming to RS–232 specifications, and compatible with RS423. The interface can be used to connect a terminal to the GIGAswitch/ATM system for local management and diagnostic purposes. Full modem support is also provided for remote maintenance and diagnostic support.

User specific parameters, such as baud rates, stop bits, parity, data length, and so forth are stored locally on the clock card in nonvolatile (Flash) memory.

C.3.4 PSC Card Interface

The clock card receives environmental status from the PSC card when requested. This status includes:

- Power supply status
- The state of the fans
- Ambient temperature

C.3.5 Line Card Monitoring and Power Control

The clock card monitors line cards and crossbar modules to determine the type of card present during power initialization, and to determine when a card is removed or inserted. The major functions of the clock card are:

- Clock generation and distribution.
- Power sourcing.
- Local console (terminal or modem interface).
- Sensing and control of the environment and of other modules.

In addition, many centralized resources exist on the clock card. Examples of such resources include the many Ethernet addresses associated with each GIGAswitch/ATM system platform, network and local management parameters, and parameters learned about any local topology.

C.4 Crossbar Module

The crossbar function in a GIGAswitch/ATM system is accomplished by a crossbar module (F5–23281) that implements a 32–bit, 13–port crossbar switch.

C.4.1 Function

The function of the crossbar module is to perform cell switching that allows multiple connections. Each connection is capable of transferring an ATM cell every 520 nanoseconds at a throughput of 800 Mbits per second for each port. Any input port may be connected to any single–output or group of outputs. Each connection must be specified individually.

C.4.2 Specifications

The crossbar module has an aggregate maximum bandwidth of 10.4 Gigabits/second. Connections are made through the crossbar every 520 nanoseconds. The crossbar module supports concurrent full–duplex communication across all ports.

D

Guidelines for Installing Additional Modules

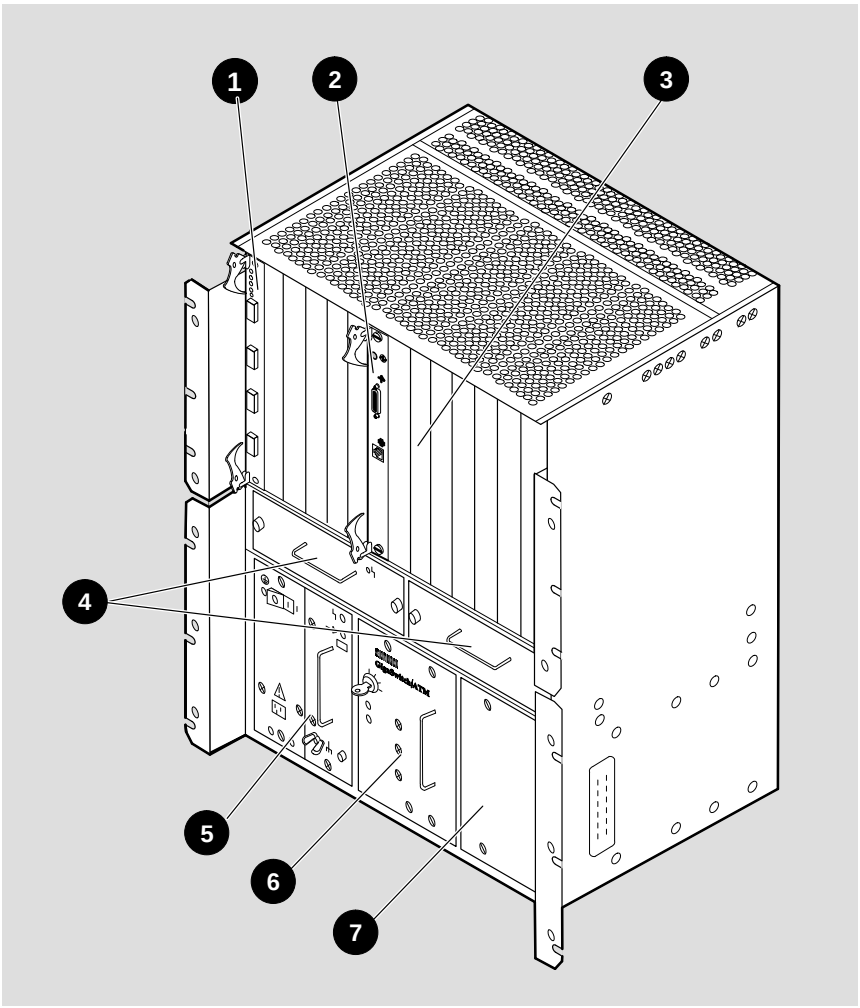
This appendix provides guidance for installing additional logic modules.

D.1 Identifying the Contents of the GIGAswitch/ATM System

The contents of the GIGAswitch/ATM system depend on any options the customer may have ordered. These options were installed in the GIGAswitch/ATM system before shipment.

Refer to Figure D–1 and its associated table to identify the contents of the GIGAswitch/ATM configuration.

Figure D–1 GIGAswitch/ATM Configuration



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Number	Order Number	Description
1	DAGGL–BA	4–port modular line card. Additional line cards can be ordered separately by the customer.
2	F5–23289	A clock card is included in all versions of the product.
3	70–30587–05	All empty logic slots are covered by blank handles.
4	70–30578–01	Two fan tray assemblies are included in all versions of the product.

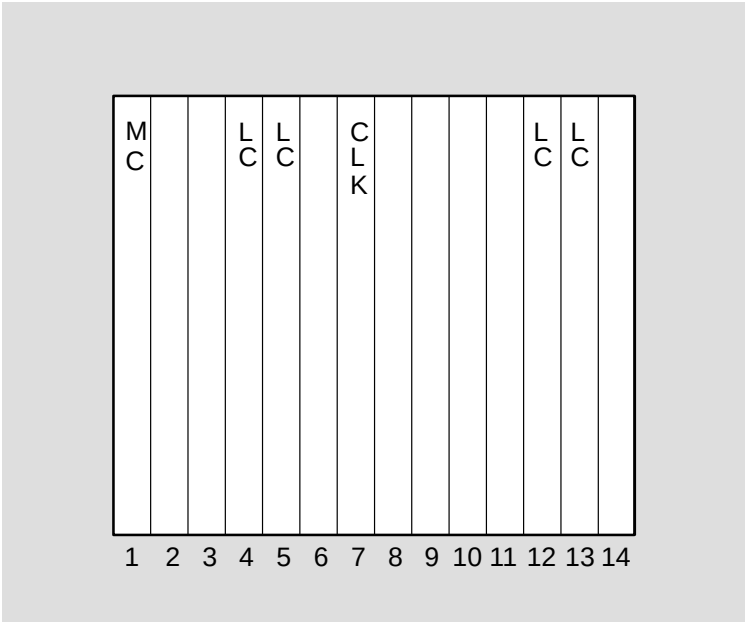
(continued on next page)

Number	Order Number	Description
5	DEFGB	Order the appropriate FEU for your system. If you are using more than ten line cards in your system, order one 20 amp power supply or two 48V power supplies. If you are using less than ten line cards, you can order one power supply (20 amp or 48V). One additional FEU can be ordered as a redundant power supply.
6	70–30585–01	A PSA is included in all versions of the product.
7	70–30912–01	A power supply filler panel is included in all versions of the product.

D.2 Recommended Location for Logic Modules

Although line cards can be placed in slots 1 through 6 and 8 through 14, the Master line card should be placed in slot 1. All additional line cards must be placed to the right of the Master line card. Digital recommends the positions shown in Figure D–2 for smaller populations of line cards and for minimum future upgrade impact.

Figure D–2 Logic Module Locations



LKG-9321-94I

Abbrev.	Order Number	Description
MC	DAGGL–*xx*	The line card inserted in Slot 1 is used as the Master line card unless another line card in the system contains the latest version of the firmware. Slot 1 is recommended.
LC	DAGGL–*xx*	Additional line cards can be ordered separately by the customer.
CLK	F5–23289	The clock card is used to perform management functions. It must be in slot 7. An Ethernet port connection is provided on this card for OBM access.

The *xx* variables in the above table specify particular line cards.

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