

# DIGITAL GIGAswitch/ATM System

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## Installation and Service

Part Number: AA-QCV7C-TE

**June 1998**

This manual describes how to install and service the DIGITAL GIGAswitch/ATM system.

**Revision Information:**

This is a revised document.

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# Preface

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## Overview

### Purpose

This document provides instructions for installing the GIGAswitch/ATM 14-slot system. It also provides information about servicing the GIGAswitch/ATM 14-slot system.

### Intended Audience

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

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## Organization

This manual is organized as follows:

Section	Description
<b>Part 1</b>	Contains overview information and installation instructions for the GIGAswitch/ATM system.
<b>Chapter 1</b>	Describes the GIGAswitch/ATM 14-slot system.
<b>Chapter 2</b>	Describes the procedures that you must complete before installing the system. These procedures include verifying the site preparation, unpacking the system, testing the system modules, and setting up electrostatic discharge (ESD) protection.
<b>Chapter 3</b>	Describes the procedures for installing the system. These procedures include installing the Richmond kit and installing the modules.
<b>Part 2</b>	Contains information for configuring and testing the GIGAswitch/ATM system.
<b>Chapter 4</b>	Describes the procedures that you must complete before configuring the system.
<b>Chapter 5</b>	Describes the clock management module (CMM) commands.
<b>Chapter 6</b>	Describes the procedures for initiating the module self-tests (MST)s and provides instructions for evaluating the results of MSTs.
<b>Chapter 7</b>	Describes the procedures for upgrading the firmware.
<b>Part 3</b>	Contains information for replacing the field replaceable units (FRUs).
<b>Chapter 8</b>	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.
<b>Chapter 9</b>	Describes the procedures for replacing the cooling and power modules and the line cards. Cooling and power modules include the fan tray and power tray assemblies.

Section	Description
<b>Chapter 10</b>	Describes the procedure for removing the system from the rack.
<b>Chapter 11</b>	Describes the procedure for removing the backplane.
<b>Part 4</b>	Contains reference information.
<b>Appendix A</b>	Provides the physical, electrical, and environmental specifications for the GIGAswitch/ATM 14-slot system.
<b>Appendix B</b>	Describes the cooling and power modules in the fan tray and power tray assemblies.
<b>Appendix C</b>	Describes the logic modules in the line card and crossbar module families.
<b>Appendix D</b>	Provides guidelines for installing additional logic modules.

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## Associated Documents

The following documents provide related information. For information on how to order additional documentation, see [How to Order Additional Documentation on page -xxv](#).

Title and Order	Description
<i>GIGAswitch/ATM System Management</i> AA-QCV8*-TE	Explains how to manage the DIGITAL GIGAswitch/ATM system.
<i>OPEN DECconnect Applications Guide</i> EC-G2570-42	Contains descriptions to help plan and install networking systems based on the OPEN DECconnect system and Networking products from Digital Equipment Corporation.
<i>ATM Modular PHY Cards Installation</i> EK-DAGGM-IN	Describes how to install and verify the operations of the DIGITAL ATM modular PHY cards.
<i>ATM 4-Port Modular Line Card</i> EK-DAGBA-IN	Provides information on using the DIGITAL 4-port modular line card (DAGGL-BB) that supports ATM modular PHY (modPHY) cards.
<i>ATM 1-Port 622 Mb/s MMF Line Card</i> EK-DAGCA-IN	Provides information on using the DIGITAL 622 Mb/s SONET/SDH ATM line card (DAGGL-CA) with one multimode fiber (MMF) port.
<i>ATM 1-Port 622 Mb/s SMF Line Card</i> EK-DAGCB-IN	Provides information on using the DIGITAL 622 Mb/s SONET/SDH ATM line card (DAGGL-CB) with one single-mode fiber (SMF) port.
<i>DIGITAL ATM 4-Port Modular Line Card</i> EK-DAGGL-BC	Describes how to install and verify the operations of the DIGITAL ATM 4-Port Modular Line Card.

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## Conventions

### Overview

This document uses the following conventions:

Convention	Description
Special Type	This special type in examples indicates system output. In text, indicates command names, keywords, node names, file names, directories, and utilities.
<b>Boldface</b>	Boldface type in examples indicates user input.
<i>Italic type</i>	In examples, indicates a variable. In text, indicates that a word or phrase is being emphasized to the reader. In text, it may also indicate the title of a book.
<Return>	Indicates that you should press the Return key.
<Ctrl/x>	Indicates that you must hold down the key labeled Ctrl while you press another key or a pointing device button.

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## Correspondence

### Documentation Comments

If you have comments or suggestions about this document, send them to DIGITAL Network Products:

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Electronically (USA only)	Dial 1-800-DEC-DEMO (For assistance, call 1-800-DIGITAL)
By Mail (USA and Puerto Rico)	DIGITAL EQUIPMENT CORPORATION P.O. Box CS2008 Nashua, New Hampshire 03061 (Place prepaid orders from Puerto Rico with the local Digital subsidiary: 809-754-7575)
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## Safety

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### Overview

Any warning or caution that appears in this manual is defined as follows. The cautions that must be observed for the hardware described in this manual are listed below in English, German, French, and Spanish.

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<b>WARNING</b>	Contains information to prevent personal injury.
<b>CAUTION</b>	Contains information to prevent damage to equipment.
<b>ACHTUNG</b>	Enthält Informationen, die beachtet werden müssen um den Benutzer vor Schaden zu bewahren.
<b>VORSICHT</b>	Enthält Informationen, die beachtet werden müssen um die Geräte vor Schaden zu bewahren.
<b>DANGER</b>	Signale les informations destinées à prévenir les accidents corporels.
<b>ATTENTION</b>	Signale les informations destinées à prévenir la détérioration du matériel.
<b>AVISO</b>	Contiene información para evitar daños personales.
<b>PRECAUCIÓN</b>	Contiene información para evitar daños al equipo.

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## Precautions

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<b>WARNING</b>	Remove modules from the unit before lifting. The empty GIGAswitch/ATM unit weighs 500 kg (110 lb). Use two people to lift the unit.
<b>ACHTUNG</b>	Entfernen Sie vor dem Hochheben die Module aus der Einheit. Ohne Module wiegt die GIGAswitch/ATM-Einheit ungefähr 500 kg. Zum Hochheben der Einheit sind zwei Personen notwendig.
<b>DANGER</b>	Retirer les modules de l'unité avant de la soulever. L'unité GIGAswitch/ATM pèse 500 kg à vide. Deux personnes sont nécessaires pour son transport.
<b>AVISO</b>	Retire los módulos de la unidad antes de levantarla. La unidad GIGAswitch/ATM vacía pesa 500 kg. Dos personas deben levantarla.

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<b>CAUTION</b>	Install the front-end unit and connect the power cord before installing the logic modules. The power cord provides the ground required for electrostatic discharge protection.
<b>VORSICHT</b>	Installieren Sie die vordere Einheit und verbinden Sie vor der Installation der logischen Module das Netzkabel. Das geerdete Netzkabel liefert die erforderliche Sicherheit gegen elektrostatische Aufladung.
<b>ATTENTION</b>	Installer l'unité avant et brancher le cordon d'alimentation avant l'installation des modules logiques. Le cordon d'alimentation est prévu pour un raccordement à la terre afin d'éviter les décharges électrostatiques.
<b>PRECAUCIÓN</b>	Instale la unidad delantera y conecte el cable de alimentación antes de instalar los módulos lógicos. El cable de alimentación proporciona la puesta a tierra que se requiere para la protección de descarga electrostática.

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## Precautions

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<b>CAUTION</b>	Do not remove the power cord or the front-end unit until after removing all the logic modules. The power cord provides the ground required for electrostatic discharge protection.
<b>VORSICHT</b>	Das Netzkabel bzw. die vordere Einheit darf erst nach dem Entfernen aller logischen Module entfernt werden. Das geerdete Netzkabel liefert die erforderliche Sicherheit gegen elektrostatische Aufladung.
<b>ATTENTION</b>	Retirer tous les modules logiques avant de débrancher le cordon d'alimentation ou de retirer l'unité avant. Le cordon d'alimentation est prévu pour un raccordement à terre afin d'éviter les décharges électrostatiques.
<b>PRECAUCIÓN</b>	Retire el cable de alimentación o la unidad delantera sólo después de que haya retirado todos los módulos lógicos. El cable de alimentación proporciona la puesta a tierra que se requiere para la protección de descarga electrostática.

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<b>CAUTION</b>	Ensure that the electromagnetic interference gasket remains intact and clean.
<b>VORSICHT</b>	Vergewissern Sie sich, daß die elektromagnetische Störungsdichtung unversehrt bleibt und sauber ist.
<b>ATTENTION</b>	Maintenir le joint d'interférences électromagnétiques propre et en bon état.
<b>PRECAUCIÓN</b>	Asegúrese de que la junta de interferencia electromagnética permanezca intacta y limpia.

---

## Precautions

---

<b>CAUTION</b>	Static electricity can damage modules and electronic components. DIGITAL recommends using a grounded antistatic wrist strap and a grounded work surface when handling any modules.
<b>VORSICHT</b>	Module und elektronische Komponenten können durch elektrostatische Entladungen beschädigt werden. Benutzen Sie immer eine antistatische Gelenkmanschette und eine geerdete Arbeitsunterlage, wenn Sie am offenen Gerät arbeiten.
<b>ATTENTION</b>	Les charges excessives d'électricité statique peuvent endommager les modules et les composants électroniques. DIGITAL conseille l'utilisation d'un bracelet de masse et d'un plan de travail mis à la terre lors de la manipulation des modules.
<b>PRECAUCION</b>	La electricidad estática puede dañar los componentes electrónicos y los módulos. DIGITAL recomienda que se utilicen cintas de pasadores y superficies de trabajo conectadas a tierra al trabajar con cualquier módulo.

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# Part 1

## Installation

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Part 1 describes the GIGAswitch/ATM system and its features. Part 1 contains the following chapters:

Chapter	Description
<b>1</b>	Contains overview information and installation instructions for the GIGAswitch/ATM system.
<b>2</b>	Describes the following procedures that you must complete prior to installing the DIGITAL GIGAswitch/ATM system: <ul style="list-style-type: none"><li>• Verifying the site preparation</li><li>• Unpacking the system</li><li>• Testing the system modules</li><li>• Installing the lower plenum into the rack</li><li>• Installing the upper plenum</li><li>• Installing the modules</li></ul>
<b>3</b>	Describes the following procedures for installing the GIGAswitch/ATM system: <ul style="list-style-type: none"><li>• Lifting the empty system onto the lower plenum</li><li>• Attaching the system to the rack</li><li>• Installing the upper plenum</li><li>• Installing the modules</li></ul>

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# Chapter 1

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## Introduction

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### Overview

#### Description

The DIGITAL GIGAswitch/ATM system is a standalone, intelligent switching system that forwards ATM cells among a set of connected ATM links based on the virtual channel identifier (VCI) field within the cell header. The links can be connected to end stations, bridges, and routers, another vendors' 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.

#### Versions

There are two versions of the GIGAswitch/ATM chassis:

- Chassis with a 20 ampere ac power supply (DAGGA-PA)
- Chassis with a 48 Vdc power supply (DAGGA-PD)

Both contain a crossbar module, a clock card, and backplanes.

#### Ordering Power Supplies

The U.S. version of the ac power supply includes a U.S. power cord. Other 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 48 Vdc source to the 48 Vdc power supply is provided by the customer.

<b>If you are using</b>	<b>Then, you can order</b>
Less than ten line cards	One power supply (20 ampere ac or 48 Vdc)
More than ten line cards	One 20 ampere ac power supply or two 48 Vdc power supplies

---

One additional front end unit (FEU) can be ordered as a redundant power supply.

## Parts of the GIGAswitch/ATM 14-Slot System

**Table 1-1** lists the GIGAswitch/ATM 14-slot system components.

**Table 1-1: GIGAswitch/ATM 14-Slot System Components**

Part (Order Number)	Quantity	
	DAGGA-CA	Option
4-port modular line card (DAGGL-BB) with the following options: <ul style="list-style-type: none"> <li>• 8 MB expanded memory option (DAGME-AA)</li> <li>• 16 MB expanded memory option (DAGME-AB)</li> <li>• 48 Vdc power module option (DAGPL-AB)</li> <li>• ATM modular PHY cards</li> </ul>	0	Up to 13 <sup>1</sup>
ATM 4-port modular line card (DAGGL-BC) with the following ATM modPHY cards: <ul style="list-style-type: none"> <li>• STS-3c (155 Mb/s) multimode fiber (MMF), DAGGM-AA</li> <li>• STS-3c (155 Mb/s) single-mode fiber (SMF), DAGGS-AA</li> <li>• STS-3c (155 Mb/s) unshielded twisted-pair (UTP) or STS-3c (155 Mb/s) screened twisted-pair (ScTP), DAGGU-AA</li> <li>• T3 (44 Mb/s) coaxial, DAGGT-AA</li> <li>• E3 (34 Mb/s) coaxial, DAGGE-AA</li> <li>• E1 (2 Mb/s) short reach twisted-pair (TP), DAGE1-AA</li> <li>• T1 (1.54 Mb/s) short reach twisted-pair (TP), DAGT1-AA</li> <li>• ATM VP loopback card, DAGVP-AA for wide-area networking features</li> </ul>	0	Up to 13 <sup>1</sup>
1-port 622 Mb/s line card (DAGGL-CA or DAGGL-CB) with the following option: <ul style="list-style-type: none"> <li>• 48 Vdc power module option (DAGPL-AB)</li> </ul>	0	Up to 13 <sup>1</sup>

Parts of the GIGAswitch/ATM 14-Slot System

**Table 1-1: GIGAswitch/ATM 14-Slot System Components**

Part (Order Number)	Quantity	
	DAGGA-CA	Option
Crossbar module (CBM) (F5-23281)	1	0
Clock card (F5-23289)	1	0
Chassis contains:	1	0
• Fan tray assembly (70-30578-01) <sup>2</sup>		
• Logic backplane (F5-23266)		
• Power backplane (54-22138-01)		
20 ampere FEU for U.S. (DEFGB-DA)	0	Up to 2 <sup>3</sup>
20 ampere FEU for other countries (DEFGB-DB)	0	Up to 2 <sup>3</sup>
48 Vdc FEU (DEFGB-BA)	0	Up to 2
Power status assembly (PSA) (70-30585-02) contains:	1	0
• Power System Controller (PSC) card (54-22132-01)		
Power cord (countries other than U.S.)	0	1 country kit per FEU

1.Up to thirteen per chassis

2.Two per chassis

3.One is required for ordinary usage. Two are required for redundancy. Refer to [Appendix D](#) for specific information.

## Features

### Hot-Swap Capability

The GIGAswitch/ATM system supports hot swapping (insertion/removal) of slave line cards on a running system. The GIGAswitch/ATM detects line card insertion/removal and updates its configuration. Master line card hot swapping is not supported on a running GIGAswitch/ATM. Removal of a master line card results in a switch reboot.

Since the left-most line card in a switch is elected as the master, slave line cards must be inserted and/or removed to the right of the master line card only. Also, only one slave line card can be inserted/removed at a time. Slave line card insertion/removal should be done only after the previous hot-swap operation is complete. Messages displayed on the console indicate that switch configuration is complete.

### 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.

## Chapter 2

---

# Preparing to Install the System

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## Overview

### Introduction

This chapter describes the procedures that you must complete before installing the GIGAswitch/ATM system.

### In This Chapter

Topic	Page
<a href="#">Verifying the Site Preparation</a>	2-2
<a href="#">Unpacking the System</a>	2-4
<a href="#">Testing the System Modules</a>	2-8
<a href="#">Preparing the Rack</a>	2-12
<a href="#">Setting Up ESD Protection</a>	2-20
<a href="#">Removing the System Modules</a>	2-21

---

## Verifying the Site Preparation

### Tasks

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

- [Area](#)
- [Cable Plant](#)
- [Rack Space](#)

### Area

[Appendix A](#) provides the physical, electrical, and environmental specifications for the GIGAswitch/ATM system.

### Cable Plant

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

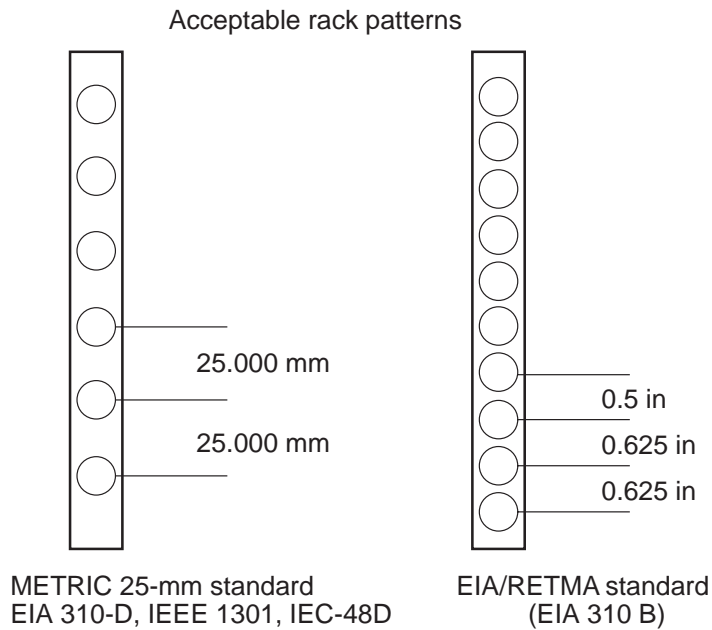
## Rack Space

A grounded rack that is 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 25 mm 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**



LKG-10762-98WF



## Unpacking the System

### Tasks

Unpacking the system involves the following tasks:

Task	Action
1	<b>Removing the Packing Material</b>
2	<b>Identifying the Parts of the Shipping Container</b>
3	<b>Testing the System Modules</b>

---

These tasks should take about 15 minutes.

### Removing the Packing Material

---

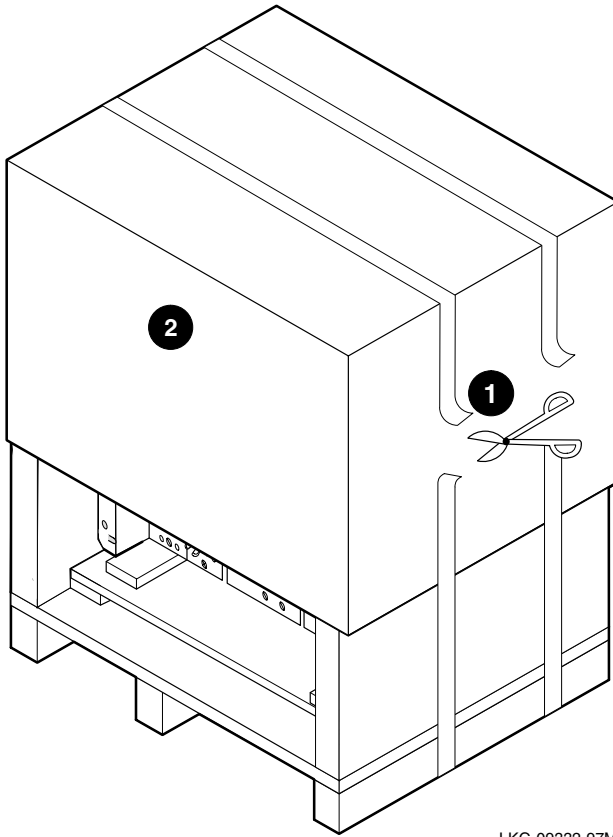
#### NOTE

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

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Refer to **Figure 2-2** and complete the following steps to remove the packing material.

Figure 2-2: Removing the Packing Material:



LKG-09332-97MI

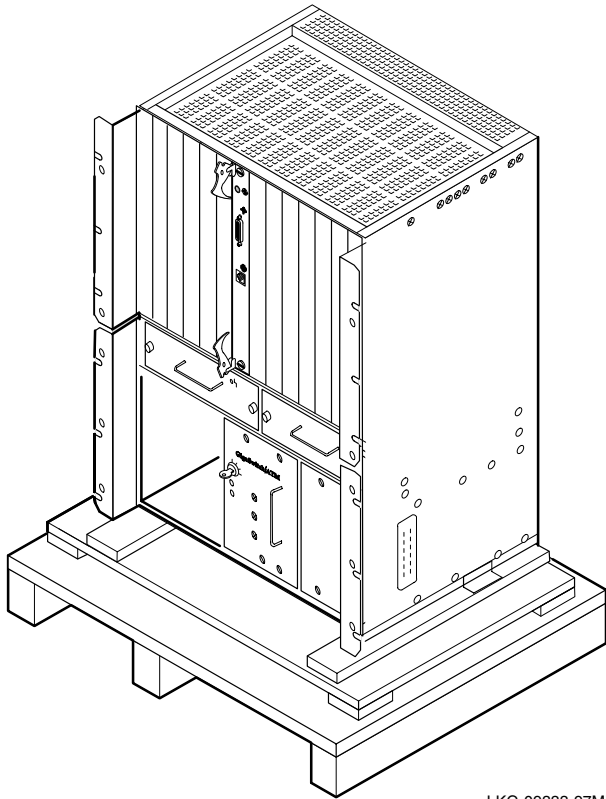
Step	Action
1	Locate the banding (1) and the shipping container (2).
2	Cut the banding (1) from the shipping container and the pallet using a band cutter.
3	Use two people to slide the shipping container (2) up and off the GIGAswitch/ATM system.
4	Remove the packing material.
5	Remove the shipping bag from the system.

## Unpacking the System

### Identifying the Parts of the Shipping Container

**Figure 2-3** shows the contents of the shipping container. The following table lists the contents.

**Figure 2-3: Contents of the Shipping Container**



LKG-09333-97MF

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

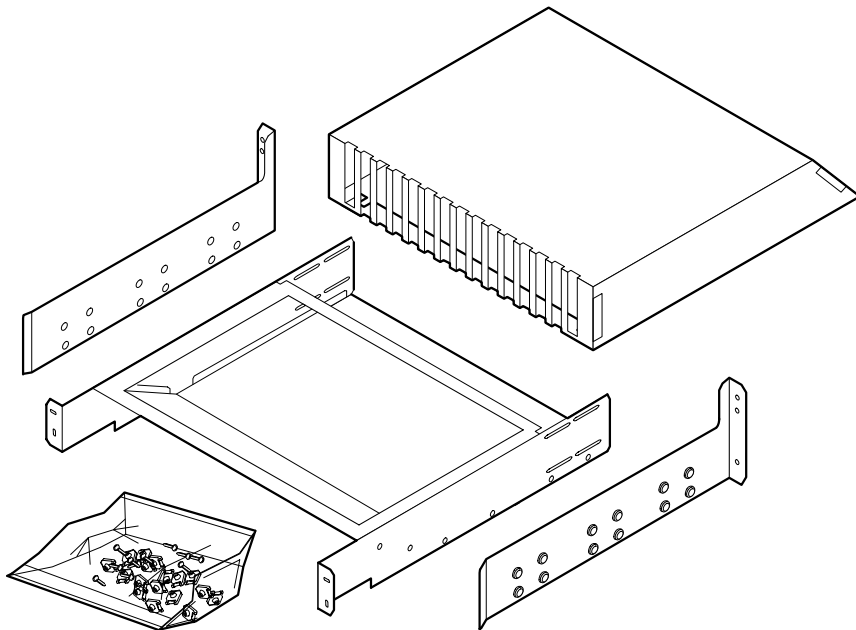
## Options

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

## Contents of the Rack Mount Kit

Figure 2-4 shows the contents of the rack mount kit. The following table lists the part numbers, names, and descriptions of the components.

Figure 2-4: Contents of the Rack Mount Kit



LKG-09335-97MI

Part Number	Name	Function
74-45687-01	Upper plenum	Directs air flow 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 exhausted from the fans in the system to the back 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 of the rack for clip nuts.

## Testing the System Modules

### Tasks

Install the front end unit (refer to [Installing the FEU on page 3-8](#)) before testing the system modules. Testing the system modules involves the following tasks:

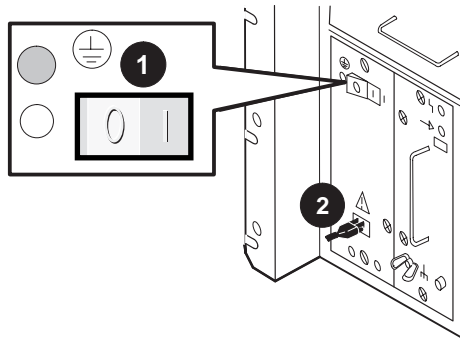
Task	Action
1	<a href="#">Applying Power to the System</a>
2	<a href="#">Evaluating the Results of the MST</a>

These tasks should take about 5 minutes.

## Applying Power to the System

Refer to **Figure 2-5** and complete the following steps to apply power to the system.

**Figure 2-5: Applying Power**



LKG-10771-98WI

Step	Action
1	Locate the power switch (1), power cord, and the power connector (2). (Note that 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), then into the connector for the primary power source.
4	Place the power switch (1) in the 1 (ON) position.

## Testing the System Modules

### Evaluating the Results of the MST

Observe the operational status of the GIGAswitch/ATM system after the power-on module self-test (MST) is complete.

If	Then, Refer to
One or more of the following conditions exist	<a href="#">Chapter 6.</a>
None of the following conditions exist	<a href="#">Removing Power from the System on page 2-11.</a>
<p><b>Conditions:</b></p> <ul style="list-style-type: none"><li>• One or more of the LEDs on the system remains solid amber or solid red.</li><li>• None of the LEDs light.</li><li>• The fan tray LED is off and the power supply LEDs remain solid green.</li></ul>	

## Removing Power from the System

Refer to [Figure 2-6](#) and complete the following steps to remove power from the system.

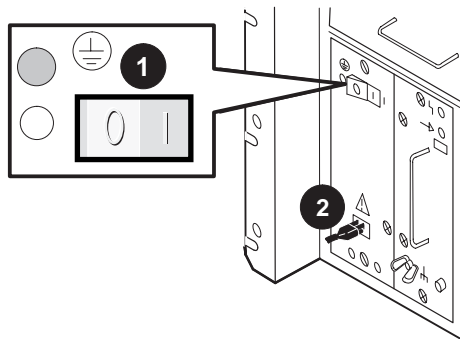
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### CAUTION

Do not remove the power cord or the front-end unit until after removing all the logic modules. The power cord provides the ground required for electrostatic discharge protection.

---

**Figure 2-6: Removing Power**



LKG-10771-98WI

Step	Action
1	Locate the power switch (1) and the power connector (2).
2	Place the power switch (1) in the 0 (OFF) position.
3	Repeat steps 1 and 2 for alternate power supplies (if installed).



## Preparing the Rack

### Tasks

Preparing the rack involves the following tasks:

Task	Action
1	<b>Installing the Clip Nuts</b>
2	<b>Installing the Lower Plenum</b>

These tasks should take about 30 minutes and require the following tools:

- Number 2 cross-point screw driver
- Pencil
- Tape measure

### Installing the Clip Nuts

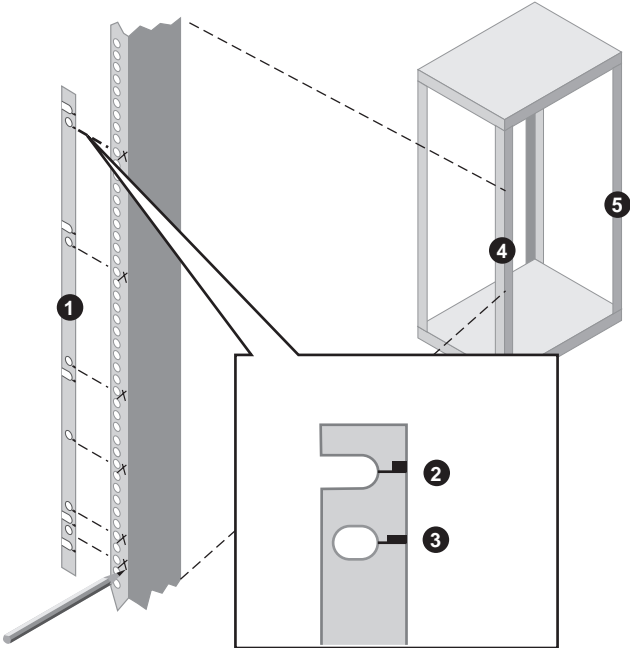
Installing the clip nuts involves the following tasks:

Task	Action
1	<b>Marking the Positions for the Clip Nuts</b>
2	<b>Attaching the Clip Nuts</b>

**Marking the Positions for the Clip Nuts**

Refer to **Figure 2-7** and complete the following steps to mark the positions for the clip nuts.

**Figure 2-7: Marking Positions for Clip Nuts**



LKG-10776-98WI

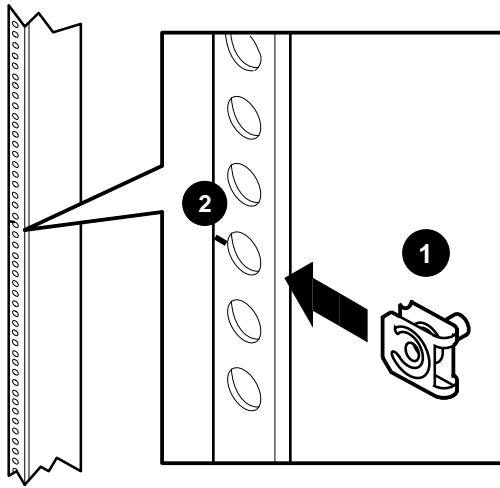
## Preparing the Rack

Step	Action
1	Locate the template (1) and distinguish between the metric markings (2) and the Radio Electronics Television Manufacturer's Association (RETMA) markings (3).
2	Locate the front rails (4) and the back 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: <ul style="list-style-type: none"><li>• Metric markings (2) (open slot) for metric racks</li><li>• RETMA markings (3) (closed slot) for RETMA racks</li></ul> 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 back rail (5).
8	Mark the position on the inside of the back rail (5) for the clip nut associated with the lower plenum bracket.
9	Repeat steps 7 and 8 for the other back rail.

## Attaching the Clip Nuts

Refer to **Figure 2-8** and complete the following steps to attach the clip nuts.

**Figure 2-8: Attaching the Clip Nuts**



LJ-5138.A14

Step	Action
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.
3	Press each clip nut onto the marked hole (2).
4	Repeat steps 2 and 3 for the left front rail.
5	Place the clip nuts over the marked holes on the right back rail of the rack. Orient each clip nut (1) so the screw can be installed from the front of the rack.
6	Press each clip nut onto the marked hole (2).
7	Repeat steps 5 and 6 for the left back rail.

## Preparing the Rack

### Installing the Lower Plenum

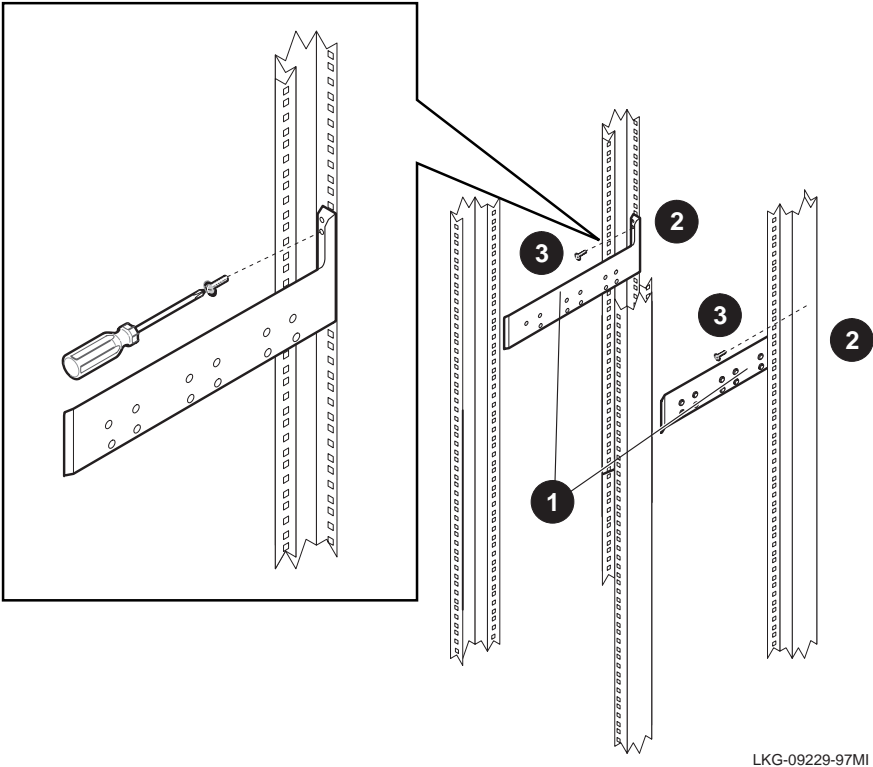
Installing the lower plenum involves the following tasks:

Step	Action
1	<a href="#">Attaching the Lower Plenum Bracket</a>
2	<a href="#">Attaching the Lower Plenum</a>

#### Attaching the Lower Plenum Bracket

Refer to [Figure 2-9](#) and complete the following steps to attach the lower plenum bracket to the back rails of the rack.

Figure 2-9: Attaching the Lower Plenum Bracket



LKG-09229-97MI

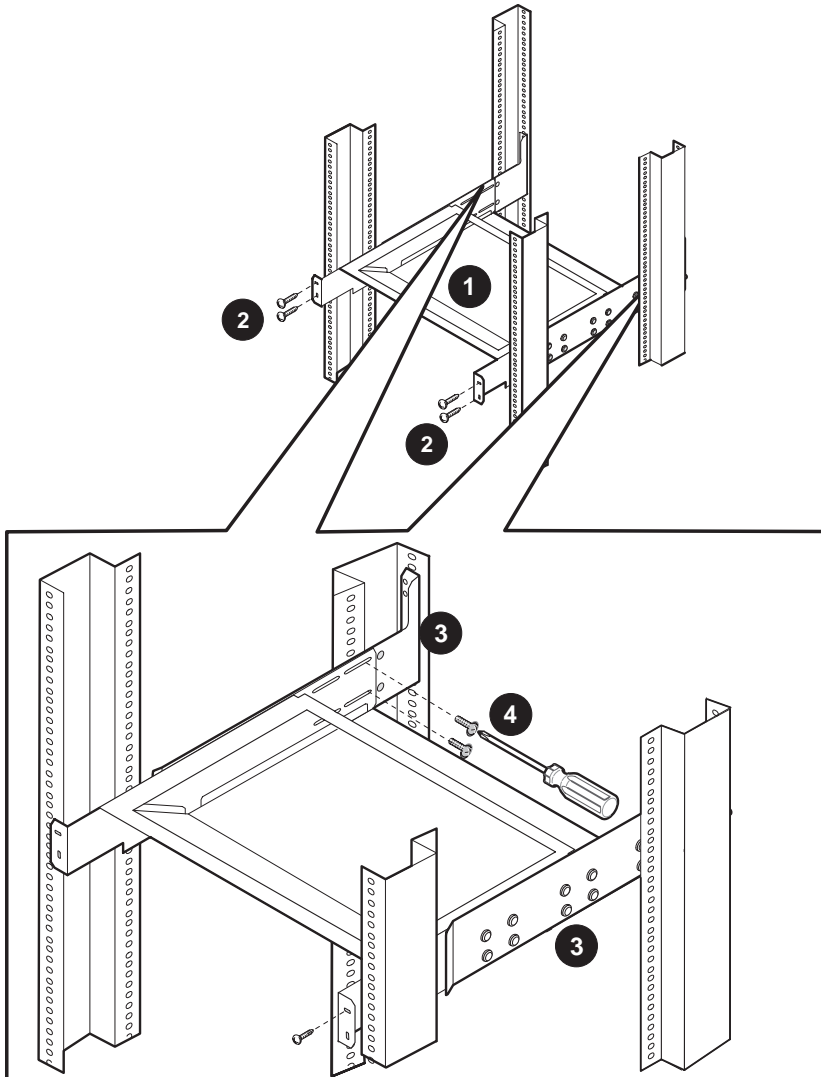
Step	Action
1	Locate the hole and the attached pin on the back of the lower plenum brackets (1), the back rails (2), the two screws (3) used to attach the lower plenum brackets to the back rails of the rack, and the clip nuts (not shown) on the back rails of the rack.
2	Align the hole and the attached pin of the right lower plenum bracket with the corresponding clip nut and hole on the inside of the back rail (2).
3	Insert the pin of the right lower plenum bracket into the corresponding hole in the rack.
4	Attach the right lower plenum bracket to the right back rail. Install one screw (3) using a number 2 cross-point screwdriver.
5	Repeat steps 2, 3, and 4 for the left lower plenum bracket.

## Preparing the Rack

### Attaching the Lower Plenum

Refer to [Figure 2-9](#) and complete the following steps to attach the lower plenum.

**Figure 2-10: Attaching the Lower Plenum**



LKG-09322-97MI

## Preparing the Rack

Step	Action
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) that are 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.
4	Install the four screws (2) using a number 2 cross-point screwdriver.
5	Attach the lower plenum (1) to the right plenum bracket.
6	Install the two screws (4) using a number 2 cross-point screwdriver.
7	Repeat steps 5 and 6 for the left plenum bracket.



## Setting Up ESD Protection

### ESD Equipment

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#### CAUTION

Static electricity can damage modules and electronic components. DIGITAL recommends using a grounded antistatic wrist strap and a grounded work surface when handling any modules.

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Protect the logic modules from damage caused by electrostatic discharge (ESD) by using the following equipment:

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

The Portable Static-Dissipative Field Service Kit (Part Number 29-26246) is used to protect ESD-sensitive modules from damage.

### Using ESD Equipment

Complete the following steps to set up and maintain a static-free area:

Step	Action
1	Ground the unit. The unit is grounded through the power cord when the power cord is connected to the unit and to 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 and to an unpainted surface on the unit.
4	Wear the ESD wrist strap and attach it to the ground cord assembly.

---

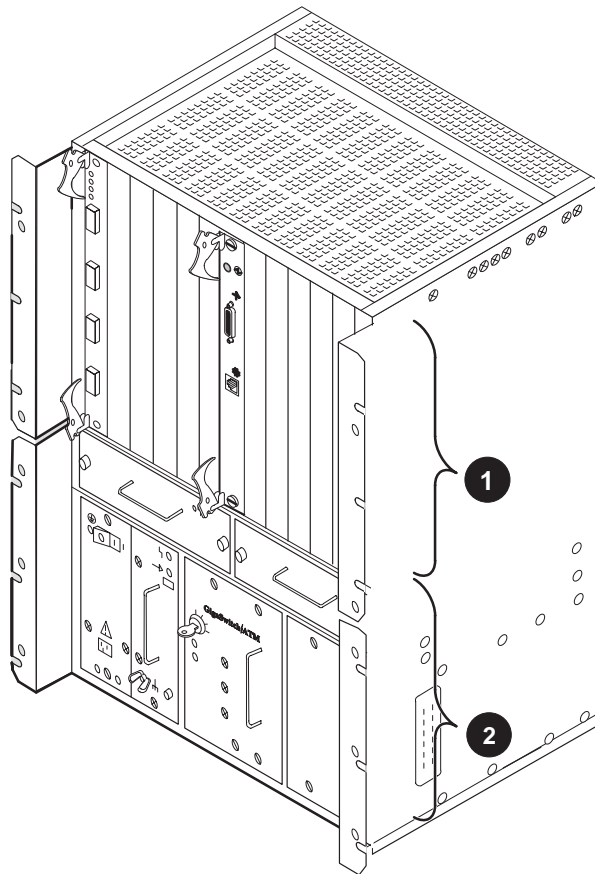
---

## Removing the System Modules

### System Modules

The system contains logic modules as well as cooling and power modules. (See [Figure 2-11](#) and its associated table.)

**Figure 2-11: System Modules**



LKG-09221-98WF

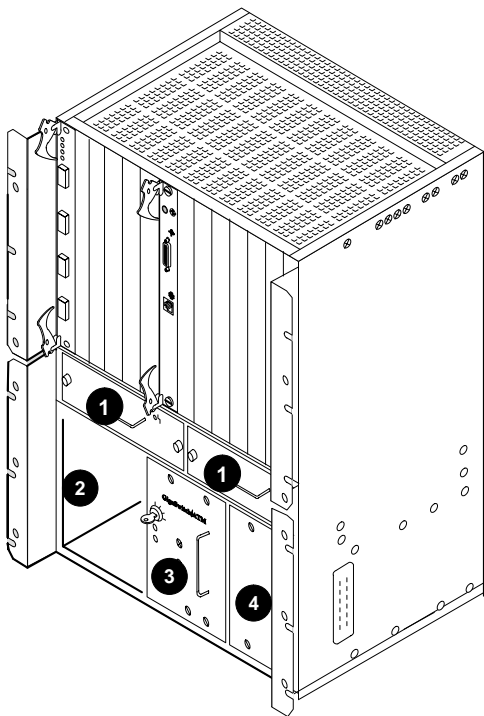
Item	Description
1	Logic modules
2	Cooling and power modules

## Removing the System Modules

### Removing Cooling and Power Modules

**Figure 2-12** and its associated table describe the cooling and power modules.

**Figure 2-12: Cooling and Power Modules**



LKG-09223-97MI

Item	Name	Description
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	Provides monitoring and control of the cooling and power systems.
4	Slot for backup FEU	Same a FEU.

## Tasks

Removing the cooling and power modules involves the following tasks:

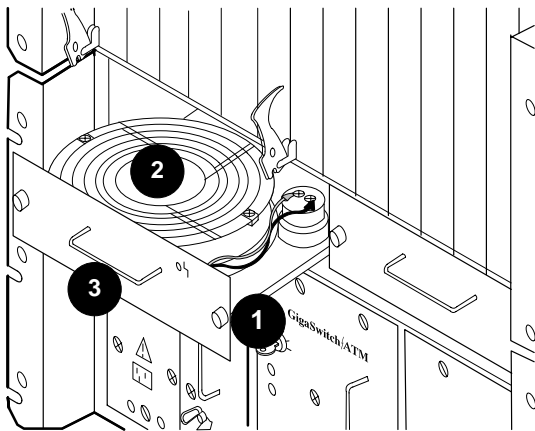
Task	Action
1	<a href="#">Removing the Fan Tray Assembly</a> <a href="#">Removing the Fan Tray Assembly</a>
2	<a href="#">Removing the FEU</a>

## Removing the System Modules

### Removing the Fan Tray Assembly

Refer to [Figure 2-13](#) and complete the following steps to remove the fan tray assembly.

**Figure 2-13: Fan Tray Assembly**



LKG-10772-98WI

Step	Action
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.

## Removing the FEU

Refer to [Figure 2-14](#) and complete the following steps to remove the FEU. The removal of the FEU requires the use of a number 2 cross-point screw driver.

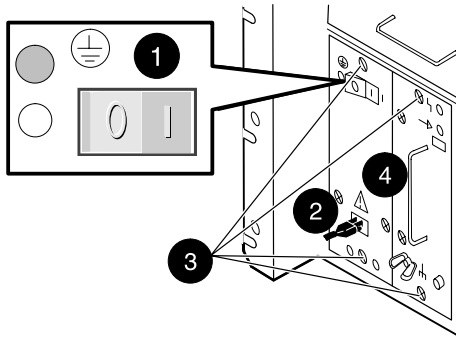
---

### CAUTION

Do not remove the power cord or the front-end unit until after removing all the logic modules. The power cord provides the ground required for electrostatic discharge protection.

---

**Figure 2-14: Removing the FEU**



LKG-10773-98WI

Step	Action
1	Locate the power switch (1), the power cord (2), and the four screws (3) that fasten the selected module to the system, and the handle (4) of the selected module.
2	Place the power switch (1) into the 0 (OFF) position.
3	Remove the power cord (2) from the primary power outlet and the power connector.
4	Remove the four screws (3) from the module using a number 2 cross-point screw driver.
5	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.
6	Repeat steps 1 through 5 to remove the other module (if installed).



## Chapter 3

---

# Installing the GIGAswitch/ATM System

---

## Overview

### Introduction

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

---

#### NOTE

Complete the procedures described in [Chapter 2](#) before proceeding with this chapter.

---

## In This Chapter

Topic	Page
<a href="#">Installing the GIGAswitch/ATM System into the Rack</a>	<a href="#">3-2</a>
<a href="#">Attaching the Upper Plenum</a>	<a href="#">3-6</a>
<a href="#">Installing the System Modules</a>	<a href="#">3-7</a>

---



## Installing the GIGAswitch/ATM System into the Rack

Installing the GIGAswitch/ATM system into the rack involves the following tasks:

Step	Action
1	<a href="#">Removing the GIGAswitch/ATM System from the Pallet</a>
2	<a href="#">Placing the GIGAswitch/ATM System onto the Lower Plenum</a>
3	<a href="#">Attaching the GIGAswitch/ATM System to the Rack</a>

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

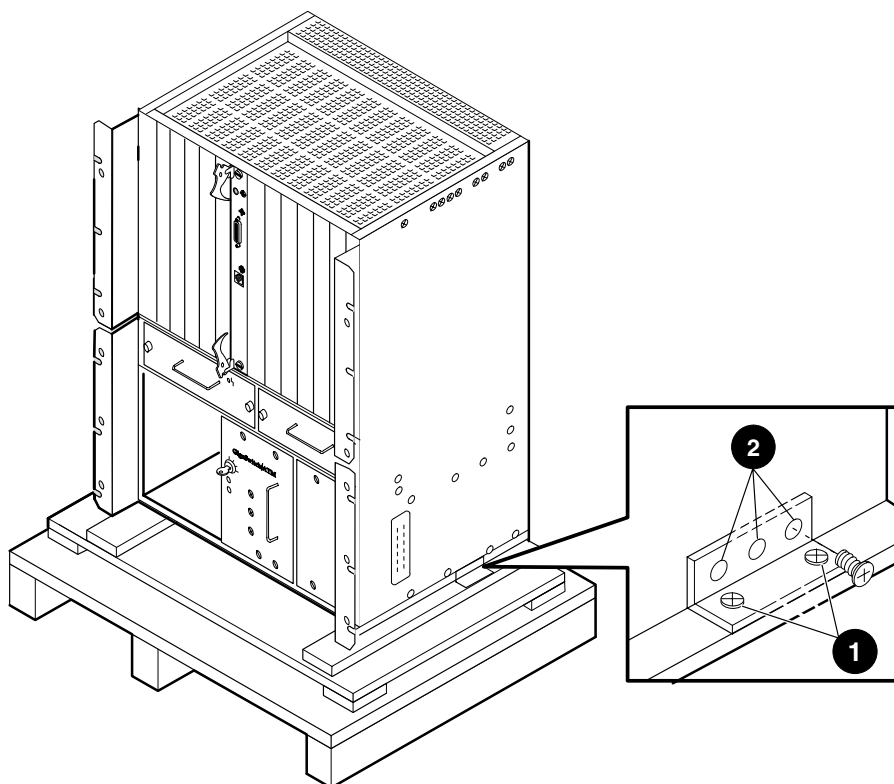
- Adjustable wrench
- Number 2 cross-point screwdriver
- ESD equipment

### Removing the GIGAswitch/ATM System from the Pallet

Refer to [Figure 3-1](#) and complete the following steps to remove the GIGAswitch/ATM system from the pallet.

## Installing the GIGAswitch/ATM System into the Rack

Figure 3-1: Removing the System from the Pallet



LKG-09329-97MI

Step	Action
1	Locate the four screws (1) (two on each side) that attach the brackets to the pallet, and the six screws (2) (three on each side) that attach the brackets to the GIGAswitch/ATM system.
2	Using the adjustable wrench, loosen the four screws (1) that attach the brackets to the pallet.
3	Using the adjustable wrench, remove the six screws (2) that attach the brackets to the GIGAswitch/ATM system.

## Installing the GIGAswitch/ATM System into the Rack

### Placing the GIGAswitch/ATM System onto the Lower Plenum

Refer to [Figure 3-2](#) and complete the following steps to place the GIGAswitch/ATM system onto the lower plenum.

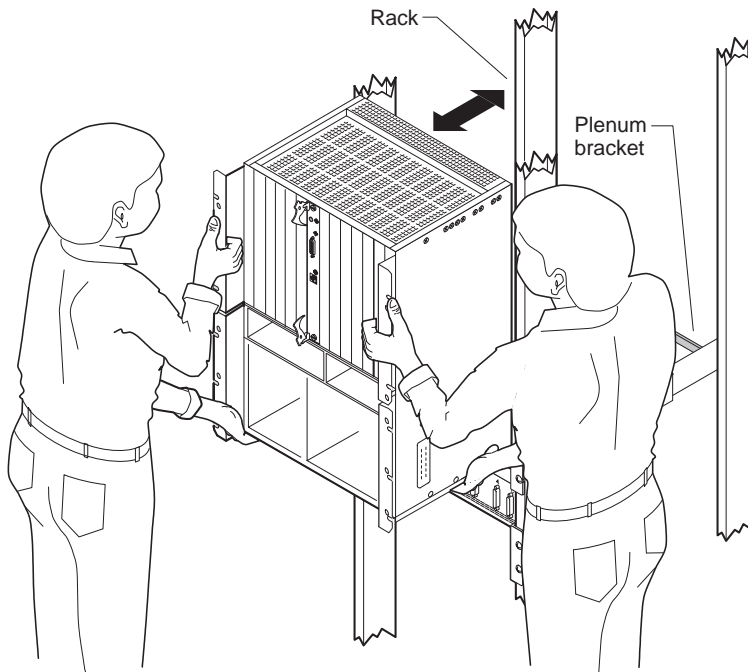
---

#### WARNING

Remove modules from the unit before lifting. The empty GIGAswitch/ATM unit weighs 500 kg (110 lb). Use two people to lift the unit.

---

**Figure 3-2: Placing the System onto the Lower Plenum**



LKG-09327-97MI

Step	Action
1	Using two people, lift the empty GIGAswitch/ATM system to the height of the lower plenum in the rack.
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.

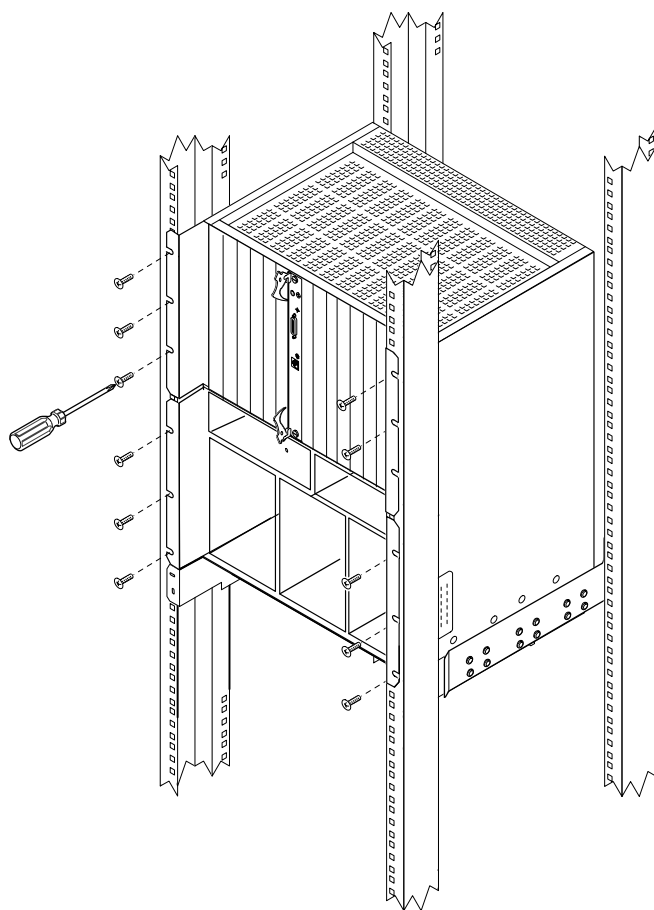
---

## Installing the GIGAswitch/ATM System into the Rack

### Attaching the GIGAswitch/ATM System to the Rack

Refer to [Figure 3-3](#) and complete the following steps to attach the GIGAswitch/ATM system to the rack.

**Figure 3-3: Attaching the System to the Rack**



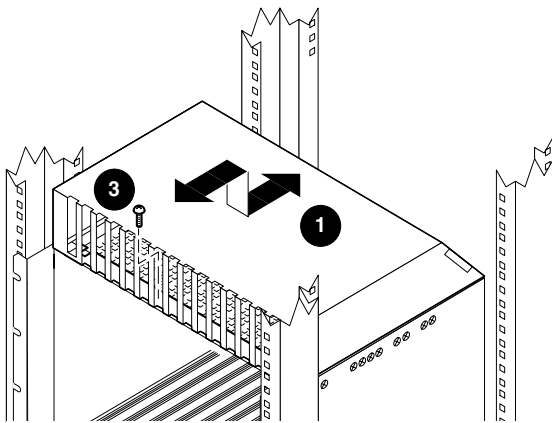
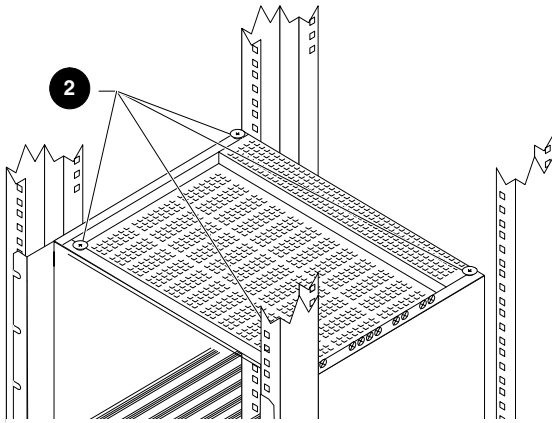
LKG-09328-97MI

Step	Action
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 the screwdriver.

## Attaching the Upper Plenum

Refer to [Figure 3-4](#) and complete the following steps to attach the upper plenum to the GIGAswitch/ATM system.

**Figure 3-4: Attaching the Upper Plenum**



LKG-09732-97MI

Step	Action
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.
3	Slide the upper plenum in until it catches under the four screws (2).
4	Install the mounting screw (3) to attach the upper plenum (1) to the GIGAswitch/ATM system using a number 2 cross-point screwdriver.

---

## Installing the System Modules

Installing the system modules involves the following tasks and requires a number 2 cross-point screwdriver:

Step	Action
1	<a href="#">Installing the FEU</a>
2	<a href="#">Installing the Fan Tray Assemblies</a>

---

### CAUTION

Install the front-end unit and connect the power cord before installing the logic modules. The power cord provides the ground required for electrostatic discharge protection.

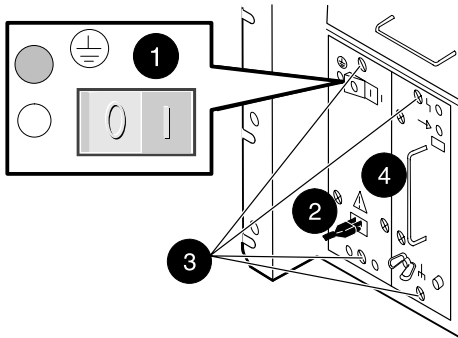
---

## Installing the System Modules

### Installing the FEU

Refer to **Figure 3-5** and complete the following steps to install the FEU.

**Figure 3-5: Installing the FEU**



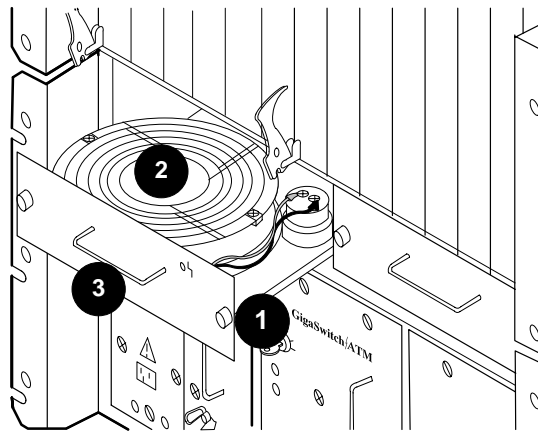
LKG-10773-98WI

Step	Action
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.

## Installing the Fan Tray Assemblies

Refer to [Figure 3-6](#) and complete the following steps to install the fan tray assemblies.

**Figure 3-6: Installing the Fan Tray Assemblies**



LKG-10772-98WI

Step	Action
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 (2) (LED to the upper right of the handle) with the module guides of the slot designated for the 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 to 4 to install the other fan tray assembly.





---

## Part 2

# Configuration and Testing

---

Part 2 contains information for configuring and testing the GIGAswitch/ATM system. Part 2 contains the following chapters:

Chapter	Description
<a href="#">4</a>	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.
<a href="#">5</a>	Describes the clock management module (CMM) commands.
<a href="#">6</a>	Describes the procedures for initiating the module self-tests (MSTs) and provides instructions for evaluating the results of the MSTs.
<a href="#">7</a>	Describes the procedures for upgrading the firmware.

---



## Chapter 4

---

# Preparing to Configure the System

---

## Overview

### Introduction

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

### In This Chapter

Topic	Page
<a href="#">Setting Up the Hardware</a>	<a href="#">4-3</a>
<a href="#">Setting Up the Hardware for SLIP Access</a>	<a href="#">4-6</a>
<a href="#">Setting Up Servers</a>	<a href="#">4-8</a>
<a href="#">Setting Up the SLIP Interface</a>	<a href="#">4-15</a>
<a href="#">Setting Up Security and Password Protection</a>	<a href="#">4-17</a>
<a href="#">Setting Up the OBM Session</a>	<a href="#">4-20</a>
<a href="#">Gathering Information for Configuration</a>	<a href="#">4-22</a>

### OBM Interface

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.

## Bootp Server

If you have firmware Version 2.0 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.

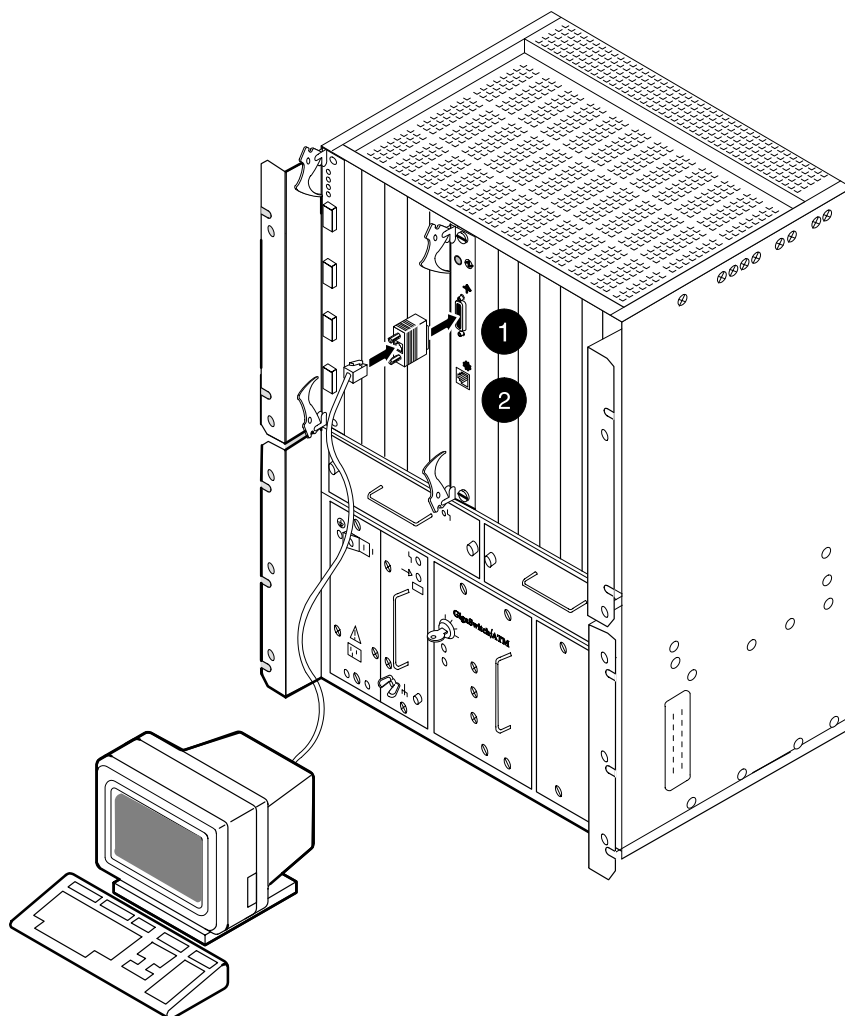
---

## Setting Up the Hardware

### References

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](#) or [Table 4-2](#) to set up the hardware for either asynchronous or remote OBM access.

**Figure 4-1: Setting Up the Hardware for Asynchronous Access**



LKG-09326-9MI

## Setting Up the Hardware

**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 <i>DIGITAL GIGAswitch/ATM System Management</i> ).
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	Comments
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)  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.)

## Setting Up the Hardware

Step	Action	Comments
4	Set up the Ethernet and IP addresses with or without the bootp server.	<p>If you have a bootp server, set up the bootp server with the Ethernet address and assigned IP address from <a href="#">Step 3</a> and <a href="#">Step 4</a>. 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. <a href="#">Bootp Server on page 4-2</a> 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 <a href="#">Table 4-1</a> and set the IP address from <a href="#">Step 4</a> of this table using OBM. Once the IP address is set, you have remote OBM access and you can use the ping command.</p> <p>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.</p>
5	<p>Type Telnet IP address 5000 at the operating system prompt, where IP address is the IP address from <a href="#">Step 4</a>.</p> <p>or</p> <p>Type telnet IP address at the operating system prompt, where IP address is the IP address from <a href="#">Step 4</a>. Type obm at the console prompt (GIGAswitch/ATM-&gt;).</p>	<p>OBM displays the announcement message.</p>



---

## Setting Up the Hardware for SLIP Access

### References

Refer to [Chapter 3](#) for information about installing the GIGAswitch/ATM system. Refer to [Figure 4-1](#) and complete the following steps described in [Table 4-3](#) to set up the hardware for serial line IP (SLIP) access.

**Table 4-3: Setting Up Hardware for SLIP Access**

Step	Action	Comments
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.	The CMM responds with the CLK> prompt.
3	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.	The switch asks, "Commit IP address to nonvolatile storage, y or n? (n):"
6	Enter y.	
7	Configure the SLIP interface on the host system.	Consult the host system documentation for information about configuring the SLIP interface. (Refer to <a href="#">Setting Up the SLIP Interface on page 4-15</a> for an example of the setup on a DIGITAL UNIX system.)
8	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.

## Setting Up the Hardware for SLIP Access

Step	Action	Comments
9	Press the Break key on the terminal.	CMM enters local mode.
10	Enter SL at the CLK> prompt.	The SLIP mode is stored in nonvolatile RAM and enters SLIP mode automatically on powerup. 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.
11	Disconnect the terminal from the CMM console port and connect it to the serial communication port on the host system.	
12	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).	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).

## Setting Up Servers

### Bootp and tftp 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.

This section describes the following tasks:

Task	Page
<a href="#">Setting Up the tftp Server</a>	<a href="#">4-8</a>
<a href="#">Setting Up the bootp Server</a>	<a href="#">4-12</a>

### Setting Up the tftp Server

This section describes the procedure for setting up tftp locally on your DIGITAL UNIX system. To set up tftp locally, complete the following steps:

Step	Action	Comments
1	Log in as <code>root</code> or <code>superuser</code> .	
2	Go to the root directory using the <code>cd /</code> command and create the <code>tftpboot</code> directory using the <code>mkdir</code> command.	
3	Copy the image files to the <code>/tftpboot</code> directory on your server using the <code>cp</code> command.	These are the same files created by the <code>tar</code> command described in <a href="#">Copying the Firmware on page 7-2</a> . Make sure that these files have the correct permission (world has read access) using the <code>ls -l</code> command. If you need to change the permission, use the <code>chmod</code> command.

Step	Action	Comments
4	In the same directory, create a control file named AN3_VERxx, where xx is the version number for your firmware (for example, V2.7 would be 27).	The control file contains the lines described in the following section.

**Control File Contents**

The control file contains the following lines:

```
000250F0B/tftpboot/LC15V27.BIN
LC15V27.ROM
QLC15 2 LC15V27.ROM LC15V27.BIN
QLCV2 LC20V27.ROM LC20V27.BIN
```

Table 4-4 identifies the location of the fields in the control file.

**Table 4-4: Location of Fields in 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- <i>n</i>	Application Image Filespec for 4-port 155 Mb/s line card
2	1- <i>n</i>	Kernel Image Filespec for 4-port 155 Mb/s line card
3- <i>n</i>		Three fields on each line separated by spaces indicate the hardware type, the ROM file name, and the application file name

## Setting Up Servers

### Descriptions

- 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, 270 would be specified as 000270. 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 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 loads the application only 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.

## Setting Up Servers

- 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	LC15V27.ROM	LC15V27.BIN
QLCV2	LC20V27.ROM	LC20V27.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 2.7 are:

File	Description
AN3_VER27	Load control file
LC15V27.ROM	Kernel image for 4-port 155 Mb/s line card
LC15V27.BIN	Application image for 4-port 155 Mb/s line card
LC20V27.ROM	Kernel image for 4-port modular line card
LC20V27.BIN	Application image for 4-port modular line card

## Setting Up Servers

### Setting Up the bootp Server

This section describes the procedure for setting up a DIGITAL UNIX system as the bootp server. To set this up, complete the following steps:

**Table 4-5: Setting Up the bootp Server**

Step	Action
1	Log in as root or superuser.
2	Verify that the following lines are in the <code>/etc/inetd.conf</code> file using the <code>more</code> command: <pre>bootps dgram udp wait root /usr/sbin/bootpd bootpd -d tftp dgram udp wait root /usr/sbin/tftpd tftpd -r /tftpboot</pre> <ul style="list-style-type: none"><li>• If these lines exist, proceed to <a href="#">Step 4</a>.</li><li>• 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 <code>inetd</code> process by completing the procedures in <a href="#">Step 3</a>.</li></ul>
3	<p><b>a)</b> Determine the process ID (PID) of the <code>inetd</code> process using the <code>ps -aux   grep inetd</code> command.</p> <p><b>b)</b> Stop the <code>inetd</code> process using the <code>kill -9 pid</code> command, where <code>pid</code> is the PID from the preceding command.</p> <p><b>c)</b> Restart the <code>inetd</code> process using the <code>/usr/sbin/inetd &amp;</code> command.</p>

Note: 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

Step	Action
4	<p>Check the firmware upgrade documentation for the name and location of the firmware image and any release information used for setting up this file.</p> <p>Set up the <code>/etc/bootptab</code> file to include the information for the GIGAswitch/ATM system in the following format:</p> <pre>node:ht=hw-type:ha=hw-addr:ip=ip-addr:sm=subnet-mask:gw=gw-addr:hd=home-dir:bf=boot-file</pre> <p>Where:</p> <ul style="list-style-type: none"> <li>• <code>node</code> is the unique node name of the GIGAswitch/ATM system.</li> <li>• <code>hw-type</code> is the hardware type. For Ethernet, the value is 1.</li> <li>• <code>hw-addr</code> is the hardware address (MAC or Ethernet address) for the switch.</li> <li>• <code>ip-addr</code> is the IP address for the switch.</li> <li>• <code>subnet-mask</code> 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.</li> <li>• <code>gw-addr</code> is the default gateway address. This optional field is used as the inet address of the default router if specified.</li> <li>• <code>home-dir</code> is the home directory of the boot file.</li> <li>• <code>boot-file</code> is the name of the boot file that points to the binary image of the firmware.</li> </ul> <p>Make sure the home directory reflects the tftp path and directory specified in the <code>/etc/inetd.conf</code> file. The home directory is found on the local host. For example, a switch node named <code>an23</code> with Ethernet address 08-00-2B-12-34-56 and IP address 16.20.111.222 would have the following entry in the <code>/etc/bootptab</code> file:</p> <pre>an23:ht=1:ha=08002B123456:ip=16.20.111.222:hd=/tftpboot:bf=AN3_VER27</pre> <p>The control file is located in the <code>/tftpboot</code> 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.</p>
5	<p>Verify that the <code>/tftpboot</code> directory exists. If it does not exist, follow the instructions in <a href="#">Setting Up the tftp Server on page 4-8</a>. Verify that the directory specified by the boot file is <code>/tftpboot</code> and that the specified control file exists in this directory.</p>
6	<p>Modify the local <code>/etc/hosts</code> file to include the workstation and GIGAswitch/ATM system information for the switch. For example, the <code>/etc/hosts</code> file might list the GIGAswitch/ATM system as follows:</p>

```
Inet Address      Host Name      Full inet name      Comments
16.17.18.19      an29           an21c10.nac.lkg.dec.com # GIGAswitch/ATM system
```



## Setting Up Servers

Step	Action
7	<p>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 <code>/usr/adm/syslog.dated</code> using the <code>ls</code> command. Determine if there is a <code>demon.log</code> file in the directory with the latest time-stamp using the <code>ls /usr/adm/syslog.dated/latest-date</code> command, where <code>latest-date</code> is the directory with the latest time-stamp from the preceding command. If there is a <code>daemon.log</code> file, then you can verify that the bootp requests are coming from the target GIGAswitch/ATM system by using the <code>tail -f /usr/adm/syslog.dated/latest-date/daemon.log</code> command.</p>
8	<p>Confirm that the host address in the <code>/etc/hosts</code> 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:</p> <pre>#ping ip-addr #ping node-name</pre> <p>where <code>ip-addr</code> is the IP address and <code>node-name</code> is the node name of the GIGAswitch/ATM system. Use the <code>&lt;Ctrl/C&gt;</code> key sequence to end the display.</p>
9	<p>Create a remote connection to the console for the GIGAswitch/ATM system using the following command:</p> <pre>#telnet node-name</pre> <p>where <code>node-name</code> is the node name for the GIGAswitch/ATM system. Your host must be on the network. The <code>help</code> command displays information about available console commands. Use the <code>logout</code> command to end the remote connection. Display network information, such as IP addresses, by executing the <code>ifshow</code> command. To identify the host that serviced the last request, execute the <code>hostshow</code> command. Refer to <i>DIGITAL GIGAswitch/ATM System Management</i> for more information about some useful console commands.</p>

---

You can now set up the OBM session.

---

## Setting Up the SLIP Interface

### Introduction

You can set up the SLIP interface for the GIGAswitch/ATM system using the OBM menus.

### Example Procedure

The following example procedure describes the setup for Alpha systems running the DIGITAL UNIX operating system. This procedure configures two `sl` devices.

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.

---

**Table 4-6: Setting Up the SLIP Interface**

Step	Action	Comments
1	Enter the following command to configure two <code>sl</code> devices: <pre>pseudo-device    sl    2</pre>	The <code>sl</code> device must be listed in the <code>/sys/conf/HOSTNAME</code> configuration file.
2	Using the following format, enter the host information into the <code>/etc/hosts</code> file for both the local and remote nodes of the SLIP connection to facilitate subsequent setup procedures: <pre>16.24.96.100 localhost_sl 16.24.96.101 remotehost_sl</pre>	The <code>_sl</code> piece is optional, but it helps differentiate this interface as a SLIP port. Be sure that there is not an IP address or subnet conflict with existing interfaces on the system ( <code>ln0</code> , <code>fta0</code> , and so forth).

## Setting Up the SLIP Interface

Step	Action	Comments
3	Configure the SLIP interface using the <code>ifconfig</code> command as follows: <pre>ifconfig s10 localhost_sl remotehost_sl netmask 255.255.255.0 up</pre>	Substitute the dot notation IP address if you did not add this information to the <code>hosts</code> file.
4	Assign a serial line to the network interface. <pre>slattach tty00</pre>	The <code>tty</code> 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 <code>ifconfig</code> command. In this case, <code>s10</code> is chosen. You can omit the full path because the command defaults to <code>/dev</code> for the <code>tty</code> . You can use the third parameter to specify the baud rate. The default is 9600.
5	In this case, you would enter one of the following: <pre># telnet remotehost_sl # telnet 16.24.96.101</pre>	Accessing the remote system over the SLIP connection is the same as connecting to a system over the network.

## Setting Up Security and Password Protection

### Introduction

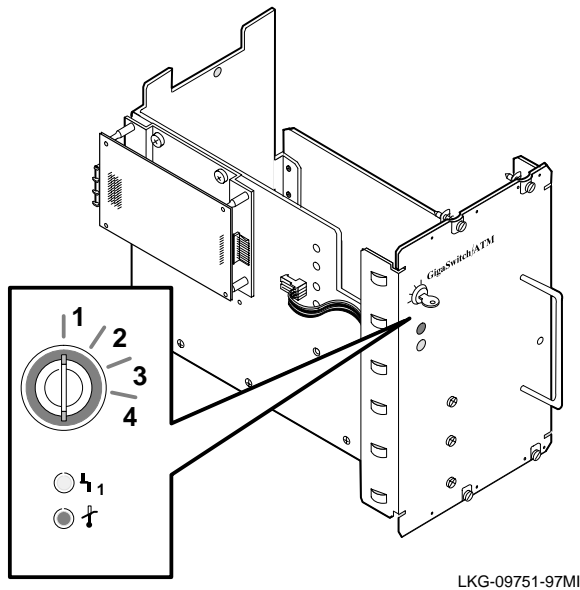
The security keyswitch controls the ability to secure your system and provide password protection using in-band management commands issued from any GIGAswitch/ATM system management station or out-of-band management (OBM) commands issued through the terminal or modem interface for the GIGAswitch/ATM system.

### Security Switch

**Figure 4-2** and the corresponding table identifies the security switch, and describe its positions.

## Setting Up Security and Password Protection

**Figure 4-2: Security Keyswitch**



If The Keyswitch is Set to Position	Then, Security is
1	Enabled: <ul style="list-style-type: none"><li>• Switch security and password protection are enabled.</li><li>• Telnet and SLIP access are enabled.</li><li>• The OBM utility can be invoked by default using the Telnet or console ports.</li><li>• Telnet access using port 5000 is not supported.</li><li>• Telnet access to slave line cards is not supported.</li></ul>
2, 3, or 4	Disabled <ul style="list-style-type: none"><li>• Switch security and password protection are disabled.</li><li>• SLIP access is disabled.</li><li>• Telnet access using port 5000 is supported.</li></ul>

## Setting Up Security and Password Protection

---

### NOTE

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

---

## Password Protection

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	managename

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.

## Setting Up the OBM Session

### Introduction

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

### Connecting the OBM Agent

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 [Setting Up Security and Password Protection on page 4-17](#) 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](#).

## Setting Up the OBM Session

After entering the obm console command, the OBM agent prints out the following message.

```
+=====+
          DIGITAL GIGAswitch/ATM Switch
                Out-of-Band Management
                      Interface
                          Appl Vers: V2.7
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:
```



## Gathering Information for Configuration

### Introduction

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 permanent virtual circuits (PVCs) on your hosts.

### PVC Configuration Worksheet

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.

Gathering Information for Configuration

**Table 4-7: PVC Configuration Worksheet**

Host Name	Port #	Slot #	VCI	Host Name	Port #	Slot #	VCI

Gathering Information for Configuration

Host Name	Port #	Slot #	VCI	Host Name	Port #	Slot #	VCI

## Chapter 5

---

# Using CMM Commands

---

### Overview

This chapter describes the clock management module (CMM) local mode commands:

Command	Meaning
^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.

---

You use these commands by connecting a terminal to the CMM.

## Obtaining Information About CMM Commands

### Powering On

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>
```

Press the Return key after each command.

The H command displays the Clock Management Module Console Port Help screen.

```
CLK>H
```

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

```
    Copyright (c) 1998 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>
```

### 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.

---

## Using SLIP Mode

### Introduction

This section explains how to enter and leave SLIP mode if your hardware has been set up for SLIP access. Refer to [Setting Up the Hardware for SLIP Access on page 4-6](#) for more information about setting up SLIP support.

### Entering SLIP Mode

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

```
CLK>SL
```

If the IP addresses for SLIP have not been configured as described in [Setting Up the Hardware for SLIP Access on page 4-6](#), the CMM stays in local mode and displays the `CLK>` prompt.

### Leaving SLIP Mode

To leave SLIP mode, complete the following steps:

Step	Action
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 <code>CLK&gt;</code> prompt.
4	At the <code>CLK&gt;</code> prompt, you can execute any of the local mode commands.

## Displaying Information

### Displaying the Ethernet Address

The A command displays the Ethernet address 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
```

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

CLK>
```

The asterisk (\*) indicates the current master line card.

## 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: 2.7
    HW Revision: B.3
Cabinet temperature: normal
Fan status: normal
CLK>
```

## Displaying Time

The T command displays the time.

```
CLK>T
Current = WED 06/01/98 16:40:17. Change to >
CLK>
```

The new date and time must match the displayed format (DDD mm/dd/yy HH:MM:SS). If it does not, the system displays an error message about illegal input of the date and time.

## 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
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>
```



## Using the Error Logs

### 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 06/01/98 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.

### 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.

---

## Modifying Settings

### 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.

### Modifying Switch Settings

The `DE` command is used to modify the following switch settings:

- Line card startup mode
- Console output mode
- Console baud rate
- 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.

### Changing the Available Power

The GIGAswitch/ATM system has two 110/220-volt power supply options: 15 amperes and 20 amperes. The 15-A supply powers a switch with up to 11 line cards. If 12 or 13 line cards are loaded in the switch, a 20-A supply is required. The current version of power supplies do not identify themselves, so this information must be entered manually at the `CLK>` prompt with the following commands:

Power Supply	Command
15 amperes	<code>DE /PWRL</code>
20 amperes	<code>DE /PWRH</code>

To modify the available power for the system, use the following commands:

To...	Use This Command	The Display Shows
Decrease Power	<code>/PWRL</code>	950 Watts
Increase Power	<code>/PWRH</code>	1300 Watts

## Modifying Settings

### Modifying the Line Card Startup Mode

To modify the line card startup mode, use the following commands:

Command	Purpose
DE/SM0	Normal startup mode with self-test
DE/SMF	Fast load startup mode without self-test
DE/SML DE/SMN	Diagnostics

### Modifying the Console Output Mode

To modify the console output mode, use the following commands:

Command	Mode
DE/OMQ	Quiet
DE/OMV	Verbose

### 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 any one of the following values:

600	1200	2400
4800	9600	19200
38400	57600	115200

### Modifying the UID Mode

To modify the UID mode, use one of the following commands:

Mode	Command
Single	/UIDS
Multiple	/UIDM

Single mode is the default option and should not be changed.

## Chapter 6

---

# Testing the System

---

## Overview

### Introduction

This chapter describes the screens associated with the module self-test (MST).

Before you initialize the MST, read [Chapter 4](#) for the 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.

### In This Chapter

Topic	Page
<a href="#">Initiating the MST</a>	<a href="#">6-2</a>
<a href="#">Evaluating the Results of the MST</a>	<a href="#">6-5</a>
<a href="#">Using the Diagnostic Services</a>	<a href="#">6-26</a>

---

---

## Initiating the MST

### Methods

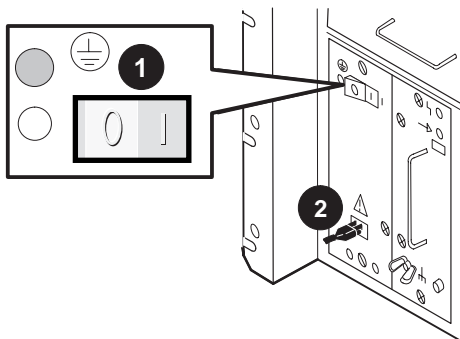
The following methods are used to initiate the MST:

- **Applying Power to the GIGAswitch/ATM System**
- **Rebooting the GIGAswitch/ATM System**

### Applying Power to the GIGAswitch/ATM System

Refer to **Figure 6-1** and complete the following steps to apply power to the GIGAswitch/ATM system.

**Figure 6-1: Applying Power to the System**



LKG-10771-98WI

Step	Action	Comments
1	Locate the power switch (1), the power cord, and the power connector (2).	Some power cords are shipped separately in country kits.
2	Place the power switch (1) in the 0 (OFF) position.	Press the side marked 1 so that the side marked 0 becomes visible.
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.	Press the side marked 0 so that the side marked 1 becomes visible.

## Rebooting the GIGAswitch/ATM System

This section contains the display selections required to reboot the GIGAswitch/ATM system from the OBM terminal. After initiating an OBM session, the Main Menu appears.

Complete the following steps to reboot the system:

Step	Action	Results
1	Select option 3 (Switch Configuration Menu) from the Main Menu.	The Switch Configuration Menu appears.
2	Select option 7 (Reboot Switch Software) from the Switch Configuration Menu.	A question confirming your action appears.
3	Type y to confirm that you want to reboot the switch.	The OBM session is disconnected and the switch reboots.

**Example:** The following example shows 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 session
Enter selection: 7
```

## Initiating the MST

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, and the following menu appears:

```
***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>
```

---

## Evaluating the Results of the MST

### Components

This section helps you to evaluate the results of the MST by indentifying each light-emitting diode (LED) and describing its purpose on the following component LEDs:

- **4-Port Modular Line Card LEDs**
- **4-Port 155 Mb/s Line Card LEDs**
- **1-Port 622 Mb/s Multimode Fiber (MMF) Line Card LEDs**
- **4-Port ATM Modular Line Card LEDs**

### 4-Port Modular Line Card LEDs

#### Description

Each 4-port modular line card contains three sets of LEDs. [Table 6-1](#) lists the LED names and locations on the line card.

**Table 6-1: 4-Port Modular Line Card LED Locations**

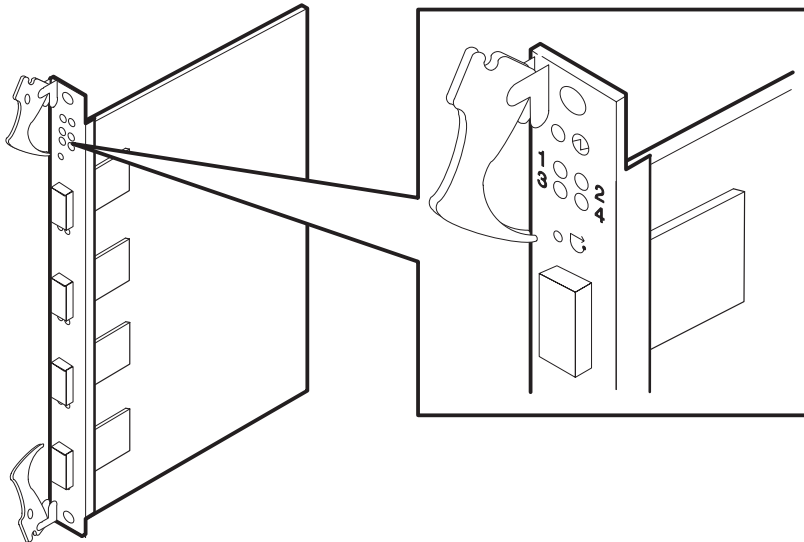
LED Name	LED Location	Description
Module LED	Top of module	See <a href="#">Table 6-2</a> .
Link LEDs	Below the Module LEDs	See <a href="#">Table 6-3</a> .
PHY LEDs	Below each port	Display physical layer information. Refer to <i>ATM Modular PHY Cards Installation</i> for information about the PHY LEDs.

[Figure 6-2](#) shows the LED locations, and [Table 6-2](#) and [Table 6-3](#) describe the meaning of each LED state for the 4-port modular line card.



## Evaluating the Results of the MST

**Figure 6-2: 4-Port Modular Line Card LEDs**



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**Table 6-2: 4-Port Modular Line Card Module LED States**

Module LED State	Meaning
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 <a href="#">Table 6-4</a> .
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. Refer to <a href="#">Table 6-3</a> for Link LED status.
Amber	Self-test has completed and an error was detected. The four Link LEDs display diagnostic codes as described in <a href="#">Table 6-3</a> .

If the Module LED is green, the Link LEDs display the information described in [Table 6-3](#).

**Table 6-3: 4-Port Modular Line Card Link LEDs States**

Link LED State	Meaning
Flashing green	Testing is in progress. The receive signal is present.
Solid green	Testing has completed. The receive signal and the transmit signal are synchronized. Line error rate is below the threshold.
Flashing amber	Suspected remote end node is a DIGITAL switch. Testing is in progress to confirm this. or A loopback cable is connected between two ports on the same switch.
Solid amber	It is confirmed that the remote end is a DIGITAL switch (other than itself).

## Initialization

During switch initialization, the Module and Link LEDs indicate the progress of the loading process for the flash and RAM as described in [Table 6-4](#).

**Table 6-4: 4-Port Modular Line Card Initialization Stages**

Stage	Module LED State	Description
1	Solid amber	Power is applied to the module.
2	Flashing green	The firmware is loading.
3	Flashing amber	The diagnostics are running.
4	Solid green or Solid amber	The firmware is executing. The diagnostics have failed.

## Evaluating the Results of the MST

### Loopback Test

You can perform a simple loopback test for the ports on a line card. For example, you can test port 1 and port 2 by completing the following steps:

Step	Action	Results of a Passing Test
1	Connect the transmit line <sup>1</sup> of port 1 to the receive line <sup>2</sup> of port 2.	The LED on port 1 lights.
2	Connect the receive line <sup>2</sup> of port 1 to the transmit line <sup>1</sup> of port 2.	The LED on port 2 lights.

1.The upper receptacle

2.The lower receptacle

## 4-Port 155 Mb/s Line Card LEDs

### Description

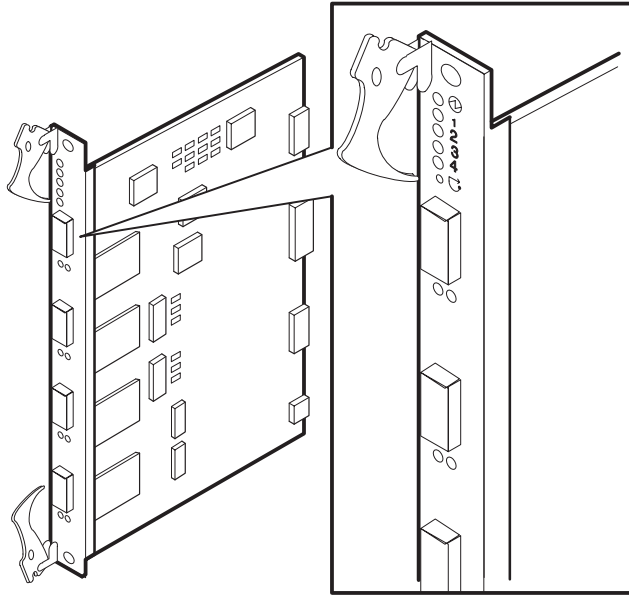
Each 4-port 155 Mb/s line card contains three sets of LEDs. [Table 6-5](#) lists the LED names and locations on the line card.

**Table 6-5: 4-Port 155 Mb/s Line Card LED Locations**

LED Name	LED Location	Description
Module LED	Top of module	See <a href="#">Table 6-6</a> .
Link LEDs	Below the Module LEDs	See <a href="#">Table 6-7</a> .
PHY LEDs		See <a href="#">Table 6-8</a> .
Port status LED	Below and to the left of each port	
FRU (field-replaceable unit)	Below and to the right of each port	

[Figure 6-3](#) shows the LED locations. [Table 6-6](#), [Table 6-7](#), and [Table 6-8](#) describe the meaning of each LED state for the card.

**Figure 6-3: LEDs for 4-Port 155 Mb/s Line Card**



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**Table 6-6: 4-Port 155 Mb/s Line Card Module LED States**

Module LED State	Meaning
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 <a href="#">Table 6-10</a> .
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. Refer to <a href="#">Table 6-7</a> for Link LED status.
Amber	Self-test has completed and an error was detected. The four Link LEDs display diagnostic codes as described in <a href="#">Table 6-11</a> .

If the Module LED is green, the Link LEDs display the information listed in [Table 6-7](#).

## Evaluating the Results of the MST

**Table 6-7: 4-Port 155 Mb/s Line Card Link LEDs States**

Link LED State	Meaning
Flashing green	Testing is in progress. The receive signal is present.
Solid green	Testing has completed. The receive signal and the transmit signal are synchronized. Line error rate is below the threshold.
Flashing amber	Suspected remote end node is a DIGITAL switch. Testing is in progress to confirm this.  or  A loopback cable is connected between two ports on the same switch.
Solid amber	It is confirmed that the remote end is a DIGITAL switch (other than itself).

The PHY LEDs display Physical Layer information. [Table 6-8](#) describes the PHY LEDs.

**Table 6-8: 4-Port 155 Mb/s Line Card PHY LEDs States**

PHY LED Name	PHY LED State	Meaning
<b>Port Status</b>	Off	Port is waiting for a connection.
	Green	Port is active (connected, with a link established).
	Flashing green	Port is disabled by network management.
	Amber	Port is inactive due to excessive media errors.
<b>FRU</b>	Amber	PHY card has a hardware fault.

## Initialization

During switch initialization, the Module and Link LEDs indicate the progress of the loading process for the flash and RAM as described in [Table 6-9](#).

**Table 6-9: 4-Port 155 Mb/s Line Card Initialization Stages**

Stage	Module LED State	Description
1	Solid amber	Power is applied to the module.
2	Flashing green	The firmware is loading.
3	Flashing amber	The diagnostics are running.
4	Solid green or Solid amber	The firmware is executing. The diagnostics have failed.

## Loopback Test

You can perform a simple loopback test for the ports on a line card by connecting a fiber-optic cable between two ports. For example, you can test port 1 and port 2 by completing the following steps:

Step	Action	Results of a Passing Test
1	Connect the transmit line <sup>1</sup> of port 1 to the receive line <sup>2</sup> of port 2.	The LED on port 1 lights.
2	Connect the receive line <sup>2</sup> of port 1 to the transmit line <sup>1</sup> of port 2.	The LED on port 2 lights.

1.The upper receptacle

2.The lower receptacle

## Evaluating the Results of the MST

### 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 6-10](#).

**Table 6-10: LED Indications of Firmware Load on 4-Port Line Cards**

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 as described in [Table 6-3](#) or [Table 6-7](#).

## Using the Diagnostic LEDs on 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. [Table 6-11](#) describes the Link LEDs states.

**Table 6-11: 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



## Evaluating the Results of the MST

### 1-Port 622 Mb/s Multimode Fiber (MMF) Line Card LEDs

#### Description

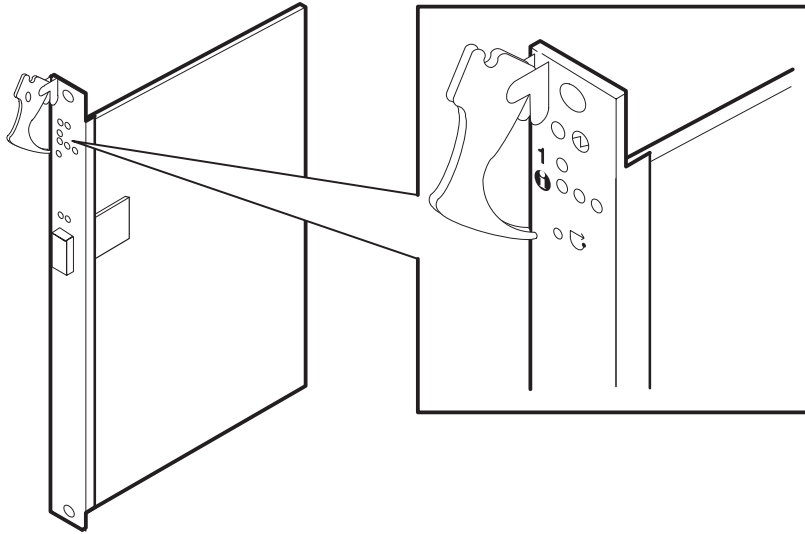
Each 1-port 622 Mb/s MMF line card contains four sets of LEDs. [Table 6-12](#) lists the LED names and the locations on the line card.

**Table 6-12: 1-Port 622 Mb/s MMF Line Card LEDs**

LED Name	LED Location	Description
Module LED	Top of module	See <a href="#">Table 6-13</a> .
Link LED (labeled <b>l</b> )	Below the Module LED	See <a href="#">Table 6-14</a> .
Information LEDs (labeled <b>i</b> )	Three LEDs below the Link LED	
PHY LEDs		See <a href="#">Table 6-15</a> .
Port status LED	Above and to the left of each port	
FRU (field-replaceable unit)	Above and to the right of each port	

[Figure 6-4](#) shows the LED locations. [Table 6-13](#), [Table 6-14](#), and [Table 6-15](#) describe the meaning of each LED state.

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



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Table 6-13: 1-Port 622 Mb/s Line Card Module LED States

Module LED State	Meaning
Off	Module is powered down.
Flashing green	System initialization is in progress. The Link and Information LEDs displays the progress of the firmware load as described in <a href="#">Table 6-17</a> .
Flashing amber	Self-test is in progress.
Green	Self-test completed successfully. The Link LED displays the status of the line and the type of the end node: <ul style="list-style-type: none"> <li>• ATM end node for user-to-network interface (UNI)</li> <li>• ATM switch for network-to-network interface (NNI)</li> </ul> Refer to <a href="#">Table 6-14</a> for Link LED status.
Amber	Self-test has completed and an error was detected. The Link LED and the Information LEDs display diagnostic codes as described in <a href="#">Table 6-18</a> .

If the Module LED is green, the Link LEDs display the information listed in [Table 6-14](#).

## Evaluating the Results of the MST

**Table 6-14: 1-Port 622 Mb/s Line Card Link LED States**

Link LED State	Meaning
Flashing green	Testing is in progress. The receive signal is present.
Solid green	Testing has completed. The receive signal and the transmit signal are synchronized. Line error rate is below the threshold.
Flashing amber	Suspected remote end node is a DIGITAL switch. Testing is in progress to confirm this.  or  A loopback cable is connected between two ports on the same switch.
Solid amber	It is confirmed that the remote end is a DIGITAL switch (other than itself).

The PHY LEDs display Physical Layer information. [Table 6-15](#) describes the PHY LEDs.

**Table 6-15: 1-Port 622 Mb/s Line Card PHY LEDs States**

PHY LED Name	PHY LED State	Meaning
<b>Port Status</b>	Off	Port is waiting for a connection.
	Green	Port is active (connected, with a link established).
	Flashing green	Port is disabled by network management.
	Amber	Port is inactive due to excessive media errors.
<b>FRU</b>	Amber	PHY card has a hardware fault.

## Initialization

During switch initialization, the Module LED indicates the progress of the loading process for the flash and RAM as described in [Table 6-16](#).

**Table 6-16: 1-Port 622 Mb/s Line Card Module LED Initialization Stages**

Stage	Module LED State	Description
1	Solid amber	Power is applied to the module.
2	Flashing green	The firmware is loading.
3	Flashing amber	The diagnostics are running.
4	Solid green or Solid amber	The firmware is executing. The diagnostics have failed.

## Loopback Test

You can perform a simple loopback test for the ports on a line card by connecting a cable between two ports. For example, you can test port 1 and port 2 by completing the following steps:

Step	Action	Results of a Passing Test
1	Connect the transmit line <sup>1</sup> of port 1 to the receive line <sup>2</sup> of port 2.	The LED on port 1 lights.
2	Connect the receive line <sup>2</sup> of port 1 to the transmit line <sup>1</sup> of port 2.	The LED on port 2 lights.

1.The upper receptacle

2.The lower receptacle

## Evaluating the Results of the MST

### Determining Firmware Load Progress on 622 Mb/s Line Cards

When the Module LED flashes green, it indicates that the line card is loading firmware. The Link and Information LEDs indicate the load progress as described in [Table 6-17](#). (The Link LED is LED 1 and the three Information LEDs are LED 2 through LED 4 from left to right.)

**Table 6-17: LED Indications of Firmware Load Progress on 622 Mb/s Line Cards**

Link LED	Information LEDs			Condition
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 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 LED indicates the link status described in [Table 6-14](#).

## Using the Diagnostic LEDs on 1-Port 622 Mb/s Line Cards

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 6-18](#). (The Link LED is LED 1 and the three Information LEDs are LED 2 through LED 4 from left to right.)

**Table 6-18: LED Indications for Diagnostics on 622 Mb/s Line Cards**

Link LED	Information LEDs				
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	

## Evaluating the Results of the MST

### 4-Port ATM Modular Line Card LEDs

#### Description

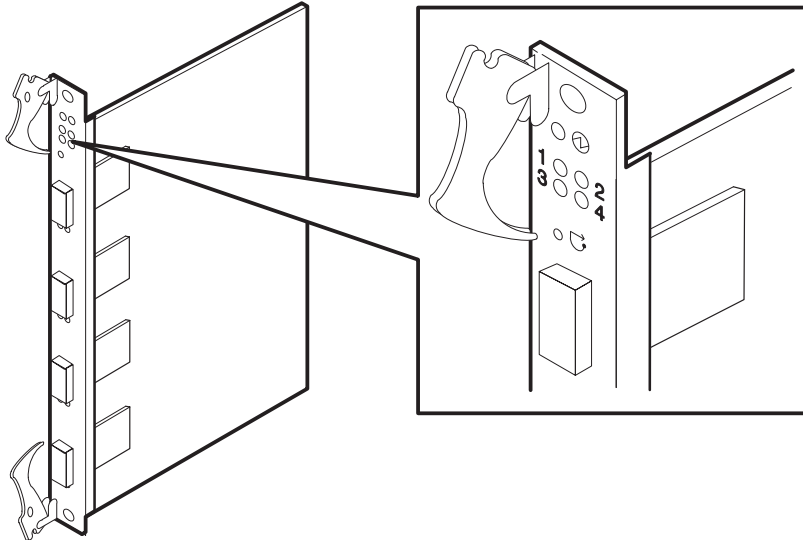
Each 4-port ATM modular line card contains three sets of LEDs. [Table 6-19](#) lists the LED names and the locations on the line card.

**Table 6-19: 4-Port ATM Line Card LEDs**

LED Name	LED Location	Description
Module LED	Top of module	See <a href="#">Table 6-20</a> .
Link LEDs	Below the Module LED	See <a href="#">Table 6-21</a> .
PHY LEDs:		Refer to <i>DIGITAL ATM Modular PHY Cards Installation</i> for more information about the PHY LEDs.
• Port Status LED	Below and to the left of each port	
• FRU (field-replaceable unit)	Below and to the right of each port	

[Figure 6-5](#) shows the LED locations. [Table 6-20](#), and [Table 6-21](#) describe the meaning of each LED state.

**Figure 6-5: 4-Port ATM Modular Line Card LEDs**



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**Table 6-20: 4-Port ATM Modular Line Card Module LED States**

Module LED State	Meaning
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
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. Refer to <a href="#">Table 6-21</a> for Link LED status.
Amber	Self-test has completed and an error was detected. The four Link LEDs display diagnostic codes as described in <a href="#">Table 6-24</a> .

If the Module LED is green, the Link LEDs display the information listed in [Table 6-21](#).



## Evaluating the Results of the MST

**Table 6-21: 4-Port ATM Line Card Link LEDs States**

Link LED State	Meaning
Flashing green	Testing is in progress. The receive signal is present.
Solid green	Testing has completed. The receive signal and the transmit signal are synchronized. Line error rate is below the threshold.
Flashing amber	Suspected remote end node is a DIGITAL switch. Testing is in progress to confirm this.  or  A loopback cable is connected between two ports on the same switch.
Solid amber	It is confirmed that the remote end is a DIGITAL switch (other than itself).

## Initialization

During switch initialization, the Module and Link LEDs indicate the progress of the loading process for the flash and RAM as described in [Table 6-22](#).

**Table 6-22: 4-Port ATM Line Card Link LED Initialization Stages**

Stage	Module LED State	Description
1	Solid amber	Power is applied to the module.
2	Flashing green	The firmware is loading.
3	Flashing amber	The diagnostics are running.
4	Solid green or Solid amber	The firmware is executing. The diagnostics have failed.

## Loopback Test

You can perform a simple loopback test for the ports on a line card by connecting a cable between two ports. For example, you can test port 1 and port 2 by completing the following steps:

Step	Action	Results of a Passing Test
1	Connect the transmit line <sup>1</sup> of port 1 to the receive line <sup>2</sup> of port 2.	The LED on port 1 lights.
2	Connect the receive line <sup>2</sup> of port 1 to the transmit line <sup>1</sup> of port 2.	The LED on port 2 lights.

- 
- 1.The upper receptacle
  - 2.The lower receptacle

## Evaluating the Results of the MST

### Determining Firmware Load Progress on 4-Port ATM Line Cards

When the Module LED flashes green, it indicates that the line card is loading firmware. The Link LEDs indicate the load progress as described in [Table 6-23](#).

**Table 6-23: LED Indications of Firmware Load Progress on 4-Port ATM Line Cards**

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 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 LED indicates the link status described in [Table 6-21](#).

## Using the Diagnostic LEDs on 4-Port ATM Line Cards

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 6-24](#).

**Table 6-24: LED Indications for Diagnostics on 4-Port ATM 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

## Using the Diagnostic Services

### Introduction

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

### 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. Once you are logged in to 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 6-25](#)). Do not supply a port number when you are connecting to the master line card.

**Table 6-25: Telnet Port Numbers for Line Cards**

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

## 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 those 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 contains information since the last power-up only. 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. [Table 6-26](#) describes the four modes.

**Table 6-26: Error Log Displays**

Mode	Name	Entries
1	First	Oldest messages (for the number of specified entries)
2	Next	Entries starting from the current pointer and increments by the specified number of entries
3	All	Complete log that fits within the buffer
4	Last	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
```

## Using the Diagnostic Services

```
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 log printed to the screen is similar to the example for the error log.

**Table 6-27** describes the three modes.

**Table 6-27: Status Log Displays**

Mode	Name	Entries
1	First	Oldest messages (for the number of specified entries)
2	Next	Entries starting from the current pointer and increments by the specified number of entries
3	All	Complete log that fits within the buffer

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 printed 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.



## Using the Diagnostic Services

### 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 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 01/15/98 10:04:00

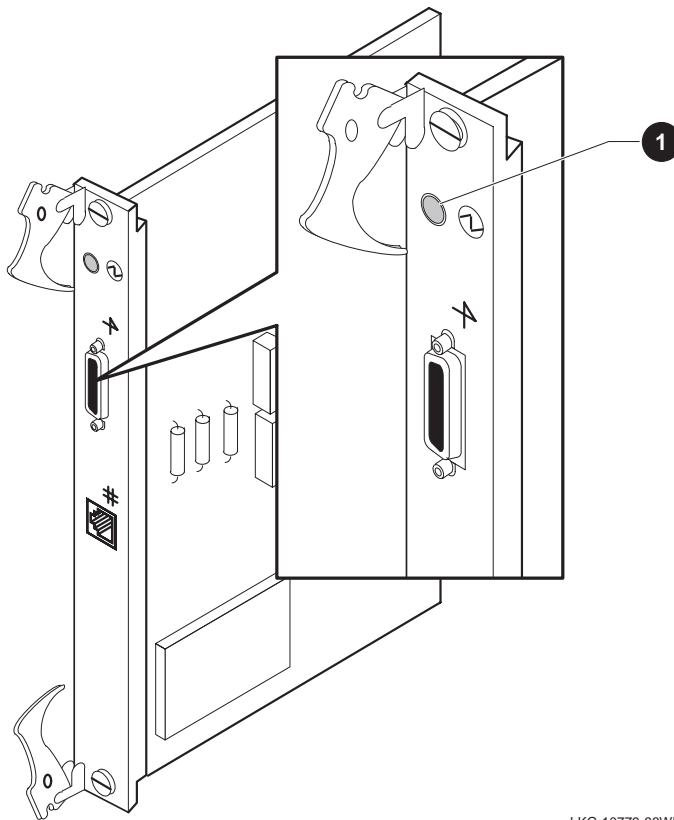
Entry status = 0000
Entry CRC    = C7CEF802
Write Count  = 1
FRU Mask     = GIGAswitch/ATM CMM
Error ID     = Ethernet Address ROM Test
Test Data:
              Subtest: Start Address Test
Returned Status      = Block A <> Block B
Expected Value       = 00CB
Actual Value         = 00CF
Power Enable Register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

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

## Clock Card LED

**Figure 6-6** shows the LED (1) for the clock card. **Table 6-28** describes the states of that LED as a result of the CMM boot diagnostics.

**Figure 6-6: Clock Card LED**



LKG-10779-98WF

**Table 6-28: Clock Card LED States**

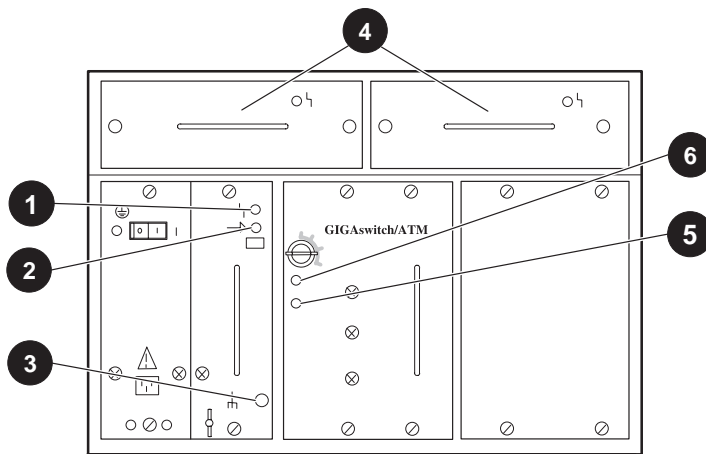
LED (1) State	Event	Description
Solid amber	Clock card startup.	MST in progress.
Flashing amber	Clock card MST completed.	MST failed.
Solid green	Clock card MST completed.	MST passed.
Changes from solid green to solid amber.	Higher level of failure occurred. The system reboots. <sup>1</sup>	Examples: master election error or buffer exhaustion.

<sup>1</sup>. Check the CMM error log for more information.

### Cooling and Power Module LEDs

Figure 6-7 shows the cooling and power module LEDs. Table 6-29 describes each LED.

Figure 6-7: Cooling and Power Module LEDs



LKG-09227-97MI

Table 6-29: Cooling and Power Module LEDs

Item	LED Name	State	Description
1	Front end unit (FEU)	Steady amber	MST failed
2	FEU OK	Steady green	MST passed
3	Power	Off	Source power not available at FEU's input
		On	Source power available at FEU's input
4	Fan tray assembly fault	Off	MST passed
		Steady amber	MST failed
5	System temperature fault	Steady red	System temperature fault
		Off	System temperature normal
6	PSC card fault	Off	MST passed
		Steady amber	MST failed

## Chapter 7

---

# Upgrading the Firmware

---

## Overview

### Introduction

This chapter describes the procedures for upgrading the GIGAswitch/ATM firmware on single or multiple line cards.

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

### Reference

Consult the release notes and `READ_ME.TXT` files for the firmware release to determine the correct versions.

### In This Chapter

Topic	Page
<a href="#">Copying the Firmware</a>	7-2
<a href="#">Loading the Firmware for the Line Card</a>	7-3
<a href="#">Loading the Firmware for the CMM</a>	7-7

---

## Copying the Firmware

---

# Copying the Firmware

## Locating 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.

## Using the Commands

Copy the image to your system using the following 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, enter the following command:

```
# 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.

---

## Loading the Firmware for the Line Card

### Introduction

The firmware for the line card is divided into two components, kernel and application. [Table 7-1](#) lists the contents of these components.

**Table 7-1: Linecard Firmware Contents**

Component	Contents
Kernel	Operating system Protocol stack Basic control routines
Application	Diagnostics Higher level functions such as the following: <ul style="list-style-type: none"><li>• Management</li><li>• Signaling</li><li>• Routing</li></ul>

---

Some firmware releases require only 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 [Setting Up Servers on page 4-8](#) for more information about setting up your servers.

---

## Loading the Firmware for the Line Card

### Upgrading the Kernel and Application Images

To downline load both the kernel and application images when upgrading firmware, set the first two lines of the control file (see [Setting Up the tftp Server on page 4-8](#)) to the following lines:

```
000250FB/tftpboot/app_image.bin  
  
kernel_imagel.rom  
QLC15      LC15V27.ROM      LC15V27.BIN  
QLCV2      LC20V27.ROM      LC20V27.BIN
```

The following table describes the parameters:

Parameter	Meaning
000250	Internal version number of the application image (check the firmware release notes for the appropriate version number)
F	Application Force flag
B	Boot ROM load flag
tftpboot/app_image.bin	Application file
kernel_imagel.rom	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 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).

## Loading the Firmware onto Multiple Line Cards

To download to multiple line cards, complete the following steps:

Step	Action
1	Use the procedure described in <a href="#">Upgrading the Kernel and Application Images on page 7-4</a> .
2	Use the DE/SML CMM command to cause the new firmware to be loaded automatically to all the line cards.
3	After the download completes, use the DE/SM0 CMM command to resume normal loading.

If your system has five or more line cards, the following error message might appear during download:

```
TFTP Transfer Timed out
```

If this message appears, perform the following procedure only when you are upgrading the firmware. If the GIGAswitch/ATM system already has the V2.7 firmware, it is not necessary to reload the system.

Step	Action
1	Use the SD command to verify that the line card startup mode is L (forced download). If the mode is not L, use the DE/SML CMM command to set the line card startup mode to L.
2	Power down the system.
3	Reboot the system with three line cards. Results: All three cards load the new firmware.
4	Power down the system.
5	Keep the master line card in the system and remove the other two line cards.
6	Install two more line cards and reboot the system.
7	Repeat steps 2 through 6 for all the line cards.
8	Use the DE/SM0 CMM command to set the line card startup mode to 0 (normal with self-test).
9	Install all the line cards into the system and reboot the system.



## Loading the Firmware for the Line Card

### Line Card LED Indications During Switch Initialization

During initialization, the Module LED and Link LED at the top of each line card are used to indicate progress in loading of flash and RAM. [Table 7-2](#) describes the Module LED stages during initialization.

**Table 7-2: Initialization Stages**

Stage	Module LED State	Description
1	Solid amber	Power is applied to the module. <sup>1</sup>
2	Flashing green	The firmware is loading.
3	Flashing amber	The diagnostics are running.
4	Solid green or Solid amber	The firmware is executing. The diagnostics have failed.

<sup>1</sup> If the LED does not turn amber on the twelfth and thirteenth module, the power supply might not be appropriate. Refer to the `DE/PWEH CMM` command and use the appropriate power supply.

### Line Card LED Indications During Firmware Load in Progress

Refer to [Table 6-10](#) for detailed information on the Link LED indications during a firmware load.

---

## Loading the Firmware for the CMM

### Verifying the Firmware Version

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. Also, remember that you must upgrade the line card firmware before upgrading the CMM firmware.

### Loading the 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, complete the following steps:

Step	Action	Comments
1	Change directory to the location of the new firmware.	
2	Invoke the <code>tip</code> utility, specifying the serial line connection to the CMM.	The serial line must be configured in the <code>/etc/remote</code> file, for example: <code>lport0:dv=/dev/tty01:br#9600:pa=none:</code> The cable connected to this <code>tty01</code> is now defined as <code>lport0</code> . You can choose any name.
3	If it does not exist, create the <code>/var/spool/locks</code> directory.	
4	To connect to the CMM attached to <code>lport0</code> , use the command <code>tip lport0</code>	Once the <code>tip</code> session is started, the clock responds with a command menu and a <code>CLK&gt;</code> 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
```

## Loading the Firmware for the CMM

If the `/etc/remote` file is incorrect, complete the following steps to correct the `/etc/remote` file and/or the `/var/spool/locks` directory before proceeding:

Step	Action	Results
1	Enter the Download Code Image command: CLK>DO Transmit S-Records at SDLL> prompt: SDLL>	The CMM waits for an S-Record file.
2	Return to the host system by entering a tilde followed by a right angle bracket (~>): SDLL>~>	The host system prompts you for the file name of the firmware you wish to load, for example, CMM1-80.X: Local File Name?:

---

### NOTE

If your system does not support this method of loading the CMM with the `tip` utility, refer to [Alternate Downline Load Procedure on page 7-9](#).

---

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. Complete the following steps:

Step	Action
1	At the CLK> prompt, enter the B command to display the switch configuration information, including the CMM Firmware Version number.
2	Verify that the version number loaded is correct.

## Alternate Downline Load Procedure

This procedure requires a serial port from the Alpha system be connected to the GIGAswitch/ATM CMM serial port using the `tip` utility. In this example, `tty01` (DEC423 connector) is used, but any serial port on the Alpha system (such as `tty00`, a 25-pin RS-232) can be used. Complete the following steps to downline load the firmware:

Step	Action
1	Configure a serial port on the Alpha system to allow a <code>tip</code> session: <ol style="list-style-type: none"> <li>a) Add the following line to <code>/etc/remote</code>:  <code>tipcsl:dv=/dev/tty01:br#9600:pa=none:</code></li> <li>b) If it does not exist, create the <code>/var/spool/locks</code> directory.</li> </ol>
2	Connect the <code>tty01</code> port (DEC423 connector) to the serial port on the CMM.
3	Power on the GIGAswitch/ATM system.
4	Initiate a <code>tip</code> session to the switch using the following command: <pre># tip tipcsl CLK&gt;</pre>
5	Enter the Download Code Image command: <pre>CLK&gt;DO Transmit S-Records at SDLL&gt; prompt: SDLL&gt;</pre>
6	Exit the <code>tip</code> session by entering a tilde followed by a period ( <code>~.</code> ): <pre>SDLL&gt;~. #</pre>
7	Download the S-Record CMM file as follows: <pre># cat CMMn-<i>nn</i>.X &gt; /dev/tty01</pre> where <i>nn</i> is the version number of the CMM firmware.
8	Connect to the GIGAswitch/ATM system using <code>tip</code> and press the Return key to terminate the load process: <pre># tip tipcsl &lt;Return&gt;</pre> <p><u>Note:</u> The CMM responds with the following text, then reboots the switch:</p> <pre>Termination Record Received. Count = 00000E65 RAM download complete. Flash programming complete.</pre>
9	Verify that the new version is correct, using the <code>B</code> command.

## Loading the Firmware for the CMM

### CMM LED Indications During Switch Initialization

**Table 7-3** describes the CMM LED indications during initialization and module self-test.

**Table 7-3: Clock Card LED States**

LED (1) State	Event	Description
Solid amber	Clock card startup	MST in progress.
Flashing amber	Clock card MST completed	MST failed.
Solid green	Clock card MST completed	MST passed (usually about 10 seconds after power-up).
Changes from solid green to solid amber.	Higher level of failure occurred. <sup>1</sup> The system reboots.	Examples: master election error or buffer exhaustion.

---

<sup>1</sup>.Check the CMM error log for information about the failure.

---

## Part 3

## Service

---

Part 3 contains information about replacing the field-replaceable units (FRUs) in the GIGAswitch/ATM system. Part 3 contains the following chapters:

Chapter	Description
<a href="#">8</a>	Describes the procedures you must complete before replacing the GIGAswitch/ATM modules. These procedures include setting up electrostatic discharge (ESD) protection and evaluating the need for removing and applying power.
<a href="#">9</a>	Describes the procedures for replacing the cooling and power modules and the logic modules. Cooling and power modules include the following families: <ul style="list-style-type: none"><li>• Fan tray assembly</li><li>• Front end unit (FEU)</li><li>• Power status assembly (PSA)</li><li>• Power system controller (PSC)</li></ul> Logic modules include the following families: <ul style="list-style-type: none"><li>• Line card</li><li>• Clock card</li></ul>
<a href="#">10</a>	Describes the procedures for removing the GIGAswitch/ATM system.
<a href="#">11</a>	Describes the procedures for replacing the logic backplane, crossbar module, and power backplane after all the modules are removed from the selected backplane.

---



## Chapter 8

---

# Preparing to Replace Modules

---

## Overview

### Introduction

This chapter lists the prerequisites for replacing the GIGAswitch/ATM modules and describes the procedures for preparation.

### In This Chapter

Topic	Page
<a href="#">Prerequisites</a>	8-2
<a href="#">Setting Up ESD Protection</a>	8-3
<a href="#">Removing Power from the System</a>	8-4

---



---

## Prerequisites

GIGAswitch/ATM modules include the following:

- Logic modules
- Cooling and power modules

The following table summarizes the prerequisites for removing logic modules: whether electrostatic discharge (ESD) equipment must be used, whether power must be removed, slot limitations, and which modules must be removed before performing the replacement procedure for the desired module.

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

---

<sup>1</sup>The GIGAswitch/ATM system also needs to be removed from the rack before replacing the logic backplane or crossbar module if the back of the rack is not accessible.

---

## Setting Up ESD Protection

---

### CAUTION

Static electricity can damage modules and electronic components. DIGITAL recommends using a grounded antistatic wrist strap and a grounded work surface when handling any modules.

---

Protect the logic modules from damage caused by electrostatic discharge (ESD) by using the following equipment:

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

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

Step	Action
1	Ground the unit. The unit is grounded through the power cord when the power cord is connected to the unit and to 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.

---

---

## Removing Power from the System

---

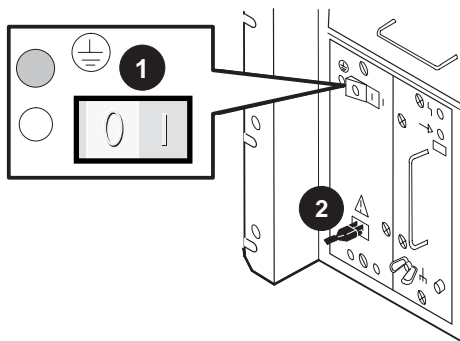
### CAUTION

Do not remove the power cord or the front-end unit until after removing all the logic modules. The power cord provides the ground required for electrostatic discharge protection.

---

Refer to **Figure 8-1** and complete the following steps to remove power from the GIGAswitch/ATM system.

**Figure 8-1: Removing Power from the System**



Step	Action
1	Locate the power switch (1) and the power connector (2).
2	Place the power switch (1) in the 0 (OFF) position.
3	Repeat steps 1 and 2 for any alternate power supply.

---

## Chapter 9

---

# Replacing Modules

---

## Overview

### Introduction

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

### Reference

Read [Chapter 8, Preparing to Replace Modules](#) before attempting to replace any module in the GIGAswitch/ATM system.

### In This Chapter

Topic	Page
<a href="#">Replacing the Logic Module</a>	<a href="#">9-2</a>
<a href="#">Replacing the Fan Tray Assemblies</a>	<a href="#">9-8</a>
<a href="#">Replacing the Front End Unit</a>	<a href="#">9-10</a>
<a href="#">Replacing a Power Supply Filler Panel</a>	<a href="#">9-13</a>
<a href="#">Replacing the Power Status Assembly</a>	<a href="#">9-15</a>
<a href="#">Replacing the Power System Controller Card</a>	<a href="#">9-17</a>

---

## Replacing the Logic Module

### Reference

[Appendix D](#) contains the recommended location for the modules.

### Setting Up Electrostatic Discharge Protection

Before replacing the logic modules, you must set up electrostatic discharge (ESD) protection. Refer to [Chapter 8](#) for more information.

To set up the ESD protection, complete the following steps:

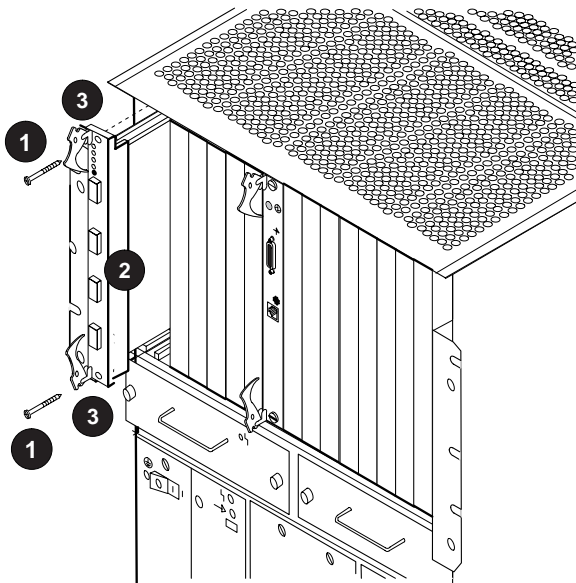
Step	Action
1	Set up the ESD equipment. See <a href="#">Chapter 8</a> .
2	Wear the grounded ESD wrist band.
3	Unpack the replacement module. Leave the module in the ESD bag, and place the bag on a flat surface.
4	Place the empty container on the ESD mat.
5	Remove the module to be replaced from the chassis. See the procedure in <a href="#">Removing the Logic Module on page 9-3</a> .
6	Place the module to be replaced in the empty container.
7	Remove the replacement module from the ESD bag.
8	Install the replacement module into the chassis. See the procedure in <a href="#">Installing the Logic Modules on page 9-5</a> .
9	Remove the module to be replaced from the container and place it into the ESD bag.
10	Place the ESD bagged module in the container and remove the wrist strap.

---

## Removing the Logic Module

When replacing a line card, any installed options must be removed. Refer to [Removing Line Card Options on page 9-4](#). Refer to [Figure 9-1](#) and complete 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.

**Figure 9-1: Replacing the Logic Module**



LKG-09222-97MI

Step	Action
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 as described in <a href="#">Setting Up Electrostatic Discharge Protection on page 9-2</a> .
3	Loosen the upper and lower screws (1).
4	Move the ejectors (3) outward to unseat the module (2) from the unit.
5	Gently slide the module (2) out of the unit.
6	Place the module in a static proof bag.
7	Place the bagged module on a flat surface or on another bagged module. Modules can be stacked four modules high.
8	Repeat steps 4 through 7 for the remainder of the line cards.

## Replacing the Logic Module

### 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.

### Removing the 48-Vdc Power Module Option

To remove the 48-V power module (DAGPL-AB) from the system, complete the following steps:

Step	Action
1	Power down the system.
2	Carefully place a thin flat blade screwdriver between the power module and the line card on the inner edge of one set of pins.
3	Gently insert the screwdriver without touching the line card surface so that the power module is eased away from the line card. <u>Note:</u> Do not insert the screwdriver more than 2.54 cm (1 in).
4	Repeat steps 2 and 3 for the other set of pins.
5	Gently pull the power module off the line card.

## Installing the Logic Modules

---

### CAUTION

Install the front-end unit and connect the power cord before installing the logic modules. The power cord provides the ground required for electrostatic discharge protection.

---

Refer to [Figure 9-1](#) and complete 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 the clock card module.:

Step	Action
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 as described in <a href="#">Setting Up Electrostatic Discharge Protection on page 9-2</a> .
3	Align the module (LEDs on the top) with the upper and lower guides, and GENTLY slide the module into the unit.
4	Move the ejectors (3) inward to seat the module (2) in the unit.
5	Tighten the upper and lower screws (1) using a number 2 cross-point screwdriver.

---



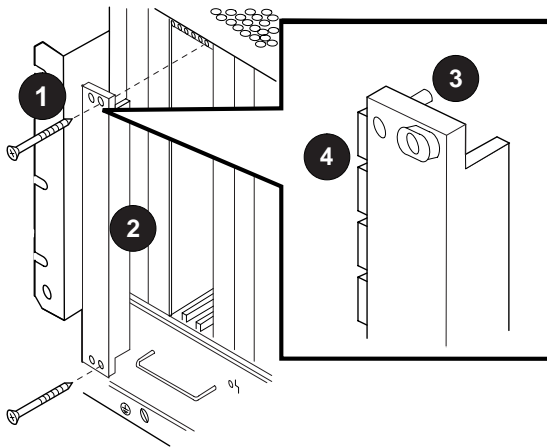
## Replacing the Logic Module

### Replacing the Blank Handles

#### Removing the Blank Handles

Refer to **Figure 9-2** and complete the following steps to remove the blank handle from the GIGAswitch/ATM system.

**Figure 9-2: Replacing the Blank Handles**



LKG-09325-97MI

Step	Action
1	Locate the screws (1) that fasten the selected blank handle (2) to the GIGAswitch/ATM system, the guide pins (3), and the electromagnetic interference (EMI) gasket (4).
<b>CAUTION</b>	
Ensure that the electromagnetic interference gasket remains intact and clean.	
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 system.

### Installing the Blank Handle

Refer to [Figure 9-2](#) and complete the following steps to install the blank handle into the GIGAswitch/ATM system.

Step	Action
1	Locate the screws (1) that fasten the selected blank handle (2) to the GIGAswitch/ATM system, the guide pins (3), and the electromagnetic interference (EMI) gasket (4).
<hr/> <b>CAUTION</b> <hr/> <p>Ensure that the electromagnetic interference gasket remains intact and clean.</p> <hr/>	
2	Align the 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.

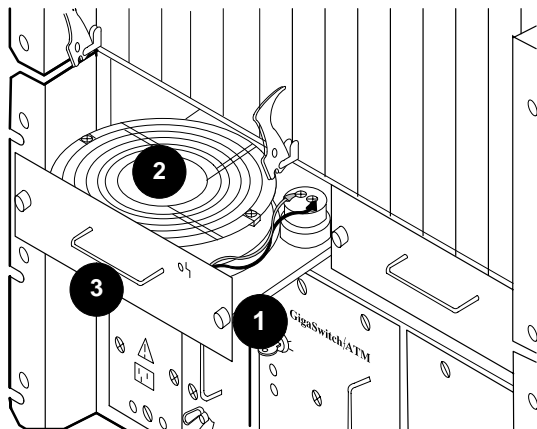
---

## Replacing the Fan Tray Assemblies

### Removing the Fan Tray Assemblies

Refer to [Figure 9-3](#) and complete the following steps to remove the fan tray assemblies from the GIGAswitch/ATM system.

**Figure 9-3: Replacing the Fan Tray Assemblies**



LKG-10772-98VI

Step	Action
1	Locate the two fasteners (1) that attach the fan tray assembly (2) to the GIGAswitch/ATM system and the handle (3).
2	Release the two fasteners (1) that attach the 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 fans are rotating.
4	Wait for the fans 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.

## Installing the Fan Tray Assemblies

Refer to [Figure 9-3](#) and complete the following steps to install the fan tray assemblies into the GIGAswitch/ATM system.

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

---

## Replacing the Front End Unit

### Removing the Front End Unit

---

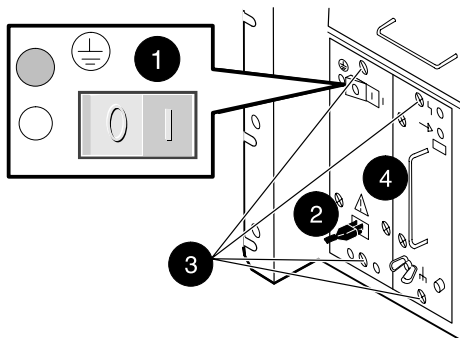
#### CAUTION

Do not remove the power cord or the front-end unit until after removing all the logic modules. The power cord provides the ground required for electrostatic discharge protection.

---

Refer to [Figure 9-4](#) and complete the following steps to remove the Front End Unit (FEU) from the GIGAswitch/ATM system.

**Figure 9-4: Replacing the FEU**



LKG-10773-98WI

Step	Action
1	Locate the power switch (1), power cord (2), four screws (3) that fasten the selected module to the system, and the handle (4) of the selected module.
2	Place the power switch (1) in the 0 (OFF) position. Press the side marked 1 so that the side marked 0 becomes visible. Remove the power cord (2) from the primary power outlet and the power connector.
3	Remove the four screws (3) 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.

---

## Installing the Front End Unit

Refer to [Figure 9-4](#) and complete the following steps to install the FEU into the GIGAswitch/ATM system.

Step	Action
1	Locate the power switch (1), the power cord (2), the four screws (3) that fasten the selected module to the system, and the handle of the selected module (4).
2	Align the power tray with the module guides of the slot designated for the module.
3	Grasp the handle 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. Press the side marked 1 so that the side marked 0 becomes visible.
6	Plug the power cord (2) into the power connector and then into the connector for the primary power source.

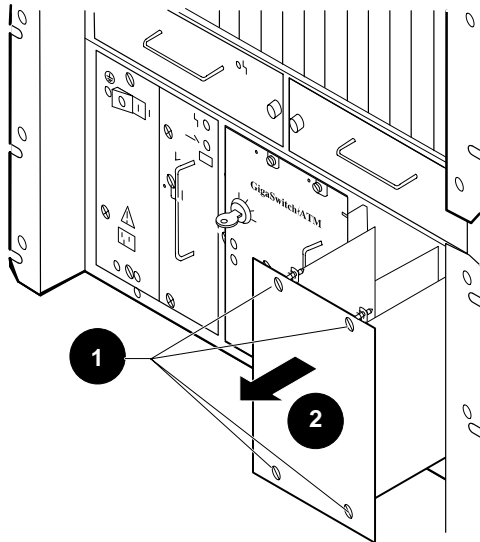
---

## Replacing a Power Supply Filler Panel

### Removing a Power Supply Filler Panel

Refer to [Figure 9-5](#) and complete the following steps to remove the power supply filler pane from the system.

**Figure 9-5: Replacing a Power Supply Filler Panel**



LKG-09749-9MI

Step	Action
1	Locate the screws (1) that fasten the power supply filler panel (2) to the system.
2	Remove the two upper and the two lower screws (1) using a number 2 cross-point screwdriver.
3	Lift the power supply filler panel (2) away from the system.

## Installing a Power Supply Filler Panel

Refer to [Figure 9-5](#) and complete the following steps to install the power supply filler panel into the system

Step	Action
1	Locate the screws (1) that fasten the power supply filler panel (2) to the system.
2	Align the power supply filler panel with the associated holes in the system.
3	Tighten the two upper and two lower screws (1) using a number 2 cross-point screwdriver.



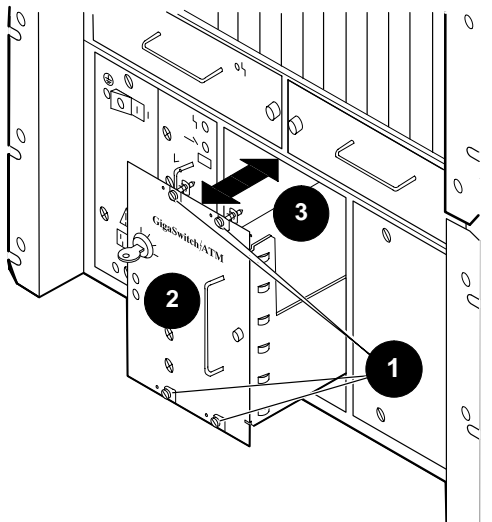
---

## Replacing the Power Status Assembly

### Removing the Power Status Assembly

Refer to **Figure 9-6** and complete the following steps to remove the Power Status Assembly (PSA) from the system.

**Figure 9-6: Replacing the PSA**



LKG-09225-97MI

Step	Action
1	Locate the four screws (1) that fasten the module to the 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.

## Installing the Power Status Assembly

Refer to [Figure 9-6](#) and complete the following steps to install the PSA into the system.

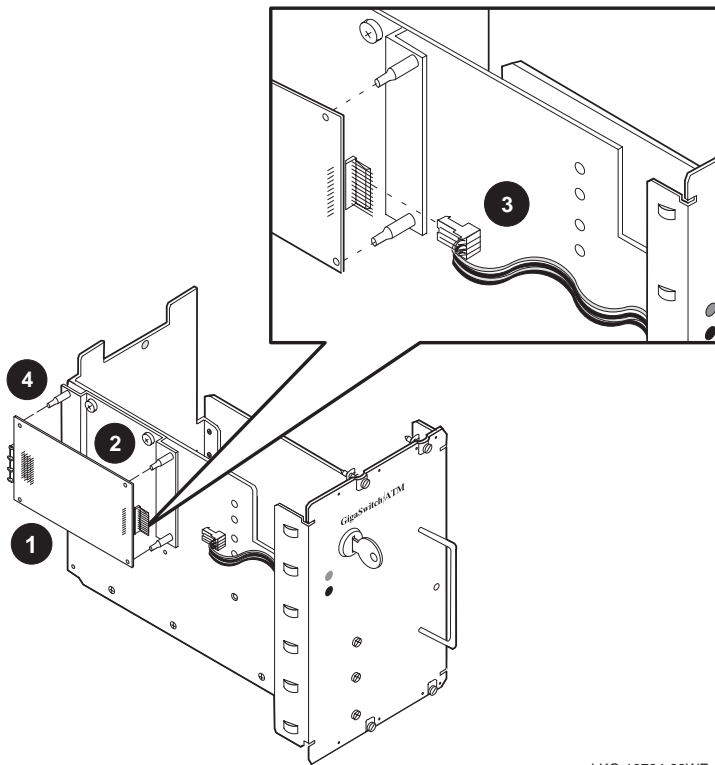
Step	Action
1	Locate the four screws (1) that fasten the module to the system, the handle (2) of the module, and the slot (3) designated for the module.
2	Align the module with the module guides of the slot (3) designated for the module.
3	Slide the module into the unit. Grasp the handle (2) with one 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.

## Replacing the Power System Controller Card

### Removing the Power System Controller Card

Refer to [Figure 9-7](#) and complete the following steps to remove the Power System Controller (PSC) card from the system.

**Figure 9-7: Replacing the PSC Card**



LKG-10764-98WF

Step	Action
1	Remove the power status assembly from the system (see <a href="#">Removing the Power Status Assembly on page 9-15</a> ).
2	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).
3	Unplug the cables from the PSC card (1).
4	Unsnap the PSC card (1) from the standoffs (4) on the PSA (2).
5	Pull the PSC card away from the PSA.

## Installing the Power System Controller Card

Refer to [Figure 9-7](#) and complete the following steps to install the PSC card into the system.

Step	Action
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 (4) on the PSA (2). <u>Note:</u> The components on the PSC card face inward.
3	Snap the PSC card onto the standoffs (4). The top three pins remain disconnected. The 4-wire connector plugs into the four pins immediately below them. The 5-wire connector plugs into the bottom five pins.
4	Follow the PSC Connector Installation Instructions 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 from the PSA onto the PSC card, as shown in the figure. Plug the cable for the security switch into the bottom five holes.
5	Install the PSA (see <a href="#">Installing the Power Status Assembly on page 9-16</a> ).



## Chapter 10

---

# Removing the System from the Rack

---

## Overview

### Introduction

This chapter describes the procedures for removing the upper plenum and detaching and lowering the GIGAswitch/ATM system from the rack.

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

- Number 2 cross-point screwdriver
- Electrostatic discharge (ESD) equipment
- Static-proof containers for modules

### In This Chapter

Topic	Page
<a href="#">Removing the Upper Plenum</a>	10-2
<a href="#">Detaching the Empty System from the Rack</a>	10-3
<a href="#">Lowering the Empty System</a>	10-4

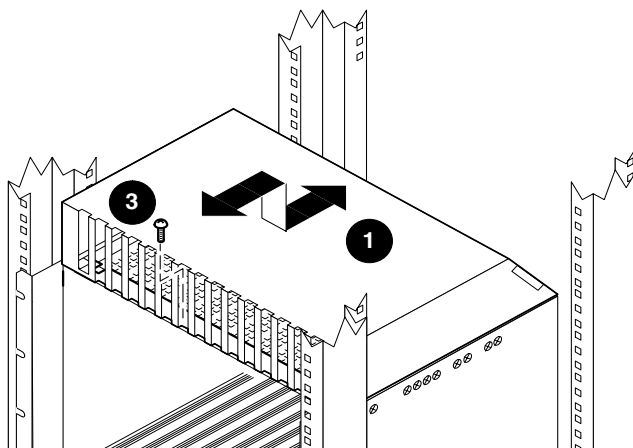
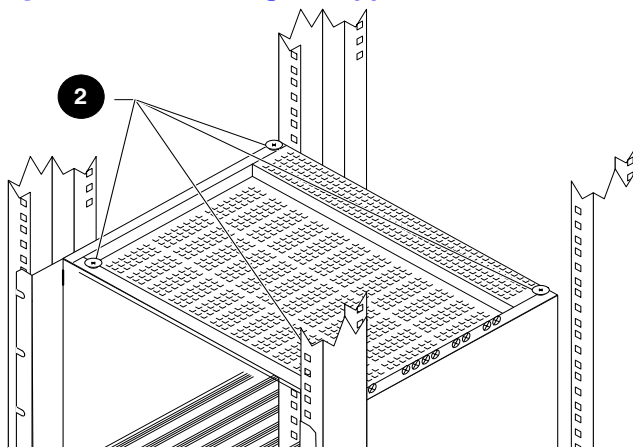
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## Removing the Upper Plenum

Refer to **Figure 10-1** and complete the following steps to remove the upper plenum.

**Figure 10-1: Removing the Upper Plenum**



LKG-09732-97MI

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Step	Action
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.

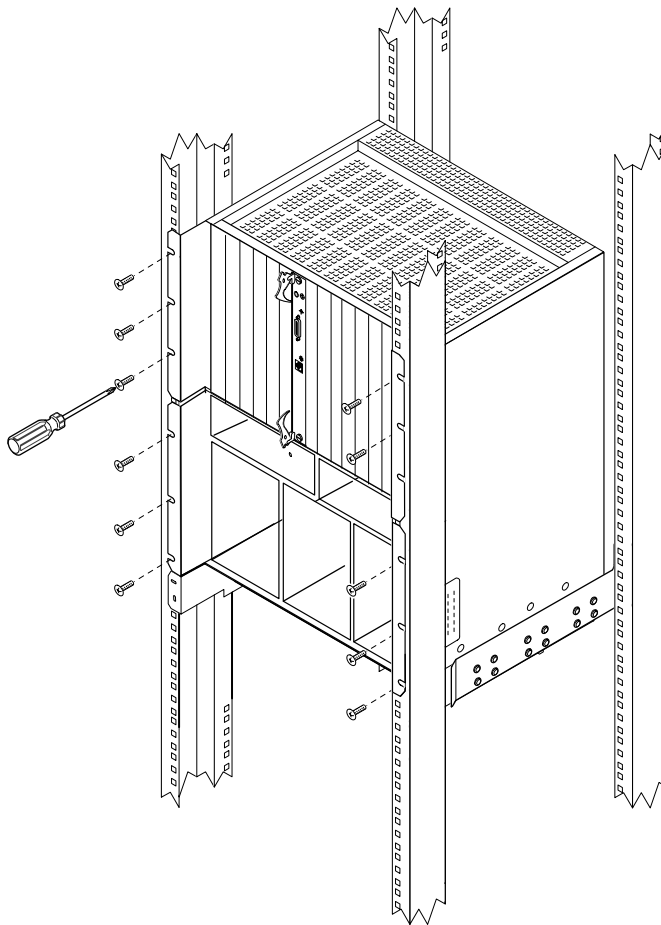
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---

## Detaching the Empty System from the Rack

Refer to [Figure 10-2](#) and complete the following steps to detach the empty GIGAswitch/ATM system from the rack.

**Figure 10-2: Detaching the System from the Rack**



LKG-09328-97MI

Step	Action
1	Locate the GIGAswitch/ATM system and the 10 screws.
2	Remove the 10 screws using a number 2 cross-point screwdriver.



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## Lowering the Empty System

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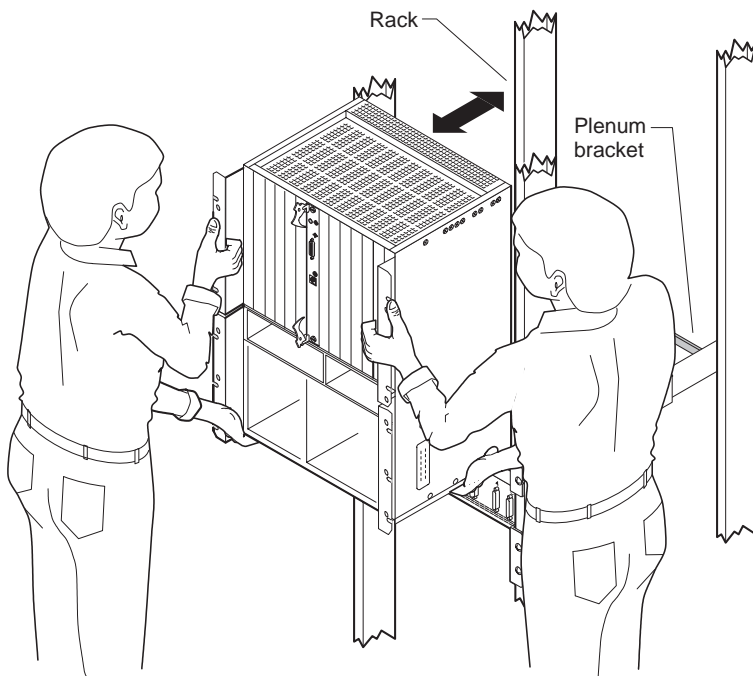
**WARNING**

Remove modules from the unit before lifting. The empty GIGAswitch/ATM unit weighs 500 kg (110 lb). Use two people to lift the unit.

---

Refer to [Figure 10-3](#) and complete the following steps to lower the empty GIGAswitch/ATM system.

**Figure 10-3: Lowering the Empty System**



LKG-09327-97MI

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Step	Action
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.

---

# Chapter 11

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## Replacing Backplanes

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### Overview

#### Introduction

This chapter describes the procedures for replacing the power backplanes. These procedures should take approximately 60 minutes and require the following tools:

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

#### In This Chapter

Topic	Page
<a href="#">Before You Replace a Backplane</a>	11-2
<a href="#">Accessing the Backplanes</a>	11-3
<a href="#">Replacing the Power Backplane</a>	11-5
<a href="#">Replacing the Crossbar Module</a>	11-9
<a href="#">Restoring the System</a>	11-11

---

## Before You Replace a Backplane

### Checking the Causes

Because of the complexity involved in removing backplanes, make sure that you eliminate all other possible causes for your equipment failure before replacing a backplane.

---

#### NOTE

Replacing the logic backplane is not recommended. Return your unit if the logic backplane fails.

---

Remove all the modules from the selected backplane before removing the backplane.

### References

Read [Chapter 8](#) before attempting to replace a power backplane as described in this chapter.

See [Chapter 9](#) for information about removing the modules.

## Accessing the Backplanes

### Overview

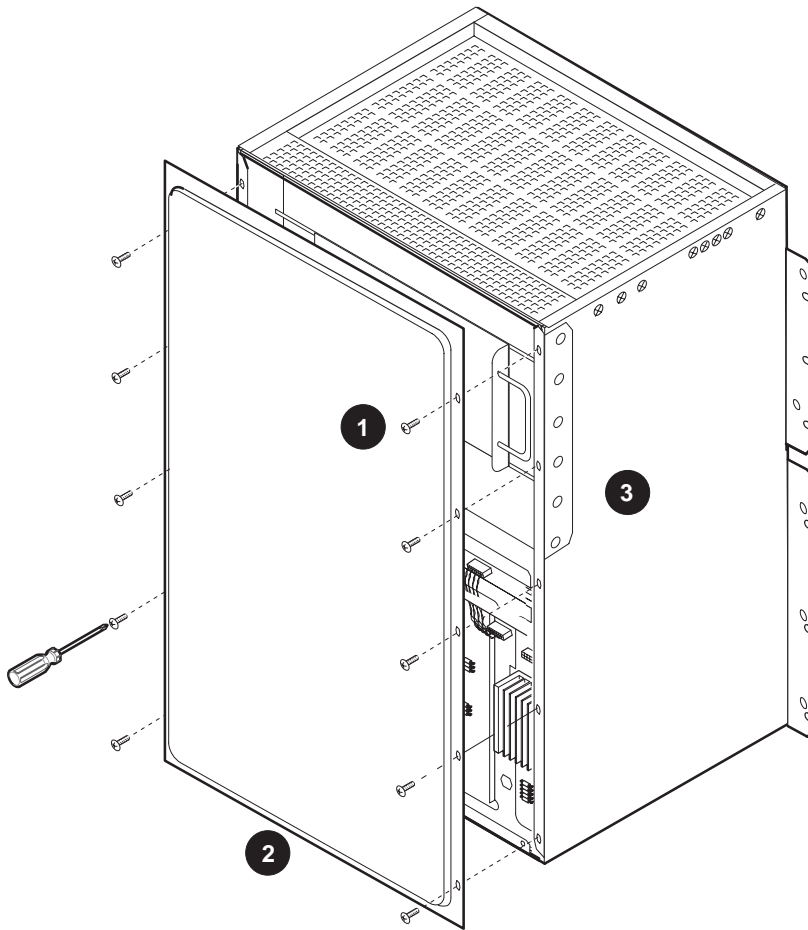
To access the backplanes, you must remove the back door from the GIGAswitch/ATM system. This section describes the procedure for removing the back door.

### Removing the Back Door

Refer to [Figure 11-1](#) and complete the following steps to remove the back door from the GIGAswitch/ATM system.

## Accessing the Backplanes

**Figure 11-1: Removing the Back Door**



LKG-10765-98WF

Step	Action
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).

---

## Replacing the Power Backplane

Replacing the power backplane involves the following tasks:

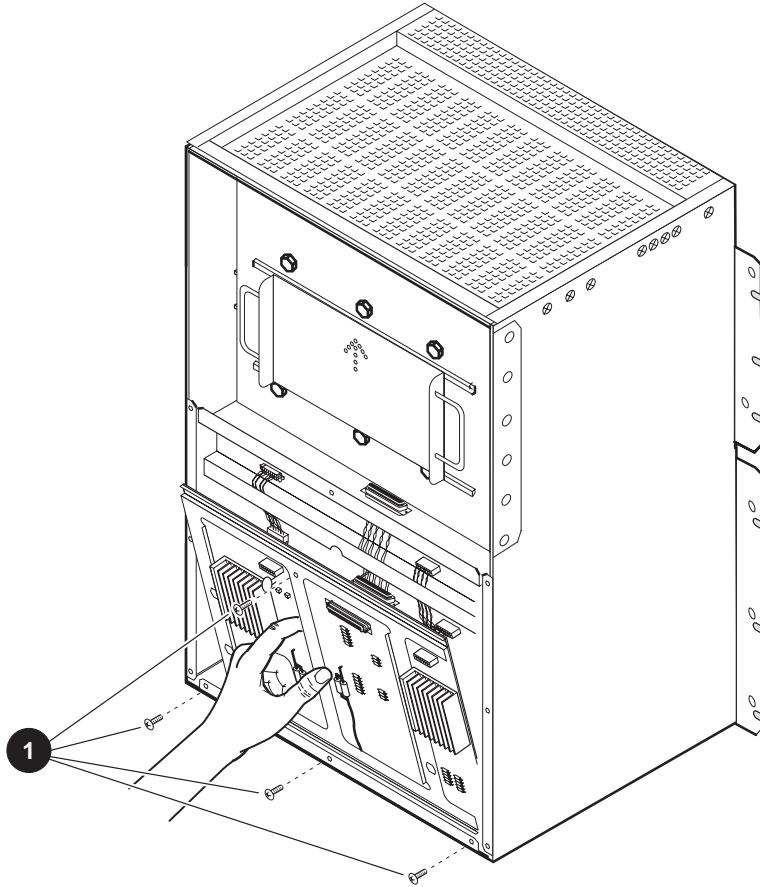
Task	Action
1	<a href="#">Removing the Power Backplane</a>
2	<a href="#">Installing the Power Backplane</a>

### Removing the Power Backplane

Refer to [Figure 11-2](#) and complete the following steps to remove the power backplane from the GIGAswitch/ATM system.

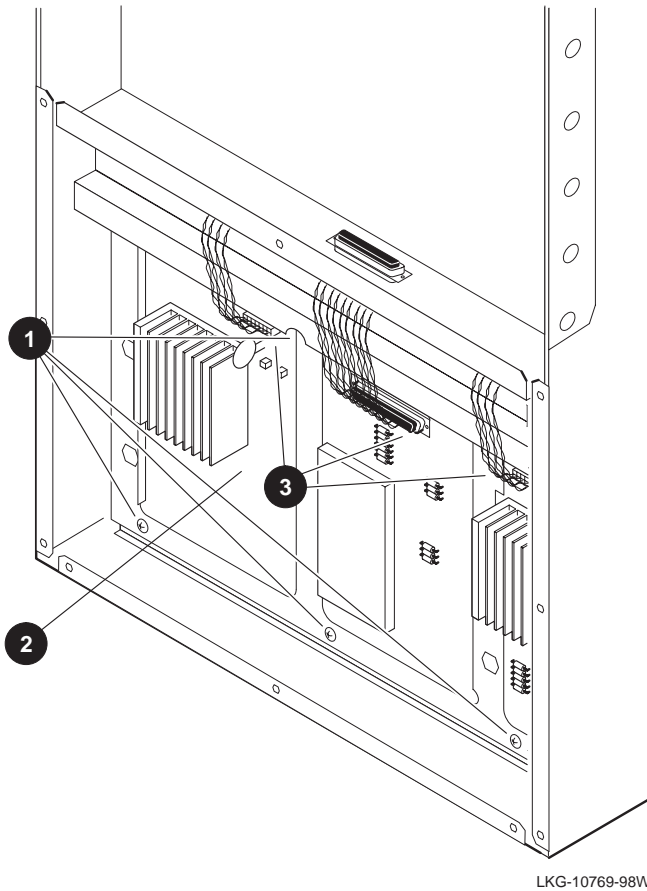
## Replacing the Power Backplane

**Figure 11-2: Removing the Power Backplane**



LKG-10766-98WF

## Replacing the Power Backplane



Step	Action
1	Remove the back door (see <a href="#">Figure 11-1</a> ).
2	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.
3	Unplug the three cables (3). Remove the two fan tray assembly cables with the squeezable tab-type connectors 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.
4	Drop the top back and lift the power backplane away from the GIGAswitch/ATM system.



## Replacing the Power Backplane

### Installing the Power Backplane

Refer to [Figure 11-2](#) and complete the following steps to install the power backplane into the system.

Step	Action
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 onto 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.
5	Install the back door (see <a href="#">Figure 11-5</a> ).

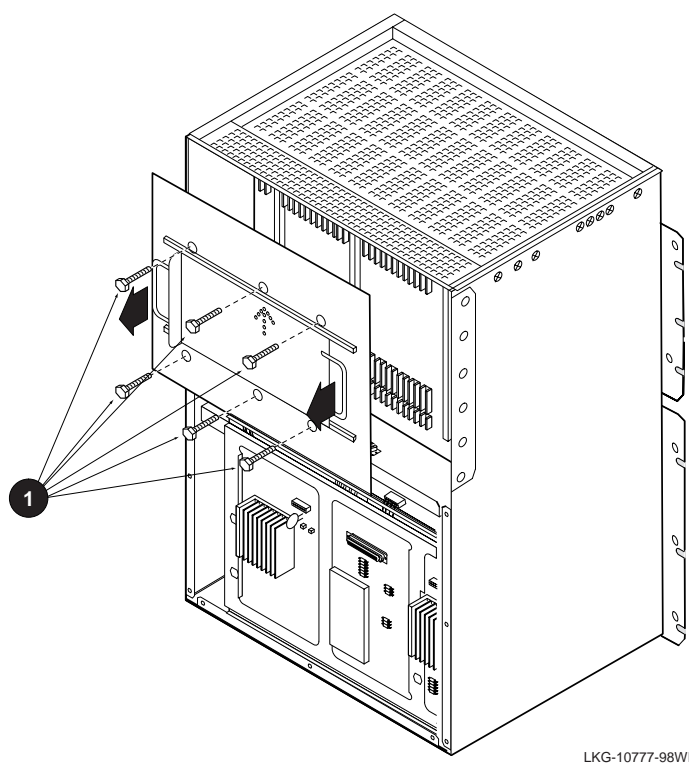
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## Replacing the Crossbar Module

### Removing the Crossbar Module

Refer to [Figure 11-3](#) and complete the following steps to remove the crossbar module from the system.

**Figure 11-3: Removing the Crossbar Module**



LKG-10777-98WI

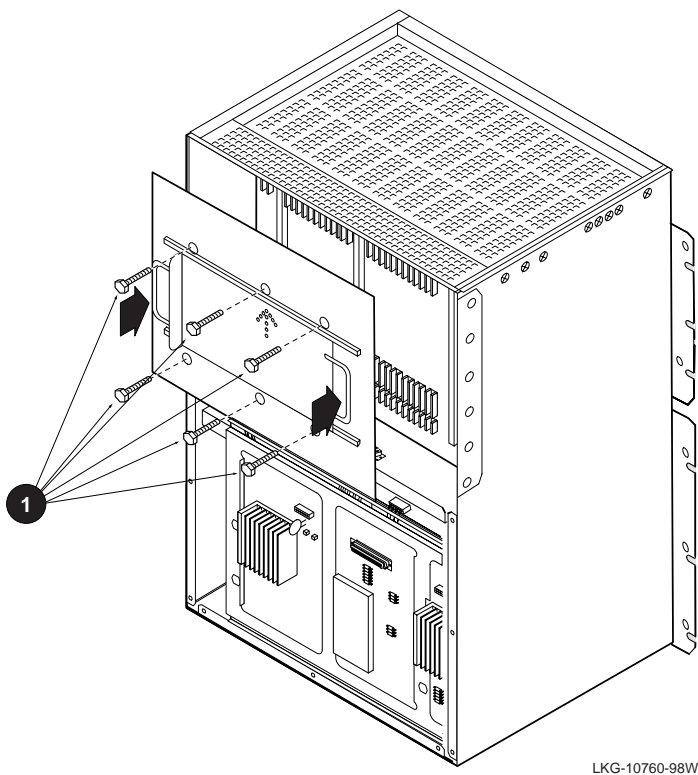
Step	Action
1	Remove the back door (see <a href="#">Removing the Back Door on page 11-3</a> ).
2	Locate the six hex bolts (1) that fasten the crossbar module to the GIGAswitch/ATM system.
3	Loosen each bolt (starting from the top left and continuing clockwise) one revolution at a time using a 12.7-mm (1/2-in) socket wrench.
4	Lift the crossbar module away from the GIGAswitch/ATM system using the handles.

## Replacing the Crossbar Module

### Installing the Crossbar Module

Refer to [Figure 11-4](#) and complete the following steps to install the crossbar module into the system.

**Figure 11-4: Installing the Crossbar Module**



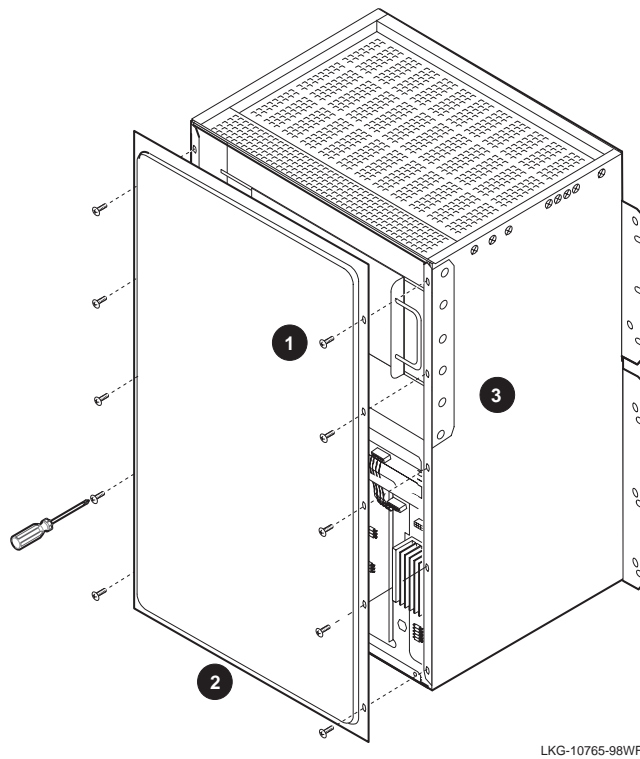
Step	Action
1	Locate the six hex bolts (1) that fasten the crossbar module to the GIGAswitch/ATM system.
2	Place the crossbar module onto the GIGAswitch/ATM system using the handles.
3	Thread each of the six bolts until you feel resistance. Using a 12.7-mm (1/2-in) socket wrench, tighten each bolt (starting from the top left and continuing clockwise) one revolution at a time.
4	Install the back door (see <a href="#">Installing the Back Door on page 11-11</a> ).

## Restoring the System

### Installing the Back Door

Refer to [Figure 11-5](#) and complete the following steps to install the back door.

**Figure 11-5: Installing the Back Door**



LKG-10765-98WF

Step	Action
1	Locate the screws (1) that fasten the back door to the GIGAswitch/ATM system (3) and the lower lip (2).
2	Align the key slots 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.

### Installing the Modules

To restore the system, install the modules into the selected backplane (see [Chapter 7](#)).



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## Part 4

## Reference

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Part 4 contains GIGAswitch/ATM system reference information. Part 4 contains the following chapters:

Appendix	Description
<b>A</b>	Provides physical, electrical, and environmental specifications for the GIGAswitch/ATM system.
<b>B</b>	Describes the cooling and power modules in the following module families: <ul style="list-style-type: none"><li>• Fan tray assembly</li><li>• Front end unit (FEU)</li><li>• Power status assembly (PSA)</li><li>• Power system controller (PSC)</li></ul>
<b>C</b>	Describes the logic modules in the line card and clock card families.
<b>D</b>	Provides guidelines for installing additional logic modules.

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## Appendix A

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# GIGAswitch/ATM System Specifications

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## Overview

### Introduction

This appendix provides the specifications for the GIGAswitch/ATM system.

### In This Appendix

Topic	Page
<a href="#">Physical Dimensions</a>	A-2
<a href="#">Electrical Information</a>	A-3
<a href="#">Power Cord Types</a>	A-5
<a href="#">DC Power Requirements</a>	A-7
<a href="#">Environmental Information</a>	A-10
<a href="#">International Regulatory Approvals</a>	A-12
<a href="#">Acoustical Specifications</a>	A-13

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## Physical Dimensions

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# Physical Dimensions

## Physical Specifications

**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.	Typical	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 (back)	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 (back)	914	–	–	millimeters	mm
	36.0	–	–	inches	in
Service clearance (side)	0	–	–	millimeters	mm
Service clearance (top)	0	–	–	millimeters	mm
Shipping weight <sup>1</sup>	–	99.8	120	kilograms	kg
	–	220	264	pounds	lb

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<sup>1</sup>Shipping specifications for standard shipping container

## Electrical Information

### 20 Ampere FEU AC Power Requirements

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

**Table A-2: AC Power Requirements for the 20 Ampere FEU**

Parameter	Min.	Typical	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
120 V single phase input current (steady state)	–	10	20	amperes	A
120 V single phase input current (ground G)	–	–	1.0	milliamperes	mA
240 V single phase input current (steady state)	–	5.0	10	amperes	A
240 V single phase input current (ground G)	–	–	1.0	milliamperes	mA
Ride-through time	100	–	–	milliseconds	ms
In-rush current	–	–	N/A	amperes peak	A
Startup current	–	–	N/A	rms amperes	A
Startup current duration	–	–	N/A	seconds	s
Power consumption	–	1038 <sup>1</sup>	1730	watts	W
Apparent power	–	1116 <sup>1</sup>	1860	volt amperes	VA
Power factor	–	0.95	–	none	PF
Crest factor	–	1.37	–	none	CF
Efficiency factor	–	0.83	–	none	N/A

1. With maximum load.

## Electrical Information

### 15 Ampere AC Power Requirements

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

**Table A-3: AC Power Requirements for the 15 Ampere FEU**

Parameter	Min.	Typical	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
120 V single phase input current (steady state)	–	8.0	15	amperes	A
120 V single phase input current (ground G)	–	–	1.0	milliamperes	mA
240 V single phase input current (steady state)	–	4.0	7.5	amperes	A
240 V single phase input current (ground G)	–	–	1.0	milliamperes	mA
Ride-through time	100	–	–	milliseconds	ms
In-rush current	–	–	N/A	amperes peak	A
Startup current	–	–	N/A	rms amperes	A
Startup current duration	–	–	N/A	seconds	s
Power consumption	–	795 <sup>1</sup>	1325	watts	W
Apparent power	–	837 <sup>1</sup>	1395	volt amperes	VA
Power factor	–	0.95	–	none	PF
Crest factor	–	1.37	–	none	CF
Efficiency factor	–	0.83	–	none	

1. With maximum load.

---

## Power Cord Types

### Power Cords for the 20 Ampere Power Supply

**Table A-4** lists the power cords used in the various country kits available with the 20 ampere power supply for the GIGAswitch/ATM system.

**Table A-4: Power Cords for the 20 Ampere 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

Power cords are 2.5 meters in length.

## Power Cord Types

### Power Cords for the 15 Ampere Power Supply

**Table A-5** lists the power cords used in the various country kits available with the 15 ampere power supply for the GIGAswitch/ATM system.

**Table A-5: Power Cords for the 15 Ampere 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

Power cords are 2.5 meters in length.

## DC Power Requirements

### 48 Volt FEU DC Power Requirements

**Table A-6** 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-6: DC Power Requirements for the 48 Volt FEU**

Parameter	Min.	Typical	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
Startup current	–	–	25	amperes	A
Startup current duration	–	–	1	seconds	s
Power consumption	–	800	940 <sup>1</sup>	watts	W

1. With maximum load and minimum input source voltage.

## DC Power Requirements

### 15 Ampere FEU Power Requirements

Table A-7 shows the dc output power capacity for the 15 ampere FEU.

**Table A-7: DC Power Capacity for the 15 Ampere FEU**

Parameter	Min.	Typical	Max.	Units	Symbol
Current at 48 Vdc	–	12	21	amperes	A
Current at 12 to 26 Vdc	–	3.6	5.0	amperes	A
DC voltage range (48 Vdc)	46.32	–	49.68	volts	Vdc
DC voltage range (12 Vdc to 26 Vdc)	11.0	–	27.1	volts	Vdc
Output watts available	–	–	1100 <sup>1</sup>	watts	W
Current available at 48 Vdc	–	–	22	amperes	A
Current available at 11 to 27.1 Vdc	–	–	1.5 to 5.0	amperes	A

1.For input that includes fans and 48 V load.

### 20 Ampere FEU Power Requirements

Table A-8 shows the dc output power capacity for the 20 ampere FEU.

**Table A-8: DC Power Capacity for the 20 Ampere AC FEU**

Parameter	Min.	Typical	Max.	Units	Symbol
Current at 48 Vdc	–	12	28	amperes	A
Current at 12 to 26 Vdc	–	3.6	5.0	amperes	A
DC voltage range (48 Vdc)	46.32	–	49.68	volts dc	Vdc
DC voltage range (12 Vdc to 26 Vdc)	11.0	–	27.1	volts dc	Vdc
Output watts available	–	–	1467 <sup>1</sup>	watts	W
Current available at 48 Vdc	–	–	22	amperes	A
Current available at 11 to 27.1 Vdc	–	–	1.5 to 5.0	amperes	A

1.For input that includes fans and 48 V load.

## 48 Volt FEU Power Requirements

**Table A-9** shows the dc power requirements for the 48 volt FEU.

**Table A-9: DC Power Capacity for the 48 Volt FEU**

Parameter	Min.	Typical	Max.	Units	Symbol
Current at 48 Vdc	–	12	25	amperes	A
Current at 12 to 26 Vdc	–	3.6	5.0	amperes	A
DC voltage range 48 Vdc)	40.0	–	60.0	volts dc	Vdc
DC voltage range (12 Vdc to 26 Vdc)	11.0	–	27.1	volts dc	Vdc
Output watts available	940 <sup>1</sup>	–	1500 <sup>2</sup>	watts	W
Current available at 48 Vdc	–	–	25	amperes	A
Current available at 11 to 27.1 Vdc	–	–	1.5 to 5.0	amperes	A

1. At 40 Vdc input source voltage.

2. At 60 Vdc input source voltage.



## Environmental Information

### Environmental Specifications

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

**Table A-10: Environmental Information**

Parameter	Min.	Typical	Max.	Units	Symbol
Temperature <sup>1</sup> (operating)	10	–	40	degrees Celsius	°C
	50	–	104	degrees Fahrenheit	°F
Temperature (storage)	-40	–	66	degrees Celsius	°C
	-40	–	151	degrees Fahrenheit	°F
Relative humidity	10	–	90	percent relative humidity (noncondensing)	%RH
Heat dissipation	–	800	1250	watts	W
	–	2730	4265	British thermal units per hour	Btu/hr
Altitude (operating)	–	–	4267	meters above sea level	m
	–	–	14,000	feet above sea level	ft
Altitude (nonoperating)	–	–	12,192	meters above sea level	m
	–	–	40,000	feet above sea level	ft

1. For sites above 2400 m (8,000 ft), decrease the operating temperature specification by 1.8° C for each 1000 m or 3.2°F for each 3200 ft.

## Vibration Level

**Table A-11** shows the vibration level specifications.

**Table A-11: Vibration Level**

Parameter	Specification
Operating vibration (sine) DEC-STD-102-2 Class C	5 to 16 Hz @ 0.02 in DA 16 to 200 Hz @ 0.25 G peak 200 to 500 Hz @ 0.1 G peak
Nonoperating vibration (random) - DEC-STD-102	5 to 10 Hz @ +8 dB/octave 10 to 50 Hz @ 0.015 G <sup>2</sup> /Hz 50 to 300 Hz @ -8 dB/octave Total Energy: 1.03 G RMS
Operating shock	10 G / 10 ms half sine pulse in three orthogonal axes

## Ventilation

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

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

**Table A-12** lists the ventilation locations.

**Table A-12: Ventilation Locations**

Air Flow	Location
Intake	Top front
Exhaust	Bottom back

## International Regulatory Approvals

**Table A-13** shows the international regulatory compliance for the GIGAswitch/ATM system.

**Table A-13: International Regulatory Compliance**

<b>Regulatory</b>	<b>Compliance</b>
<b>Safety</b>	
CSA Certified	Canada
UL Listed	USA
UL Classified to IEC 950	European Union
CB Certified to IEC 950/EN60950	Non-EU Europe and Asia-Pacific
AS/NZS 3260	Australia/New Zealand
<b>EMC</b>	
FCC	USA, Canada
VCCI	Japan
ACA	Australia, New Zealand
BCIQ	Taiwan
CE	European Union

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## Acoustical Specifications

**Table A-14** and **Table A-15** lists the acoustical specifications for the module in English and German.

**Table A-14: English Acoustical Specifications**

Declared Values per ISO 9296 and ISO 7779<sup>1</sup>

<b>Product</b>	<b>Sound Power Level <math>L_{wAd}</math>, B</b>	<b>Sound Pressure Level <math>L_{pAm}</math>, dBA (bystander positions)</b>
	<b>Idle/Operate</b>	<b>Idle/Operate</b>
DAGGA	6.2	46

<sup>1</sup>.Current values for specific configurations are available from Digital Equipment Corporation representatives. 1 B = 10 dBA.

**Table A-15: German Acoustical Specifications**

Schallemissionswerte Werteangaben nach ISO 9296 und ISO 7779/DIN EN27779<sup>1</sup>

<b>Produkt</b>	<b>Schalleistungspegel <math>L_{wAd}</math>, B</b>	<b>Schalldruckpegel <math>L_{pAm}</math>, dBA (Zuschauerpositionen)</b>
	<b>Leerlauf/Betrieb</b>	<b>Leerlauf/Betrieb</b>
DAGGA	6,2	46

<sup>1</sup>.Aktuelle Werte für spezielle Ausrüstungsstufen sind über die Digital Equipment Vertretungen erhältlich. 1 B = 10 dBA



## Appendix B

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# Cooling and Power Modules

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## Overview

### Introduction

This appendix provides a description of the cooling and power modules in the GIGAswitch/ATM system.

### In This Appendix

Topic	Page
<a href="#">Fan Tray Assembly</a>	<a href="#">B-2</a>
<a href="#">Front End Unit</a>	<a href="#">B-3</a>
<a href="#">Power Status Assembly (PSA)</a>	<a href="#">B-6</a>
<a href="#">Power System Controller (PSC) Card</a>	<a href="#">B-8</a>

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## Fan Tray Assembly

The fan tray assembly (part number, 70-30578-01) is a member of the fan tray assembly family of cooling modules. The fan tray assembly contains two 5.75 in (146.05 mm) fans used to provide convective cooling to the GIGAswitch/ATM system. These variable-speed fans are controlled by the Power System Controller (PSC) card based on ambient temperature.

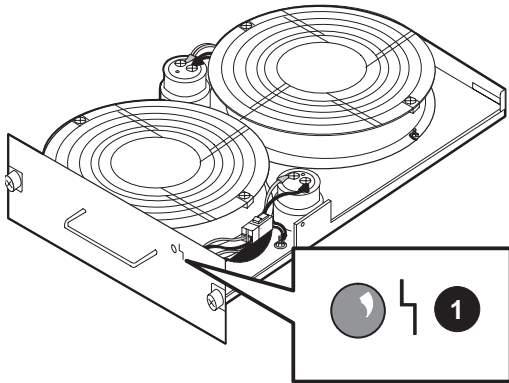
### Air Flow

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

### LED Meaning

**Figure B-1** and its associated table identify the fan tray assembly LED and the meaning of its condition.

**Figure B-1: Fan Tray Assembly LED**



LKG-09231-97MI

Item	Name	Condition	Meaning
1	Fan tray assembly fault	Off	MST passed.
		Steady amber	MST failed.

---

## Front End Unit

The front end unit (FEU) (part number, DEFGB-*xx*, where *xx* is the version number of the FEU) is a member of the FEU family of power modules.

### 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 40 V to 60 V and does not provide redundancy in a system requiring power greater than 940 watts.

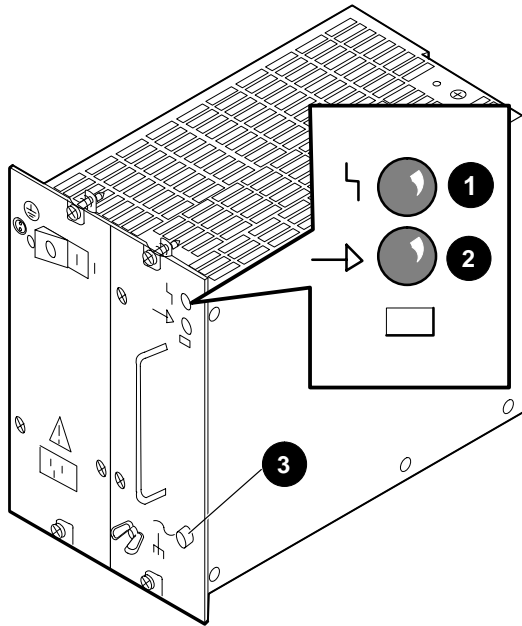
### LEDs

**Figure B-2** and its associated table identify the ac FEU LEDs and the meaning for each condition. **Figure B-3** and its associated table identify the dc FEU LEDs and the meaning for each condition.



## Front End Unit

**Figure B-2: AC FEU LEDs**

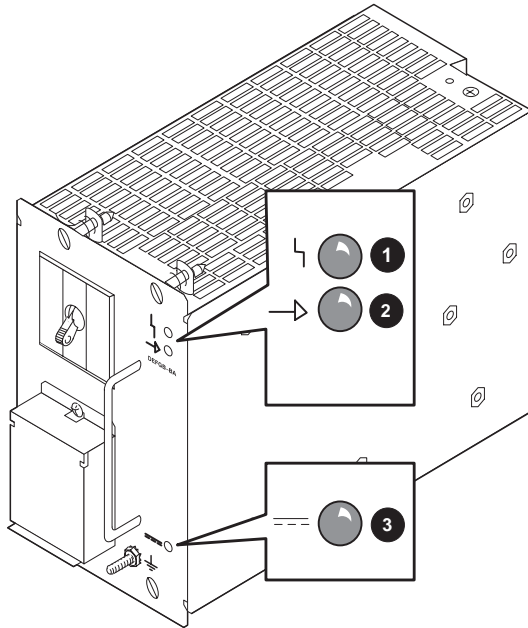


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Item	Name	Condition	Meaning
1	Front end unit (FEU)	Steady amber	MST failed.
2	Front end unit (FEU) OK	On green	MST passed.
3	Power	Off	Source power is NOT available at the FEU's input.
		On	Source power is available at the FEU's input.

Front End Unit

Figure B-3: 48 Vdc FEU LEDs



LKG-09752-97MI

Item	Name	Condition	Meaning
1	Front end unit (FEU)	Steady amber	MST failed.
2	Front end unit (FEU) OK	On 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.

## Power Status Assembly (PSA)

The power status assembly (PSA) (part number, 70-30585-02) is a module that contains the power system controller (PSC) card and system security switch. Refer to [Power System Controller \(PSC\) Card on page B-8](#) for more information about the PSC.

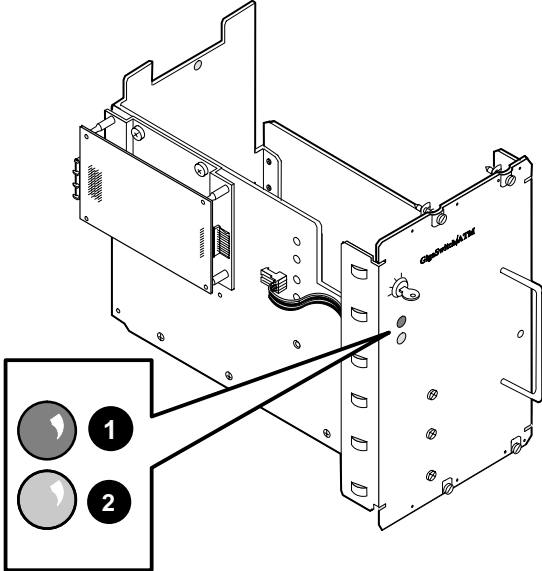
### LED Testing

All LEDs light for one second during startup to ensure that the LEDs are operational. After startup, only those LEDs indicating faults remain on.

### LED Meaning

[Figure B-4](#) and its associated table identify the LEDs on the PSA.

Figure B-4: PSA LEDs



LKG-09233-97MI

Item	Name	Condition	Meaning
1	PSC card fault	Off	MST passed.
		Steady amber	MST failed.
2	System temperature fault	Steady red	System temperature fault.
		Off	System temperature normal.

---

## Power System Controller (PSC) Card

The power system controller (PSC) card (part number, 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.

### Functions

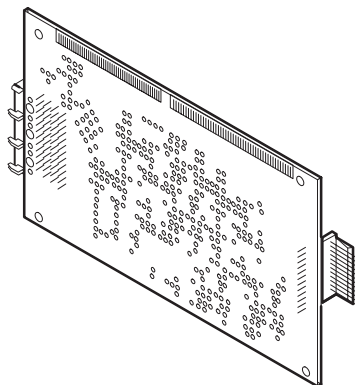
The PSC card is that portion of the GIGAswitch/ATM that controls and monitors the 48 Vdc power supply and the fan tray assemblies. The PSC card reports the operational status of the monitored units.

The PSC card performs the following functions:

- MST diagnostics, and fan tests at startup
- 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

**Figure B-5** shows the physical characteristics of the PSC card.

**Figure B-5: PSC Card**



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# Appendix C

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## Logic Modules

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### Overview

#### Introduction

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

- Line cards
- Clock card
- Crossbar module

#### In This Appendix

Topic	Page
<a href="#">4-Port Modular Line Card (DAGGL-BA)</a>	C-2
<a href="#">4-Port Modular Line Card (DAGGL-BC)</a>	C-3
<a href="#">1-Port 622 Mb/s MMF Line Card (DAGGL-CA)</a>	C-4
<a href="#">Clock Card (F5-23289)</a>	C-5
<a href="#">Crossbar Module</a>	C-7

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## 4-Port Modular Line Card (DAGGL-BA)

### Family

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

### 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.

### Reference

Refer to *ATM Modular PHY Cards Installation* for more information about the installation and use of ATM modPHY cards.

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## 4-Port Modular Line Card (DAGGL-BC)

### Family

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

### Function

The line card performs ATM cell-forwarding functions among a set of connected ATM links. This line card implements four ports using the supported links provided by the ATM modPHY cards and connects these ports to the crossbar module.

The DAGGL-BC is a logic module that supports the following ATM modPHY cards:

- STS-3c (155 Mb/s) multimode fiber (MMF), DAGGM-AA
- STS-3c (155 Mb/s) single-mode fiber (SMF), DAGGS-AA
- STS-3c (155 Mb/s) unshielded twisted-pair (UTP) or STS-3c (155 Mb/s) screened twisted-pair (ScTP), DAGGU-AA
- T3 (44 Mb/s) coaxial, DAGGT-AA
- E3 (34 Mb/s) coaxial, DAGGE-AA
- E1 (2 Mb/s) short reach twisted-pair (TP), DAGE1-AA
- T1 (1.54 Mb/s) short reach twisted-pair (TP), DAGT1-AA
- ATM VP loopback card, DAGVP-AA for wide area networking features

### Reference

Refer to *DIGITAL ATM 4-Port Modular Line Card (EK-DAGBC-IN)* for more information.

Refer to *DIGITAL ATM Modular PHY Cards Installation* for more information about the installation and use of ATM modPHY cards.



## 1-Port 622 Mb/s MMF Line Card (DAGGL-CA)

### Family

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

### Function

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

---

## Clock Card (F5-23289)

### Family

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.

### Function

The clock card performs the following functions:

- **Clock Generation and Distribution**
- **Terminal or Modem Interface**
- **PSC Card Interface**
- **Line Card Monitoring and Power Control**

### 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.

### 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 RS-423. 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, and data length are stored locally on the clock card in nonvolatile flash memory.

### PSC Card Interface

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

- Power supply status
- State of the fans
- Ambient temperature

## Clock Card (F5-23289)

### 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 clock card performs the following major functions:

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

In addition, the clock card stores many centralized resources. Examples of such resources include the following:

- Ethernet addresses associated with each GIGAswitch/ATM system platform
- Network and local management parameters
- Parameters learned about any local topology

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## Crossbar Module

### Description

The crossbar function in a GIGAswitch/ATM system is accomplished by the crossbar module that implements a 32-bit, 13-port crossbar switch.

### Function

The function of the crossbar 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 Mb/s for each port. Any input port may be connected to any single output or group of outputs. Each connection must be specified individually.

### Specifications

The crossbar has an aggregate maximum bandwidth of 10.4 Gb/s. Connections are made through the crossbar every 520 nanoseconds. The crossbar supports concurrent full-duplex communication across all ports.



## Appendix D

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# Guidelines for Installing Additional Modules

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## Overview

### Introduction

This appendix provides guidance for installing additional logic modules in the GIGAswitch/ATM system.

### In This Appendix

Topic	Page
<a href="#">Identifying the Contents of the GIGAswitch/ATM System</a>	<a href="#">D-2</a>
<a href="#">Recommended Location for Logic Modules</a>	<a href="#">D-4</a>

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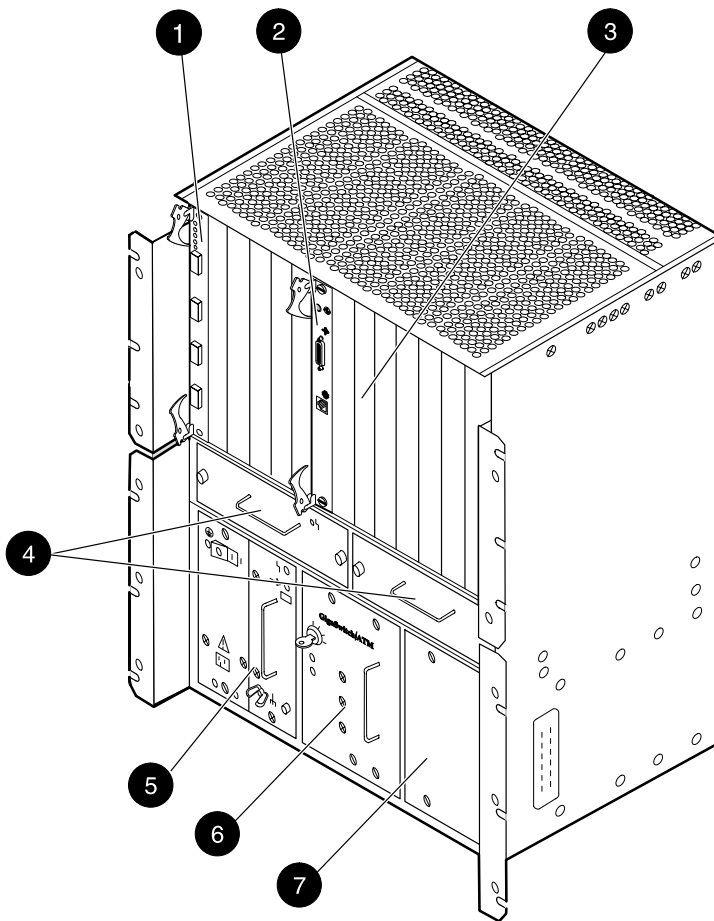
## Identifying the Contents of the GIGAswitch/ATM System

### Description

The contents of the GIGAswitch/ATM system depend on the options ordered with the system.

Refer to **Figure D-1** and **Table D-1** to identify the contents of a sample configuration.

**Figure D-1: GIGAswitch/ATM Configuration**



LKG-09318-97MI

## Identifying the Contents of the GIGAswitch/ATM System

**Table D-1: Contents of the GIGAswitch/ATM Configuration**

<b>Item</b>	<b>Name</b>	<b>Part Number</b>	<b>Comment</b>
1	4-port modular line card	DAGGL-BA	Additional line cards can be ordered separately by the customer.
2	Clock card	F5-23289	Included in all versions of the product.
3	Empty logic slots	70-30587-05	All are covered by blank handles.
4	Fan tray assemblies	70-30578-01	Two are included in all versions of the product.
5	Front end unit (FEU)	DEFGB	Order the appropriate FEU for your system. If you are using more than ten line cards in your system, order one 20 A power supply or two 48 V power supplies. If you are using less than ten line cards, you can order one power supply (20 A or 48 V). One additional FEU can be ordered as a redundant power supply.
6	Power Status Assembly (PSA)	70-30585-01	Included in all versions of the product.
7	Power supply filler panel	70-30912-01	Included in all versions of the product.



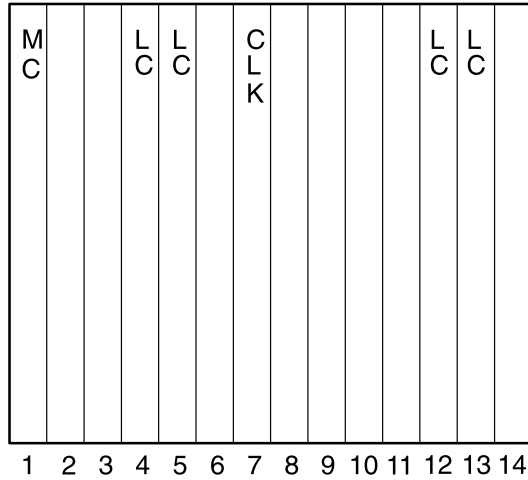
## Recommended Location for Logic Modules

### Locations

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 locations shown in **Figure D-2** and described in **Table D-2** for smaller populations of line cards and for minimum future upgrade impact.

Recommended Location for Logic Modules

**Figure D-2: Logic Module Locations**



LKG-10761-98WI

**Table D-2: Positions of Line Cards**

Abbreviation	Part Number	Description
MC	DAGGL- <i>xx</i> <sup>1</sup>	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- <i>xx</i> <sup>1</sup>	The customer can order additional line cards separately.
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.

<sup>1</sup>The *xx* variables specify particular line cards.

