Enterasys® G-Series

Ethernet Switch

Hardware Installation Guide

G3G124-24
G3G124P-24
G3G170-24

9034357-05

Electrical Hazard: Only qualified personnel should perform installation procedures.

Riesgo Electrico: Solamente personal calificado debe realizar procedimientos de instalacion.

Elektrischer Gefahrenhinweis: Installationen sollten nur durch ausgebildetes und qualifiziertes Personal vorgenommen werden.

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Part Number: 9034357-05 October 2008

Documentation URL: http://www.enterasys.com/support/manuals

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This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

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Clase A. Aviso de ITE

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AS/NZS CISPR 22

Hazardous Substances

This product complies with the requirements of European Directive, 2002/95/EC, Restriction of Hazardous Substances (RoHS) in Electrical and Electronic Equipment.

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In accordance with Directive 2002/96/EC of the European Parliament on waste electrical and electronic equipment (WEEE):

1. The symbol above indicates that separate collection of electrical and electronic equipment is required and that this product was placed on the European market after August 13, 2005, the date of enforcement for Directive 2002/96/EC.
2. When this product has reached the end of its serviceable life, it cannot be disposed of as unsorted municipal waste. It must be collected and treated separately.
3. It has been determined by the European Parliament that there are potential negative effects on the environment and human health as a result of the presence of hazardous substances in electrical and electronic equipment.
4. It is the users' responsibility to utilize the available collection system to ensure WEEE is properly treated.

   For information about the available collection system, please go to www.enterasys.com/services/support/ or contact Enterasys Customer Support at 353 61 705586 (Ireland).

产品说明书附件
Supplement to Product Instructions

部件名称 (Parts)	有毒有害物质或元素 (Hazardous Substance)					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr^{6+})	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
金属部件 (Metal Parts)	×	○	○	○	○	○
电路模块 (Circuit Modules)	×	○	○	○	○	○
电缆及电缆组件 (Cables & Cable Assemblies)	×	○	○	○	○	○
塑料和聚合物部件 (Plastic and Polymeric parts)	○	○	○	○	○	○
电路开关 (Circuit Breakers)	○	○	○	○	○	○

○： 表示该有毒有害物质在该部件所有均质材料中的含量均在 SJ/T 11363-2006 标准规定的限量要求以下。
Indicates that the concentration of the hazardous substance in all homogeneous materials in the parts is below the relevant threshold of the SJ/T 11363-2006 standard.

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Safety Information
Class 1 Laser Transceivers

The single mode interface modules use Class 1 laser transceivers.
Read the following safety information before installing or operating these modules.

The Class 1 laser transceivers use an optical feedback loop to maintain Class 1 operation limits. This control loop eliminates the need for maintenance checks or adjustments. The output is factory set, and does not allow any user adjustment. Class 1 Laser transceivers comply with the following safety standards:

- 21 CFR 1040.10 and 1040.11 U.S. Department of Health and Human Services (FDA).
- IEC Publication 825 (International Electrotechnical Commission).
- CENELEC EN 60825 (European Committee for Electrotechnical Standardization).

When operating within their performance limitations, laser transceiver output meets the Class 1 accessible emission limit of all three standards. Class 1 levels of laser radiation are not considered hazardous.

When the connector is in place, all laser radiation remains within the fiber. The maximum amount of radiant power exiting the fiber (under normal conditions) is -12.6 dBm or 55 x 10^{-6} watts.

Removing the optical connector from the transceiver allows laser radiation to emit directly from the optical port. The maximum radiance from the optical port (under worst case conditions) is 0.8 W cm^{-2} or 8 x 10^{3} W m^{2} sr-1.

Do not use optical instruments to view the laser output. The use of optical instruments to view laser output increases eye hazard. When viewing the output optical port, power must be removed from the network adapter.

Safety Compliance

Warning: Fiber Optic Port Safety

When using a fiber optic media expansion module, never look at the transmit laser while it is powered on. Also, never look directly at the fiber TX port and fiber cable ends when they are powered on.

Avertissment: Ports pour fibres optiques - sécurité sur le plan optique

Ne regardez jamais le laser tant qu'il est sous tension. Ne regardez jamais directement le port TX (Tramsmission) à fibres optiques et les embouts de câbles à fibres optiques tant qu'ils sont sous tension.

Warnhinweis: Faseroptikanschlüsse - Optische Sicherheit

Niemals ein Übertragungslaser betrachten, während dieses eingeschaltet ist. Niemals direkt auf den Faser-TX-Anschluß und auf die Faserkabelenden schauen, während diese eingeschaltet sind.

Declaration of Conformity

Application of Council Directive(s):	**2004/108/EC** **2006/95/EC**
Manufacturer's Name:	**Enterasys Networks, Inc.**
Manufacturer's Address:	**50 Minuteman Road** **Andover, MA 01810** **USA**
European Representative Name:	**Enterasys Networks, Ltd.**
European Representative Address:	**Nexus House, Newbury Business Park** **London Road, Newbury** **Berkshire RG14 2PZ, England**
Conformance to Directive(s)/Product Standards:	**EC Directive 2004/108/EC** **EN 55022:2006** **EN 55024:1998** **EN 61000-3-2:2000** **EN 61000-3-3:1995** **EC Directive 2006/95/EC** **EN 60950-1:2001** **EN 60825-1:1994** **EN 60825-2:2004**
Equipment Type/Environment:	**Information Technology Equipment, for use in a Commercial or Light Industrial Environment.**

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14. **TERMINATION.** Enterasys may terminate this Agreement immediately upon Your breach of any of the terms and conditions of this Agreement. Upon any such termination, You shall immediately cease all use of the Program and shall return to Enterasys the Program and all copies of the Program.

Contents

Chapter 3: Troubleshooting

Appendix A: Specifications

Index

Figures

Tables

About This Guide

This guide provides an overview, specifications and instructions for installing the Enterasys® G-Series Ethernet Switch in a standard 19-inch equipment rack or on a suitable flat surface. This guide also explains how to interpret the system status LEDs to facilitate troubleshooting when necessary, and also provides information on how to contact Enterasys Networks for additional help.

Who Should Use This Guide

Electrical Hazard: Only qualified personnel should install or service this unit.

Riesgo Electrico: Nada mas personal capacitado debe de instalar o darle servicio a esta unida.

Elektrischer Gefahrenhinweis: Installationen oder Servicearbeiten sollten nur durch ausgebildetes und qualifiziertes Personal vorgenommen werden.

This guide is intended for a network administrator who is responsible for installing and setting up the G-Series switch.

How to Use This Guide

Read through this guide completely to familiarize yourself with its contents and to gain an understanding of the features and capabilities of the G-Series switch. A general working knowledge of data communications networks is helpful.

For information about...	Refer to...
An overview of the G-Series chassis	Chapter 1, **Introduction**
Instructions to install the G-Series chassis hardware	Chapter 2, **Installation**
Troubleshooting installation problems and diagnosing network/operational problems	Chapter 3, **Troubleshooting**
Specifications, environmental requirements, and physical properties of the G-Series	Appendix A, **Specifications**

Related Documents

To configure the G-Series switch, refer to the *Enterasys G-Series CLI Reference*.

Manuals can be accessed on the World Wide Web, using the following URL:

http://www.enterasys.com/support/manuals/

Document Conventions

The following typographical conventions and icons are used in this guide.

blue type	Indicates a hypertext link. When reading this document online, click the text in blue to go to the referenced figure, table, or section.
Lowercase x	Indicates the general use of an alphanumeric character (for example, 6x1xx, the x's indicate a combination of numbers or letters).
	**Note:** Calls the reader's attention to any item of information that may be of special importance.
	**Caution:** Contains information essential to avoid damage to the equipment. **Precaución:** Contiene información esencial para prevenir dañar el equipo. **Achtung:** Verweißt auf wichtige Informationen zum Schutz gegen Beschädigungen.
	**Warning:** Warns against an action that could result in personal injury or death. **Advertencia:** Advierte contra una acción que pudiera resultar en lesión corporal o la muerte. **Warnhinweis:** Warnung vor Handlungen, die zu Verletzung von Personen oder gar Todesfällen führen können!
	**Electrical Hazard:** Warns against an action that could result in personal injury or death. **Riesgo Electrico:** Advierte contra una acción que pudiera resultar en lesión corporal o la muerte debido a un riesgo eléctrico. **Elektrischer Gefahrenhinweis:** Warnung vor sämtlichen Handlungen, die zu Verletzung von Personen oder Todesfällen – hervorgerufen durch elektrische Spannung – führen können!

Commonly Used Acronyms

The following acronyms are used extensively throughout this guide:

- IOM – Input/Output Module
- LED – Light Emitting Diode
- SFP – 1-Gigabit Small Form Factor Pluggable fiber-optic transceiver
- XFP- 10-Gigabit Small Form Factor Pluggable fiber-optic transceiver
- USB – Universal Serial Bus
- ESD – Electrostatic Discharge
- PoE – Power over Ethernet

Getting Help

For additional support related to the G-Series switch, the IOMs, or this document, contact Enterasys Networks using one of the following methods:

World Wide Web	www.enterasys.com/services/support/
Phone	1-800-872-8440 (toll-free in U.S. and Canada) or 1-978-684-1000 To find the Enterasys Networks Support toll-free number in your country: www.enterasys.com/services/support/contact
Internet mail	support@enterasys.com To expedite your message, please type **[Switching]** in the subject line.
To send comments or suggestions concerning this document to the Technical Publications Department: techpubs@enterasys.com To expedite your message, include the document Part Number in the Email message.	

Before contacting Enterasys Networks for technical support, have the following data ready:

- Your Enterasys Networks service contract number
- A description of the failure
- A description of any action(s) already taken to resolve the problem (for example, rebooting the unit)
- The serial and revision numbers of all involved Enterasys Networks products in the network
- A description of your network environment (such as layout, cable type, other relevant environmental information)
- Network load and frame size at the time of trouble (if known)
- The device history (for example, if you have returned the device before, or if this is a recurring problem)
- Any previous Return Material Authorization (RMA) numbers

1

Introduction

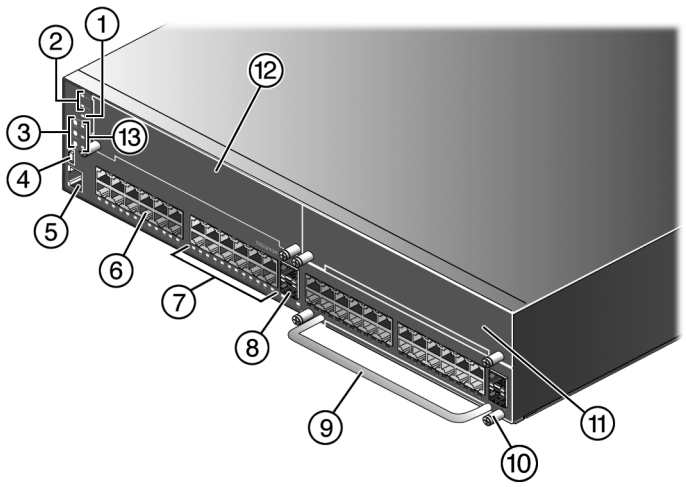
The G-Series Ethernet switch is a modular, high-density switch designed to handle networking demands in commercial and institutional settings, including education, government, and financial environments.

Overview

The G-Series product family includes the G3G124-24, G3G124-24P, and G3G170-24 base systems. These systems provide either 24-10/100/1000 copper ports and two 1-Gigabit Small Form Factor Pluggable fiber-optic transceiver (SFP) combo ports, or 24 SFP ports, in the lower left front panel (fixed Slot 1). Power over Ethernet (PoE) is factory installed on the G3G124-24P base chassis. The base systems also feature three front access I/O slots for installing optional additional IOMs. Currently, there are four G-Series product family IOMs available for the switch: a 24-10/100/1000 copper port and 2 combo port SFP module (similar to the base system front panel interface configuration), a 24-port SFP module, a 2-port 10 Gigabit XFP module and a 4-port 10 Gigabit XFP module.

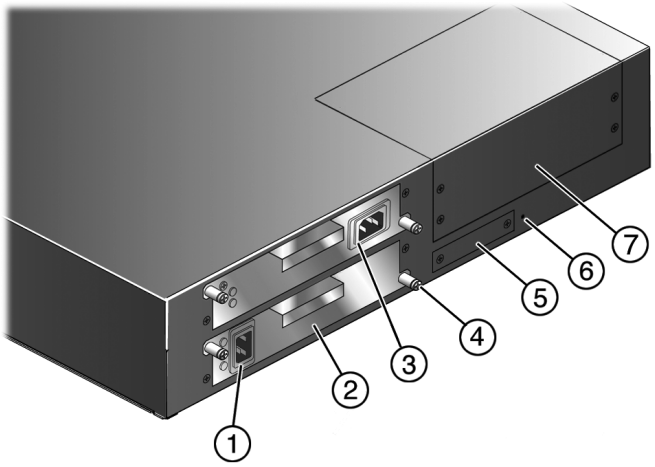
The G-Series switch can be placed as a freestanding unit or installed into a standard 48.26-centimeter (19-inch) rack.

Figure 1-1 G3G124-24 Switch (front view) with one G3G-24TX IOM installed in Slot 2.



1 SYSTEM LED
2 Power Supply LEDs (PWR1 and PWR2)
3 IOM power off buttons (Slots 2, 3 and 4)
4 USB console port
5 RJ45 console port
6 Fixed slot 1 RJ45 ports
7 Port LEDs
8 SFP combo ports
9 IOM handle (G3G-24TX in Slot 2)
10 Captive screw
11 Optional IOM Slot 4 (with coverplate)
12 Optional IOM Slot 3 (with coverplate)
13 IOM power off status LEDs (Slots 2, 3 and 4)

Figure 1-2 G3G124-24 Switch (rear view) with 1200 and 400-watt power supplies installed



1	AC power inlet	**5**	Memory slot with coverplate (reserved for future use)
2	PWR Slot 2 with 1200-watt power supply	**6**	Password reset button
3	PWR Slot 1 with 400-watt power supply	**7**	Optional module slot (reserved for later use)
4	Captive screw		

Features

The G-Series switches include the following features:

- A base system (chassis) containing fixed interfaces in the lower left front panel
  - 24 RJ45 (10/100/1000Mbps,1000BASE-TX copper) ports plus 2 combo SFP ports (G3G124-24 and G3G124-24P)
  - 24 SFP ports (G3G170-24)
- Input/Output Modules (IOMs)

  There are three I/O slots on the front of the G-Series switch, each of which can be populated with the available IOMs. IOMs can be inserted or removed when power is supplied to the base system without impacting other modules. The IOMs available for the G3 base systems are:
  - G3G-24TX, a 24-10/100/1000 copper port and 2 combo port SFP module
  - G3G-24SFP, a 24-port SFP module
  - G3K-2XFP, a 2-port XFP module
  - G3K-4XFP, a 4-port XFP module

Notes: Each combo SFP port on the G3G124-24, G3G124-24P or G3G-24TX supports the installation of Mini-GBICs for 1000Base-SX, 1000Base-LX, 100Base-FX or 1000Base-T copper SFP transceivers.

Each combo SFP port in use on these 10/100/1000 base systems or the G3G-24TX module eliminates the availability of one RJ45 port. In other words, only 24 ports per slot can be active at any given time on components equipped with a combination of RJ45 and SFP interfaces. When an SFP transceiver (Mini-GBIC) SFP port 23 establishes a link, RJ45 port 23 is disabled. When an SFP transceiver (Mini-GBIC) in SFP port 24 establishes a link, RJ45 port 24 is disabled.

- Standalone or Rack Mountable Chassis

  The G-Series Ethernet switch can be installed as a freestanding unit on a shelf or table. Optionally, it can be mounted into a standard 48.26-centimeter (19-inch) equipment rack.

- Optional PoE

  – PoE is factory installed on the G3G124-24P base system.

  – G3G-POE, a module that enables PoE for 24 ports is available for any installed G3G-24TX IOM or the G3G124-24 base system.

    Refer to "PoE (Power over Ethernet) Support" on page 1-4 for more information.

- Power Supplies

  The G-Series switch requires 100~240 VAC input and has two power supply slots located in the rear of the base unit. Power supplies must be ordered separately since they are not provided with the base switch.

  The following power supplies are available for purchase from Enterasys:

  – G3-PWR, a 400-watt AC power supply capable of providing power to a fully-loaded non-PoE switch and some PoE power (requires 15 Amp circuit)

  – G3-PWR-POE, a 1200-watt AC power supply recommended for full PoE capability (requires 20 Amp circuit)

  The power supplies are removable. They can be mixed and can be used redundantly with full load sharing, or non-redundantly. The switch is capable of supporting 48 PoE ports at 15.4 watts fully redundant, and 96 PoE ports at 15.4 watts in non-redundant mode.

  For more information about power supplies, refer to "Power Supply Installation Considerations" on page 2-5.

- Power LEDs

  The two power LEDs indicate voltage for the primary and secondary power inputs.

- Fans

  The G-Series switch has nine fans in two different sizes located in three zones to serve different cooling functions. It supports fan redundancy, which means that the system will remain operational if one fan fails.

  Refer to "Fan Management" on page 1-4 for more information.

- System LED

  The SYSTEM LED indicates operational status of the system, as described in Table 3-1 on page 3-2.

- IOM power status LEDs

  IOM status LEDs indicate the operational status of optional module(s), including when they are powered down and can be safely removed, as described in "Removing an IOM" on page 2-13.

PoE (Power over Ethernet) Support

The G3G124-24P switch is 802.3af compliant out-of-box. The G3G124-24 and the G3G-24TX IOM can be equipped with user-installed optional PoE modules to make them 802.3af compliant. For more information about installing optional PoE modules, see "Installing an Optional PoE Module on the G3G-24TX IOM" on page 2-10 and "Installing an Optional PoE Module in the G3G124-24 Switch" on page 2-23.

The G3G switches and IOMs that are 802.3af compliant provide Power over Ethernet cable connections from their RJ45 front panel connectors to powered devices (PDs) in the network. Power over Ethernet (PoE) refers to the ability to provide 48 Vdc power to a powered device using the same Ethernet cabling that provides data. Modern Ethernet implementations employ differential signals over twisted pair cables. This requires a minimum of two twisted pairs for a single physical link. Both ends of the cable are isolated with transformers blocking any DC or common mode voltage on the signal pair. PoE exploits this fact by using two twisted pairs as the two conductors to supply a direct current. One pair carries the power supply current and the other pair provides a path for the return current. While several proprietary legacy implementations of PoE have been deployed by LAN equipment vendors, in 2003 the IEEE published the IEEE 802.3af specification, which is part of the 802.3 suite of standards.

The switch is fully compliant with the IEEE 802.3af standard. It supports the standard resistor-based detection method, as well as AC disconnect capability. The switch is also capable of supplying 15.4 watts of power to 96 ports in nonredundant power mode, and 9.4 watts of power to 96 ports in redundant power mode.

Powered Device Classifications (PDs)

PDs are devices that receive their operating 48 Vdc power through a new or existing Ethernet cable from a switch or other device that can provide a PoE-compliant port connection. This enables the PD to operate in a location without local power. For example:

- Devices such as PoE-compliant remote EXIT signs and Personal Data Assistants (PDAs),
- Devices that support Voice over IP such as PoE-compliant digital telephones,
- Devices that support Wireless Application Protocol (WAP) such as security cameras, laptop PCs, and many more devices.

Fan Management

The G3 system supports three groups of independently controllable fans and several firmware readable thermal sensors. Fan zones are as follows:

- Group 1 (fans 1, 2, and 3) is located in the front left of the switch to cool the Ethernet subsystem and optional IOM module slots.
- Group 2 (fans 8 and 9) is located in the back left of the switch behind Group 1 to cool the CPU subsystem.
- Group 3 (fans 4, 5, 6, and 7) is located on either side of the power slots to cool the power supplies

Fan speeds are determined by thermal sensors located throughout the G3 system. The firmware samples the appropriate thermal sensors at regular intervals, and sets the appropriate fan speeds. Fan group 1 drives air flow across the front portion of the chassis, and fan groups 2 and 3 drive air flow across the rear portion of the chassis.

For fan group 1, when all appropriate temperature sensors register temperatures of 50 degrees C or lower, group 1 fans run at 60% of maximum speed. If firmware detects any sensor reading (on the baseboard or any IOM) above 50 degrees C, all group 1 fans will increase to 100% of maximum speed. In addition, if firmware detects a failure of any fan in group 1, all other group 1 fans will be increased to 100% of maximum speed.

For fan group 2, behavior is similar. When all appropriate temperature sensors register temperatures of 50 degrees C or lower, group 1 fans run at 60% of maximum speed. If firmware detects any sensor reading (on the rear of the baseboard or any power supply sensor) above 50 degrees C, all group 2 and 3 fans will increase to 100% of maximum speed. In addition, if firmware detects a failure of any fan in group 2 or 3, all other group 2 and 3 fans will be increased to 100% of maximum speed.

Refer to the *Enterasys G-Series CLI Reference* for information on using the G3 CLI to determine fan status.

2

Installation

This chapter provides the instructions to install the G3G124-24, G3G124-24P and G3G170-24. Unless otherwise noted, the instructions apply to all switches.

Equipment needed:

- Phillips screwdriver
- Flat blade screwdriver

Electrical Hazard: Only qualified personnel should install or service this unit.

Riesgo Eléctrico: Nada mas personal capacitado debe de instalar o darle servicio a esta unida.

Elektrischer Gefahrenhinweis: Installationen oder Servicearbeiten sollten nur durch ausgebildetes und qualifiziertes Personal vorgenommen werden.

Follow the order of the sections below for correct installation.

Unpacking the G-Series Switch

Note: Unpack the G-Series Ethernet switch components only as needed. Leave the components in their respective shipping cartons until you are ready to install that component. Save all shipping materials in the event that the chassis has to be repacked.

Shipped With the Switch

Inspect the contents for any signs of physical damage. Contact Enterasys Networks if it is damaged. Refer to "Getting Help" on page xvii for details. The contents of the package includes:

- G-Series Ethernet switch
- Rack mount installation kit

Note: Be sure to retain the rack mount installation kit for possible future use.

- RJ45 to DB9 adapter (for use with the RJ45 console port if necessary)
- Self-adhesive rubber feet
- Various documentation

Required and Shipped Separately

Required components shipped separately from the G-Series Ethernet switch include the following:

- At least one power supply module

Optional Enterasys Components

Optional components you may purchase for the G-Series Ethernet switch include the following:

- An additional power supply module for redundancy, either G3-PWR (400-watt AC) or G3-PWR-POE (1200-watt AC recommended for PoE)

Note: G-Series 400-watt and 1200-watt power supply modules can be added to and combined on the same switch. Redundancy, however, will only be supported to the lowest common amount of power. For example, a 1200-watt module added to a switch with a 400-watt module would yield a 400-watt redundant solution.

- A PoE module (G3G-POE) for installation in the G3G124-24 base unit or the G3G-24TX IOM.
- One or more IOMs:
  - G3G-24TX, a 24-10/100/1000 copper port and 2 combo port SFP module
  - G3G-24SFP, a 24-port SFP module
  - G3K-2XFP, a 2-port XFP module
  - G3K-4XFP, a 4-port XFP module

Order of Installation Steps

Once a suitable site has been chosen, proceed to install the G-Series Ethernet switch components. It is recommended that the installation proceed in this order:

1. (Optional) Install a PoE card. Refer to "G3G124-24 Optional PoE Module Installation Considerations" on page 2-3.
2. Mount the chassis to a 19-inch (48.26-centimeter) rack or other secure location. Refer to "Mounting the Switch" on page 2-3.
3. Install power supply module(s). Refer to "Installing a Power Supply" on page 2-8.
4. (Optional) Install IOMs. Refer to "Installing and Removing an IOM" on page 2-10.
5. Connect power to the switch. Refer to "Connecting Power to the Switch" on page 2-13.
6. Connect to the console port. Refer to "Connecting to the Console Port" on page 2-14.
7. Connect to the network (including installing optional SFPs) Refer to "Connecting to the Network" on page 2-16.
8. Complete the installation. Refer to "Completing the Installation" on page 2-22.

G3G124-24 Optional PoE Module Installation Considerations

Installing PoE capability in the G3G124-24 base switch requires significant disassembly of the switch. Before installing the card, you must uninstall the components described in this chapter, including the following:

1. Unplugging all power and network connections to the switch.
2. Removing IOMs.
3. Removing power supplies.
4. Removing and retaining screws securing the switch cover top and compact flash slot coverplate.
5. Removing the switch cover.

Refer to "Installing an Optional PoE Module in the G3G124-24 Switch" on page 2-23 for more information.

Note: Instructions for installing PoE on the base switch do not apply to the G3G124-24P model since it is already equipped with a PoE card.

Installing PoE capability in a G3G-24TX IOM requires that you first uninstall the module, if necessary, and follow the procedure described in "Installing an Optional PoE Module in the G3G124-24 Switch" on page 2-23.

Mounting the Switch

Perform one of the following to install the switch:

- If you are installing the G-Series Ethernet switch as a freestanding device, install the rubber feet as described in "Placing the Switch on a Flat Surface" on page 2-4.
- Install the rack-mount kit and mount the switch to a 48.26-centimeter (19-inch) rack or other secure location, as described in "Installing the Switch into a Rack" on page 2-4.

Placing the Switch on a Flat Surface

When installing the switch on a flat surface, the installation of the rubber feet is recommended to prevent the switch from sliding. Also, the surface must be able to support 15.5 kg (35 lbs) of static weight.

Caution: To ensure proper ventilation and prevent overheating, leave a minimum clearance space of 3.81cm (1.5 in.) at the left, right, and rear of the G-Series.

Do not connect the G-Series to the AC power source until instructed to do so later in the installation process.

Precaución: Para asegurar una buena ventilación y evitar que el sistema se sobrecaliente, deje un espacio mínimo de 3.81cm (1.5 pulgadas) con respecto a los lados y a la parte posterior del aparato.

No conecte el dipositivo a la fuente primaria hasta que no se le indique.

To install the rubber feet, proceed as follows:

1. Place the switch upside down on a sturdy flat surface.
2. Remove the four rubber feet from the shipping box.
3. Remove the protective strip from the back of one rubber foot and position it on one of the corners on the bottom of the switch. Press firmly into place. Repeat this procedure to install the remaining rubber feet in the other corners.
4. After installing the rubber feet, return the switch to its upright position.
5. Place the switch in its final location.

Installing the Switch into a Rack

Caution: Before installing the screws as described in this installation procedure, refer to “Torque Values” on page A-6.

Precaución: Antes de retirar los tornillos, tal como se describe en las instrucciones de instalación, consulte “Torque Values” on page A-6.

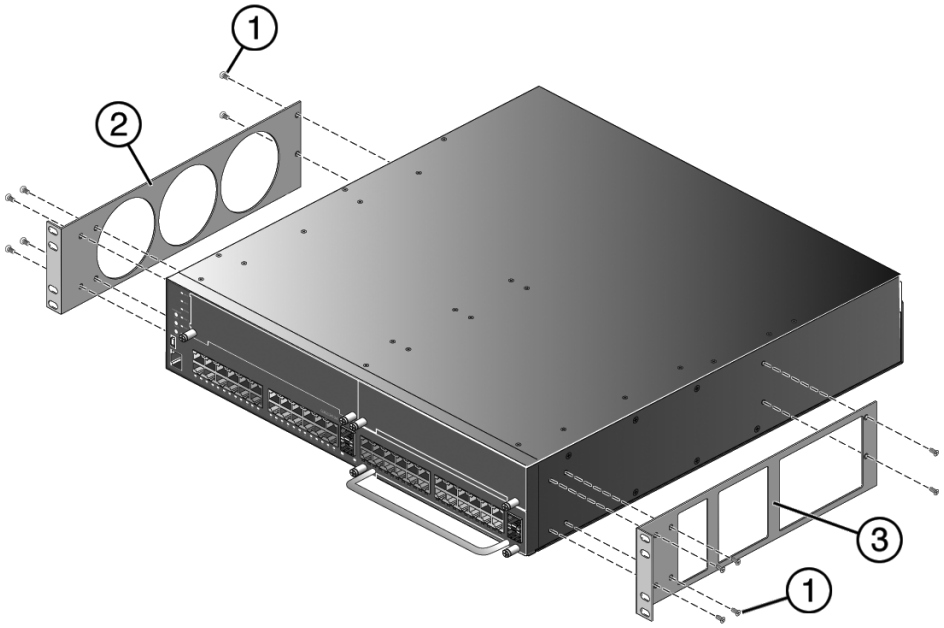
The G-Series Ethernet switch can be mounted in a standard EIA-310-D compliant 48.26-centimeter (19-inch) equipment rack. To mount the switch into a rack, you must first install the rack-mount kit, which consists of two brackets. You must provide the mounting hardware to attach the switch brackets to the rails.

Note: The G-Series Ethernet switch (with rubber feet installed) will exceed the 2U high Richmond standard and will not comply with the requirements for mounting in a 19-inch (48.26-centimeter) rack. Remove the rubber feet, if installed, before installing the switch into a rack.

To install the rack-mount kit and then install the switch into the rack:

1. Place the switch on a sturdy flat surface.
2. Install the left and right mounting brackets provided in the rack-mount kit to the sides of the switch using the screws provided as shown in Figure 2-1.

Figure 2-1 Attaching the Brackets to the Switch (G3G124-24 with G3G-24TX IOM shown)



1 Screws
2 Left rack-mount bracket
3 Right rack-mount bracket

3. Using your mounting hardware, attach the front of the brackets to the rack. Tighten securely.

Power Supply Installation Considerations

G-Series switches can have up to two internal power supplies installed. Currently, two sizes of power supplies are offered. The following power supplies are available to be purchased from Enterasys for installation on the G-Series switch:

- G3-PWR, a 400-watt AC power supply (requires a 15 amp circuit)
- G3-PWR-POE, a 1200-watt AC power supply (requires a 20 amp circuit)

These power supplies perform load sharing and may be used in any combination. The following sections discuss the available power supply configurations.

Power Supply Redundancy

Two modes of power supply operation are supported:

- **Redundant** mode, in which the power made available to the system is equal to the maximum output of the lowest rated supply. When two supplies are installed in redundant mode, system power redundancy is guaranteed if one supply is lost.
- **Non-redundant**, or additive, mode, in which the combined output of both supplies is made available to the system. In this mode, the loss of a single supply may result in a system reset.

The switch will support a full 15.4 watts of power to 96 ports in non-redundant power mode, and 9.4 watts of power to 96 ports in redundant power mode. By default, the G-Series switch is set to operate in redundant mode when a second power supply is added.

By default, the G3 switch automatically allots power to the base board and to each installed module. Each component's power consumption is subtracted from the available power and the remaining power is equally distributed among installed PoE modules. A PoE module must be allotted a minimum of 37 watts to be operational.

Table 2-1 illustrates the G3 power distribution. If one power supply fails or is removed (hot swapped) for any reason, the other power supply takes up the load. Power redundancy remains in effect as long as the load does not exceed the power as stated in the Redundancy column.

Table 2-1 Power Distribution According to Number of Installed Power Supplies

Power Supplies	Redundancy	Hot Swappable	Power Sharing
1	No	No	Maximum power 1200
2	Yes, if power demand is less than the capacity of one power supply.[1]	Yes	The total load is shared by both power supplies.

1. If power requirements exceed this capacity, power redundancy is no longer supported. Removing a power supply under this condition will cause the remaining power supplies to go into over-current protection and shut down the power system.

Power supply LEDs visible on the front panel of the switch indicate whether the power supplies are present and, if two are present, whether they are in redundant or additive (non-redundant) mode. For more information about the power supply LEDs, see "Power LED Displays" on page 2-14.

Refer to Appendix A for power specifications of various G3 components. For information on using the CLI to set the status of power redundancy and to review system power settings, refer to the *Enterasys G-Series CLI Reference*.

Supported Power Configurations

The following power configurations are supported on the G3:

- Non-redundant (additive)
  - 400 Watts (1x400)
  - 800 Watts (2 X 400)
  - 1200 Watts (1x1200)
  - 1600 Watts (1200 + 400)
  - 2400 Watts (1200 X 2)
- Redundant
  - 400 Watt (2 X 400)
  - 400 Watt (400 + 1200)
  - 1200 Watt (2 X 1200)

Allocation of PoE Power to Modules

The G-Series firmware determines the power available for PoE based on hardware configuration, power supply status, and power supply redundancy mode. The system calculates and reserves the correct amount of power required by the installed IOMs and motherboard and then makes the balance of power available for PoE. When any change is made to the hardware configuration, power supply status, or redundancy mode, the firmware recalculates the power available for PoE.

The power available for PoE is distributed to each PoE-capable base board and IOM based on the configured allocation mode:

- **Automatic** mode (default), in which available power is distributed evenly to PoE-capable modules based on PoE port count. Any change in available power, due to a change in power supply status or redundancy mode or to the addition or removal of modules, will trigger an automatic redistribution of power to the PoE controller on each PoE-capable module.
- **Manual** mode, in which the power budget for each PoE-capable module is manually configured, using either CLI commands or the MIBs. The sum of the wattage configured for each module cannot exceed the total power available on the switch for PoE.

  The configured wattage assignments are used to calculate each slot's percentage of total available power. If the total available PoE power changes, a redistribution of available power will occur, applying the calculated percentages.

When manual distribution mode is configured, if a PoE module is added to the G-Series switch, the PoE power budget for existing modules will **not** be recalculated. The new module will have a power budget of zero until it is manually provisioned. Since the sum of the manually provisioned wattages cannot exceed the total system power available, it may be necessary to adjust existing budgets to free up power for the new module.

When a PoE module is removed from a G-Series switch configured with manual power distribution mode, the PoE budget for each module will **not** be recalculated, based on the assumption that the module removed will be replaced with a new module that should receive the same amount of PoE power.

If the power needed or requested exceeds the power available, the system will generate a trap to notify the system manager.

For more information on configuring Manual mode, see the *Enterasys G-Series CLI Reference*.

Power Distribution Upon Power Supply Removal or Addition

Power Supply Removal

When a power supply is removed, the G3 responds to the decrease in available power by:

1. Detecting the power supply removal and recalculating available power.
2. Subtracting the power capacity for its base system and all installed modules from available power.
3. Distributing remaining power equally across installed PoE controllers by reprogramming maximum power in each controller.
4. Dropping support to PoE devices as necessary to stay within the programmed maximum power.

Power Supply Addition or IOM Removal

When a power supply is added or an IOM is removed, the G3 responds to the increase in available power by:

1. Detecting the power supply addition and recalculating available power (adding capacity of the new power supply or accounting for less load with removal of an IOM).
2. Subtracting the power capacity for its base system and all installed modules from available power.
3. Distributing remaining power equally across installed PoE controllers by reprogramming maximum power in each controller.

Management of PoE Power to PDs

For each PoE-capable IOM, you can configure how its PoE controller makes power available to attached powered devices (PDs). On a per module basis, you can configure:

- **Real-time** mode (default), in which the PoE controller calculates the power needed by a PD based on the actual power consumption of the attached devices.
- **Class** mode, in which the PoE controller manages power based on the IEEE 802.3af definition of the class limits advertised by the attached devices, with the exception that for class 0 and class 4 devices, actual power consumption will always be used. In this mode, the maximum amount of power required by a device in the advertised class is reserved for the port, regardless of the actual amount of power being used by the device.

For more information on configuring Class mode, see the *Enterasys G-Series CLI Reference*.

Installing a Power Supply

Power supplies are installed in either of the two slots located at the back of the chassis, as shown in Figure 2-2 on page 2-9. If you intend to install only a single power supply, it can be installed in either of the slots, although the PWR1 slot is left open for your convenience.

To install one or both power supplies in the G-Series switch:

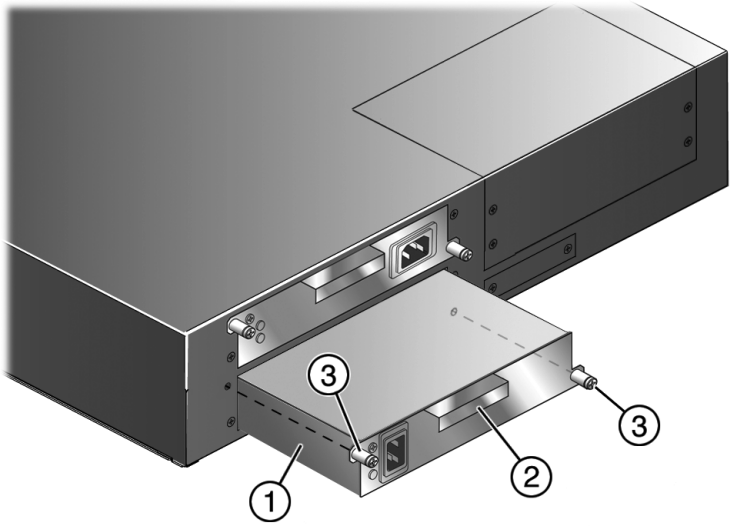
1. With an antistatic wrist strap attached to your wrist, unpack the power supply by removing it from its shipping box and stripping the packing material. (Save the shipping box and materials in the event the unit must be reshipped.)
2. Remove the power supply from its protective wrapping.
3. Examine the power supply carefully, checking for damage. If any damage is noted, *do not* install the power supply. Contact Enterasys Networks for instructions.
4. If necessary, remove the coverplate from its slot by loosening its captive screws. Retain the coverplate for future use.
5. Holding the power supply by its handle, position it with the LEDs to the left and align it with the slot opening.

Caution: Forcing a misaligned power supply into place can damage the power supply or chassis backplane.

Precaución: Colocar de manera forzada una fuente de poder o no colocarla bien alineada podría dañarla y/o maltratar el panel posterior del chasis.

6. With the power supply properly inserted into the opening, carefully slide the module until it connects to the backplane, as shown in Figure 2-2 on page 2-9. The module's handle should be nearly flush with the back of the G-Series switch. If significant resistance is encountered before the power supply is seated, remove and reinsert it. Do not force the module into place.

Figure 2-2 Installing a Power Supply Module (1200-watt module into PWR 2 slot shown)



1 Power supply **2** Power supply handle **3** Captive screws

7. Secure the power supply to the chassis by tightening the captive screws.
8. If you are installing an additional power supply, repeat step 4 through step 7. If not, ensure that the unused power slot has a coverplate installed over it.

Removing a Power Supply

To remove a power supply, proceed as follows:

1. Attach an anti-static wrist strap before handling the power supply module.
2. Unplug the associated power cord from the outlet.
3. Unplug the power cord from the AC inlet (associated with the power supply you are removing) at the back of the chassis.
4. Unscrew the captive screws to release the power supply from the chassis.
5. Remove the power supply by grasping the handle and pulling it straight out of the chassis.
6. Fasten a coverplate over the empty slot.

Caution: If you plan to operate the chassis with only one power supply, be sure to install the coverplate in place of the removed power supply to contain EMI radiation and ensure proper air circulation.

Precaución: Si desea trabajar sólo con una fuente de poder, no olvide colocar la tapa en el compartimiento de la fuente de poder que haya eliminado, para reducir la interferencia electromagnética y para asegurar una buena ventilación.

Installing and Removing an IOM

Caution: There are hazardous moving parts inside the base unit. Keep fingers and other body parts away from spinning fans when installing or removing IO modules.

Precaución: El interior de la unidad que sirve de base contiene partes móviles peligrosas. Mantenga los dedos y cualquier otra parte del cuerpo lejos de las aspas de los ventiladores cuando realice la instalación o al retirar los módulos IO.

Installing an Optional PoE Module on the G3G-24TX IOM

Notes: Instructions in this section do not fully describe installing PoE on the G3G124-24 base system, which requires completing several disassembly steps first. For more information on base system assembly, refer to "Installing an Optional PoE Module in the G3G124-24 Switch" on page 2-23.

The instructions below apply only to the G3G-24TX IOM.

If you have purchased an optional PoE card (G3G-POE), you can install it before installing the G3G-24TX IOM into the G-Series base system chassis. You can also install it at any time by first removing the IOM as described in "Removing an IOM" on page 2-13.

The G-Series PoE card and IOM are shipped in separate packages. Unpack and install the PoE card in the IOM as follows:

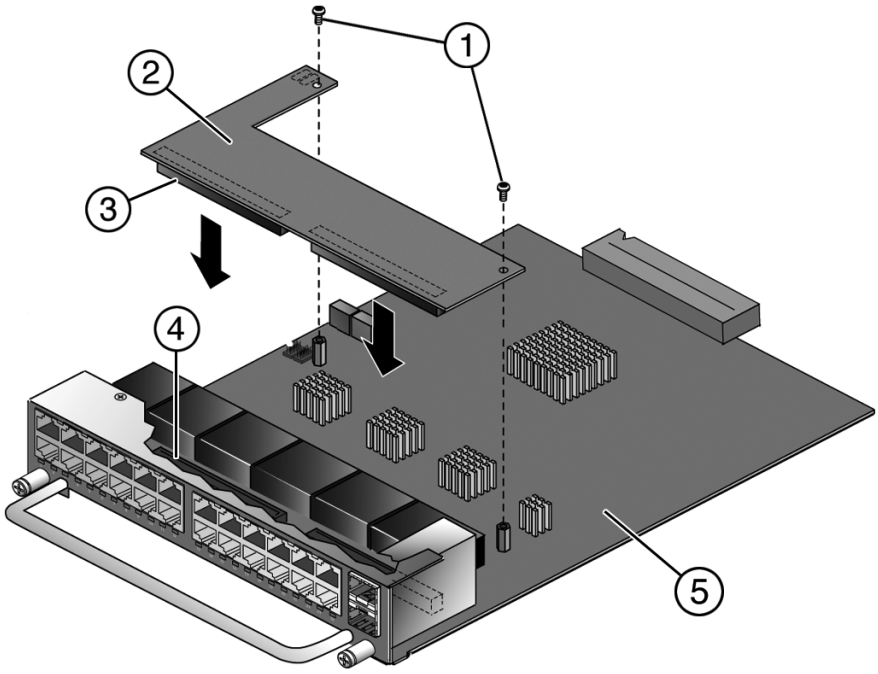
1. With an ESD strap attached to your wrist, open the box and remove the packing material protecting the PoE module.
2. Perform a visual inspection of the PoE module for any signs of physical damage. Contact Enterasys Networks if there are any signs of damage. Refer to "Getting Help" on page xvii for details.

   Caution: Observe all Electrostatic Discharge (ESD) precautions when handling sensitive electronic equipment.

   Precaución: Al trabajar con equipos electrónicos sensibles, tome todas las precauciones de seguridad para evitar descargas de electricidad estática.

3. Gently plug the PoE module into the IOM by fitting the standoffs into the PoE board mounting holes as shown in Figure 2-3. There should be a direct vertical translation of standoffs to PoE mounting holes.

Figure 2-3 Installing a PoE module in the G3G-24TX IOM



1	Fastening screws	**4**	IOM connector
2	PoE daughter card module	**5**	G3G-24TX IOM (motherboard)
3	IOM to PoE connector		

4. Using the screws shipped with the PoE module, firmly attach the PoE module to the IOM.

Installing an IOM

The following procedure describes how to install a hot-swappable IOM into your G3G switch. You can install an IOM into any open slot. Enterasys Networks recommends inserting any IOMs before you connect power to the switch as described in "Connecting Power to the Switch" on page 2-13.

Note: An IOM can be hot-inserted into the G-Series switch, but must be removed by following the procedure described in "Removing an IOM" on page 2-13.

Caution: If you are installing multiple IOMs into a switch that is running, you must wait until the previously installed IOM is completely initialized before attempting to install the next IOM. Initialization is complete when the slot's status LED turns solid green. (A syslog message will also be sent to the CLI at completion.)

Precaución: Si instala varios IOM en un switch en funcionamiento, debe esperar a que el IOM que instaló previamente se haya activado por completo antes de pasar al siguiente. Se habrá completado la activación cuando el LED de estado pase a color verde (asimismo se enviará un mensaje syslog al CLI cuando se haya completado).

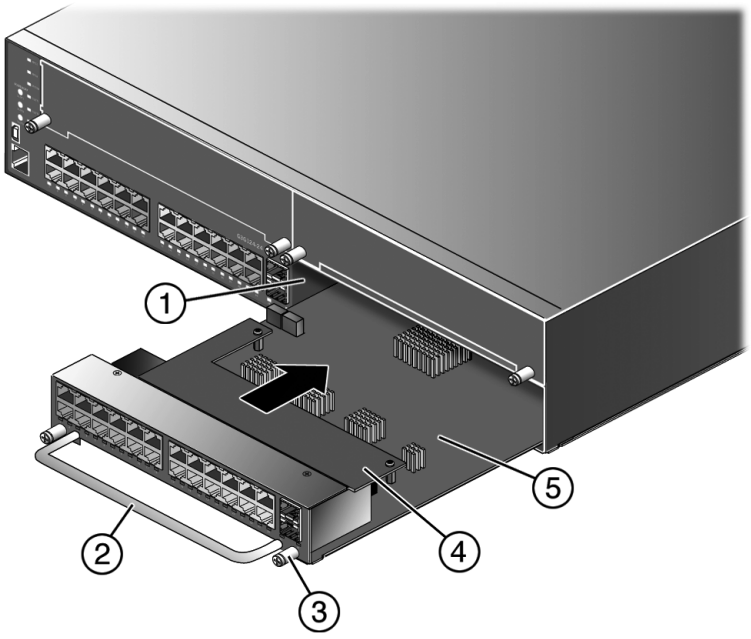
To install an IOM, refer to Figure 2-4 on page 2-12 and proceed as follows:

1. Confirm adequate power is available to power the new IOM. For more information about G3 power supplies, see "Power Supply Installation Considerations" on page 2-5. For more information about IOM power consumption, see "IOM Specifications" on page A-3.
2. Attach an ESD wrist strap to your wrist.

3. Unpack the module by taking it from its shipping box and removing any packaging materials, and removing the module from its protective plastic bag. (Save the shipping box and materials in the event the unit must be reshipped.)
4. Examine the module carefully, checking for damage. If any damage is found, do not install it. Contact Enterasys Networks for instructions.
5. Remove the coverplate from a slot by loosening the coverplate's two captive screws.
6. Insert the IOM in the guide rail of the slot. Gently slide the module into the slot, as shown in Figure 2-4, until the IOM engages the connector on the backplane and is flush with adjoining coverplates.

   Once the connection is made, the slot's status LED flashes green and IOM initialization begins. The IOM initialization lasts for approximately thirty seconds to allow enough time to tighten the IOM's captive screws. When initialization is complete the slot's status LED turns solid green and the IOM is ready for use.

Figure 2-4 Installing an IOM (G3G-24TX with optional PoE shown)



1	IOM slot 2	**4**	Optional PoE module
2	IOM handle	**5**	IOM
3	Captive screw		

7. If you are installing additional modules, wait until the slot status LED for the previously installed IOM is solid green before repeating this procedure to install additional modules. Save coverplates for optional future use.
8. After completing all module installations, be sure to install coverplate(s) over any unused IOM slot(s) to contain EMI radiation and ensure proper air circulation.

IOM Initialization Behavior

The IOM configuration is set during the IOM's initialization. When you install an IOM into a slot that has not previously had an IOM installed, the default configuration will be applied to all ports on the IOM.

When you install an IOM into a slot that previously had an IOM installed, then:

- If the IOM being installed is the same type as the previous IOM, the old configuration will be applied to the ports on the new IOM.
- If the IOM being installed is not the same type as the previous IOM, the default configuration will be applied to the ports.

For more information about the default configuration, see the *Enterasys G-Series CLI Reference* Guide.

Removing an IOM

Caution: Do not attempt to remove an IOM from the G-Series switch when power is on to the switch without performing the following procedure.

Precaución: No intente retirar el módulo IOM del switch G Series si éste está encendido. Antes de hacerlo, debe realizar el siguiente procedimiento.

To remove an installed IOM:

1. Disconnect any cabling from the IOM.
2. Press and hold the POWER OFF button corresponding to the slot from which you are removing the IOM for five seconds. The slot's status LED flashes green. Refer to Figure 3-1 on page 3-2 for the location of the POWER OFF button.
3. When the slot's status LED turns amber, it is safe to remove the IOM. Loosen the IOM's two captive screws and gently slide the IOM out of the slot using the IOM's handle. For more information, refer to "IOM Status LEDs" on page 3-3.

Caution: Use caution when removing an IOM on which you have optional PoE installed to avoid damaging the PoE module.

Precaución: Tenga cuidado al retirar un IOM que tenga un módulo PoE instalado, ya que éste puede dañarse.

4. Replace the coverplate to the slot by tightening the coverplate's captive screws.

The ports associated with the removed IOM continue to show up when displaying port status, indicating a configuration exists for these ports, but they are in "detached" state.

Connecting Power to the Switch

You can install a single primary source of power or provide two sources of power for redundancy, as described in the following sections. Examples below illustrate connecting two power sources and assume two power supply modules have already been installed as described previously in "Installing a Power Supply" on page 2-8.

Note: The two power supplies in the G-Series have automatic voltage sensing that allows connection to power sources ranging from 100–125 Vac, 12 A or 200–240 Vac, 7A, 50/60 Hz.

To connect the G-Series switch to one or two power sources, proceed as follows:

1. Plug an appropriate power cord into each switch AC power receptacle as follows:
   - G3-PWR-POE accepts an IEC320 C19 (20A) power cord.
   - G3-PWR accepts an IEC320 C13 (15A) power cord.

2. Plug the other end of each power cord into an appropriate, dedicated grounded AC outlet as follows.
   - G3-PWR-POE requires a 20 Amp circuit.
   - G3-PWR requires a 15 Amp circuit.

Note: To take full advantage of the load sharing and redundancy capabilities, each power cord should be plugged into a separate dedicated AC outlet.

3. Verify that the appropriate power LEDs (PWR1 and PWR2, not shown), located on the front panel, turn on as described in "Power LED Displays" on page 2-14 and the SYSTEM LED turns red until the G-Series completes its initialization.

If the initialization process is successful, the SYSTEM LED turns green. If the SYSTEM LED does not turn green, refer to Chapter 3 for troubleshooting information.

Power LED Displays

Once one or more power supplies are installed and power is connected to the switch, the power LEDs (PWR1 and PWR2) will indicate the switch's power mode (redundant or additive) as follows:

Display	Status
Off	Power supply not present.
Green	Normal operation.
Amber	Not enough power for redundancy. Operating in additive power mode.
Red	Power failure.

Refer to "Supported Power Configurations" on page 2-6 for possible configurations in each power mode.

Refer to the *Enterasys G-Series CLI Reference* for information on how to specify whether two installed power supplies will operate in additive or redundant mode.

Connecting to the Console Port

Note: Only one console port on the G-Series switch can be active at any given time, either the RJ45 or the USB port.

Connecting to the RJ45 Console Port

The RS-232 console port uses a standard 8-pin RJ45 connector. An RJ45 to DB9 adapter is provided with the switch, but you must provide your own RJ45 to RJ45 straight-through console cable.

Refer to Table 2-2 on page 2-15 for console port pinout assignments.

Refer to Table 2-3 on page 2-15 for RJ45 to DB9 adapter pinout assignments.

Table 2-2 Console Port Pinout

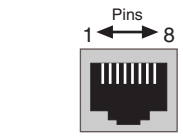
Pin	Connection
1	TXD
2	Unused
3	Unused
4	RXD
5	GND
6	Unused
7	Unused
8	Unused

To connect to the console port:

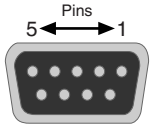
1. Connect the RJ45 connector at one end of the cable to the RJ45 console port on the G-Series switch.
2. Plug the RJ45 connector at the other end of the cable into the RJ45 to DB9 adapter.
3. Connect the RJ45 to DB9 adapter to the serial port on a terminal or a PC running terminal emulation software.
4. Make sure the terminal emulation software is set as follows:
   - Select the appropriate serial port (COM port 1 or 2).
   - Set the data rate to 9600 baud.
   - Set the data format to 8 data bits, 1 stop bit, and no parity.
   - Set flow control to none.
   - Set the emulation mode to VT100.
   - When using HyperTerminal, select **Terminal keys**, not Windows keys.
5. When you are ready to begin configuring the G-Series Ethernet switch, use the procedures in "Completing the Installation" on page 2-22 to power on the switch and boot the software. You will perform initial setup by entering CLI commands on the management console.

Table 2-3 RJ45 to DB9 Adapter Pinout

Signal	RJ45 Pin	DB9 Pin
Receive (RX)	1	2
Transmit (TX)	4	3
Ground (GRD)	5	5



RJ45 Connector (Female)



DB9 Connector (Female)

For a description of how to use the CLI and descriptions of all the CLI commands, refer to the *Enterasys G-Series CLI Reference.*

Connecting to the USB Console Port

In addition to its RJ45 console port, the G-Series switch also supports console operation through a USB console port. To connect, you will need the following user-supplied components:

- USB Type A to Mini-USB cable
- Third party device driver

Note: Before connecting a PC into the G-Series USB console port, you must download to the PC and install a third party driver, the VCP Driver Kit, located at https://www.silabs.com/products/mcu/Pages/USBtoUARTBridgeVCPDrivers.aspx

Connecting to the Network

The following procedures cover the cable connections from the network or other devices to the G-Series Ethernet switch IOM ports and uplink ports.

- "Connecting UTP Cables to RJ45 Ports" on page 2-16
- "Installing Optional SFP/XFP" on page 2-19
- "Connecting Fiber-Optic Cables to SFP/XFP Ports" on page 2-21

Connecting UTP Cables to RJ45 Ports

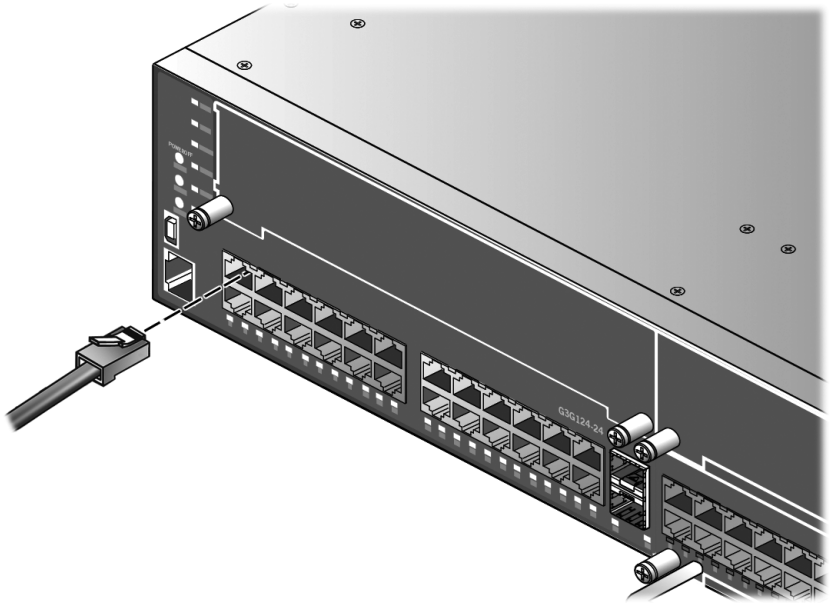
RJ45 10/100/1000 front panel ports on the G3G124-24 and G3G124-24P base units and G3G24TX IOM support Auto MDIX, which means that you can use straight-through or crossover twisted pair cabling.

Note: All RJ45 front panel and IOM ports support Category 5 Unshielded Twisted Pair (UTP) cabling with an impedance between 85 and 111 ohms. Category 3 cabling may be used if the connection is going to be used only for 10 Mbps.

To connect twisted pair segments to the G-Series, refer to Figure 2-5 on page 2-17 and proceed as follows:

1. Ensure that the device to be connected at the other end of the segment is powered on.
2. Connect the twisted pair segment to the G-Series by inserting the RJ45 connector on the twisted pair segment into the desired RJ45 port.

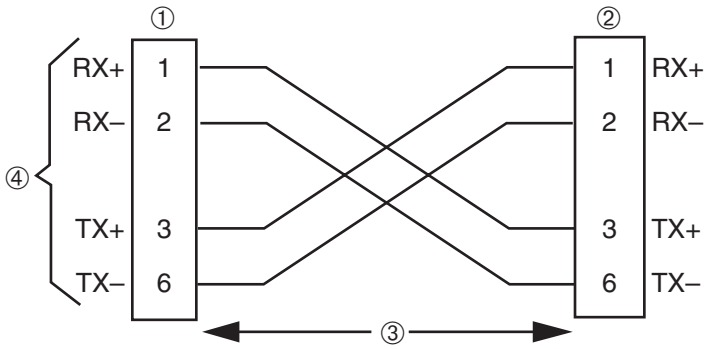
Figure 2-5 Connecting a UTP Cable Segment to RJ45 Port



3. Verify that a link exists by checking that the Link/Activity LED is on (solid green or blinking green). If the Link/Activity LED is off, perform the following steps until it is on:
   a. Verify that the cabling being used is Category 5 or better with an impedance between 85 and 111 ohms with a maximum length of 100 meters (328 feet).
   b. Verify that the device at the other end of the twisted pair segment is on and properly connected to the segment.
   c. Verify that the RJ45 connectors on the twisted pair segment have the proper pinouts and check the cable for continuity. Typically, a crossover cable is used between hub devices. A straight-through cable is used to connect between G-Series or hub devices and an end user (computer). Refer to Figure 2-6 and Figure 2-7 on page 2-18 for four-wire RJ45 connections. Refer to Figure 2-8 and Figure 2-9 on page 2-19 for eight-wire RJ45 connections.
4. If a link is not established, contact Enterasys Networks. Refer to "Getting Help" on page xvii for details.

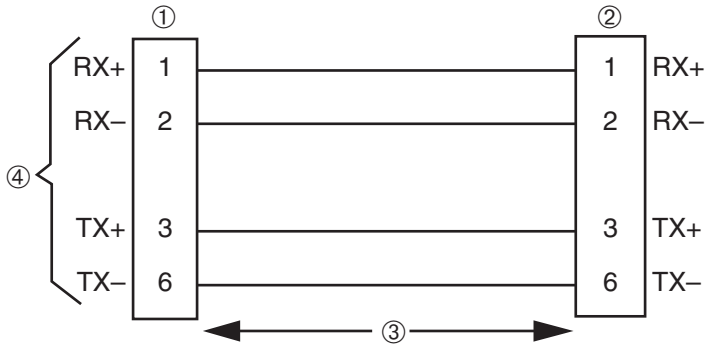
Repeat all steps above until all connections have been made.

Figure 2-6 Four-Wire Crossover Cable RJ45 Pinouts for 10/100BASE-TX



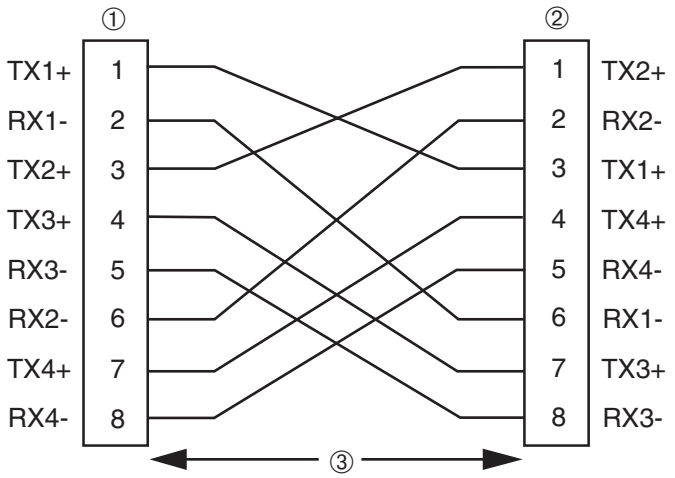
1 RJ45 switch port
2 Other device port
3 RJ45-to-RJ45 crossover cable
4 RX+/RX- and TX+/TX-connections
These connections must share a common color pair.

Figure 2-7 Four-Wire Straight-Through Cable RJ45 Pinouts for 10/100BASE-TX



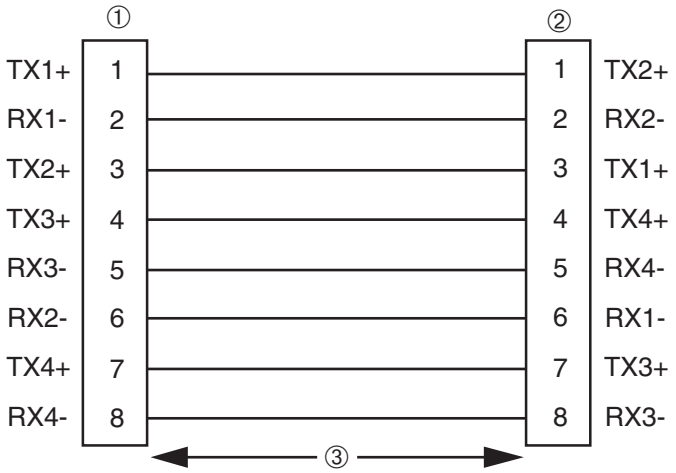
1 RJ45 switch port
2 Other device port
3 RJ45-to-RJ45 straight-through cable
4 RX+/RX- and TX+/TX-connections
These connections must share a common color pair.

Figure 2-8 Eight-Wire Crossover Cable RJ45 Pinouts for 10/100/1000BASE-TX



1 RJ45 device port
2 Other device port
3 RJ45-to-RJ45 crossover cable

Figure 2-9 Eight-Wire Straight-Through Cable RJ45 Pinouts for 10/100/1000BASE-TX



1 RJ45 device port
2 Other device port
3 RJ45-to-RJ45 straight-through cable

To connect twisted pair segments to the G-Series switch, refer to Figure 2-5 on page 2-17 and connect the twisted pair segment to the switch by inserting the RJ45 connector on the twisted pair segment into the desired RJ45 port. Repeat for each connection.

Installing Optional SFP/XFP

Note: Each combo SFP port in use on the G3G124-24 or G3G124-24P base systems or the G3G-24TX module eliminates the availability of one RJ45 port. In other words, only 24 ports can be active at any given time on components equipped with a combination of RJ45 and SFP interfaces.

When an SFP transceiver (Mini-GBIC) in SFP port 23 establishes a link, RJ45 port 23 is disabled. When an SFP transceiver (Mini-GBIC) in SFP port 24 establishes a link, RJ45 port 24 is disabled.

This section describes how to install either an SFP or XFP optical transceiver into the following G3 ports:

Transceiver Type	Switch or IOM	Ports
SFP	G3G124-24, G3G124-24P, or G3G-24TX	Combo ports 23 and 24
SFP	G3G170-24 or G3G-24SFP	Any port
XFP	G3K-2XFP or G3K-4XFP	Any port

It is recommended that the options be installed first in a new installation.

Warning: Fiber-optic SFP/XFPs use Class 1 lasers. Do not use optical instruments to view the laser output. The use of optical instruments to view laser output increases eye hazard. When viewing the output optical port, power must be removed from the network adapter.

Advertencia: Los SFP/XFPs de fibra optica usan lasers de clase 1. No se debe usar instrumentos opticos para ver la potencia laser. El uso de los instrumentos opticos para ver la potencia laser incrementa el riesgo a los ojos. Cuando vean el puerto de la potencia optica, la corriente debe ser removida del adaptador de la red.

Warnhinweis: SFP/XFPs mit Fiber-Optik Technologie benutzen Laser der Klasse 1. Benutzen sie keinesfalls optische Hilfsmittel, um die Funktion des Lasers zu überprüfen. Solche Hilfsmittel erhöhen die Gefahr von Sehschäden. Wenn sie den optischen Port überprüfen möchten stellen Sie sicher, dass die Komponente von der Spannungsversorgung getrennt ist.

Caution: Carefully follow the instructions in this manual to avoid damaging the SFP/XFP and G-Series.

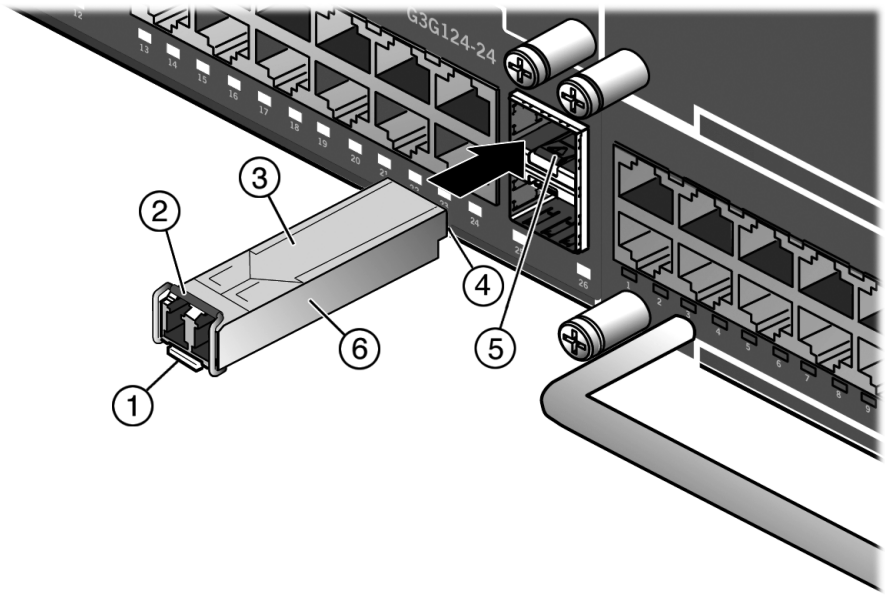
The SFP/XFP and G-Series are sensitive to static discharges. Use an antistatic wrist strap and observe all static precautions during this procedure. Failure to do so could result in damage to the SFP/XFP and G-Series. Always leave the SFP/XFP in the antistatic bag or an equivalent antistatic container when not installed.

Precaución: Siga las instrucciones del manual para no dañar el SFP/XFP ni del aparato, puesto que son muy sensible a las descargas de electricidad estática. Utilice la pulsera antiestática y tome todas las precauciones necesarias durante este procedimiento. Si no lo hace, podría dañar el SFP/XFP o del aparato. Mientras no esté instalado, mantenga el SFP/XFP en su bolsa antiestática o en cualquier otro recipiente antiestático.

To install a SFP/XFP, refer to Figure 2-10 on page 2-20 and proceed as follows.

1. With an antistatic wrist strap attached to your wrist, remove the transceiver from its packaging. If there is a protective dust cover in the transceiver connector, do not remove it at this time.
2. Hold the transceiver so that the connector will seat properly.
3. Carefully align the transceiver with the port slot as shown in Figure 2-10 on page 2-20.
4. Push the transceiver into the port slot until it “clicks” and locks into place.

Figure 2-10 Installing an SFP/XFP (shown with LC connector and without dust cover)



1	Release tab	**4**	Edge connector (insertion side)
2	Wire handle	**5**	Port slot
3	Transceiver top side	**6**	Transceiver side view

Removing an XFP/SFP

Caution: Do NOT remove the XFP/SFP from the port slot without releasing it. The XFP/SFP is released by pulling down on its wire handle. Attempting to remove the XFP/SFP without releasing it can damage the XFP/SFP.

The XFP/SFP and its host G-Series are sensitive to static discharges. Use an antistatic wrist strap and observe all static precautions during this procedure. Failure to do so could result in damaging the XFP/SFP or host G-Series. Always leave the XFP/SFP in the antistatic bag or an equivalent antistatic container when not installed.

Precaución: NO quite el XFP/SFP de la ranura sin antes abrir la traba ubicada en la parte frontal del XFP/SFP. Si lo hace, puede dañar el XFP/SFP, puesto que es muy sensible a las descargas de electricidad estática, al igual que el dispositivo host. Utilice la pulsera antiestática y tome todas las precauciones necesarias durante este procedimiento. Si no lo hace, pude dañar el XFP/SFP o el dispositivo host. Mientras no esté instalado, mantenga el XFP/SFPen su bolsa antiestática o en cualquier otro recipiente antiestático.

To remove a transceiver from a port slot, refer back to Figure 2-10 on page 2-20 and proceed as follows:

1. With an antistatic wrist strap attached to your wrist, remove the cables connected to the transceiver.
2. Release the transceiver using its wire handle. Specific operation and location of the handle will vary depending on transceiver type.
3. Grasp the sides of the transceiver and pull it straight out of the port slot.

If storing or shipping an XFP/SFP, which has a fiber-optic connector, insert its protective dust cover to protect the ends of the fiber-optic fibers from dust or contamination.

Connecting Fiber-Optic Cables to SFP/XFP Ports

Before connecting cables to SFP/XFP ports, you must install the appropriate transceiver as described in "Installing Optional SFP/XFP" on page 2-19. This section describes how to connect a 1- or 10-Gigabit fiber-optic segment from the network or other devices to an SFP or XFP port connector (LC or MT-RJ).

Each fiber-optic link consists of two fiber-optic strands within the cable for Transmit (TX) and Receive (RX). The transmit strand from a device port connects to the receive port of a fiber-optic 1-/10- Gigabit Ethernet device at the other end of the segment. The receive strand of the applicable LC or MT-RJ port connects to the transmit port of the fiber-optic 1-/10- Gigabit Ethernet device.

Caution: Do not touch the ends of the fiber-optic strands, and do not let the ends come in contact with dust, dirt, or other contaminants. Contamination of cable ends causes problems in data transmissions. If the ends of the fiber-optic strands become contaminated, use a canned duster to blow the surfaces clean. A fiber-port cleaning swab saturated with optical-grade isopropyl alcohol may also be used to clean the ends.

Precaución: No toque los extremos de los cables de fibra óptica y evite su contacto con el polvo, la suciedad o con cualquier otro contaminante. Si los extremos de los cables se ensucian, es posible que la transmisión de datos se vea afectada. Si nota que losextremos de los cables de fibra óptica se ensucian, utilice aire comprimido paralimpiarlos. También puede limpiarlos con un estropajo embebido en alcohol isopropílico.

Refer to Figure 2-11 on page 2-22 as you perform the following procedure.

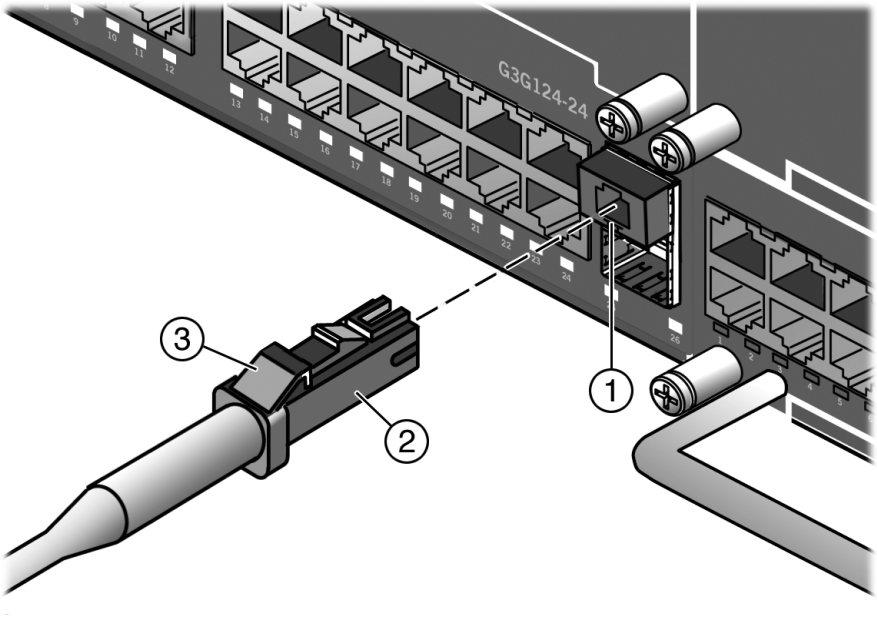
To connect an LC or MT-RJ cable connector to an SFP or XFP port connector:

1. Remove the protective covers (not shown) from the uplink port SFP/XFP and from the connectors on each end of the cable.

Note: Leave the protective covers in place when the connectors are not in use to prevent contamination.

2. Insert the cable connector into the SFP/XFP connector until it clicks into place.

Figure 2-11 Cable Connection (LC shown) to Uplink Port with SFP/XFP Installed



1 Combo SFP port with MGBIC installed **2** LC cable connector **3** Release tab

3. Plug the other end of the cable into the appropriate port on the other device. Some cables may be terminated at the other end with two separate connectors, one for each fiber-optic strand. In this case, ensure that the transmit fiber-optic strand from the G-Series is connected to the receive port of the other device, and the receive fiber-optic strand on the G-Series is connected to the transmit port of the other device.
4. Repeat this procedure for other SFP/XFP ports, if needed.
5. If an SFP/XFP port is unused, install a dust cover.

Completing the Installation

1. Power on the switch.
2. Verify that the PWR1 and PWR2 power LEDs are lit. Refer to "Power LED Displays" on page 2-14 for information on interpreting the power LEDs.
3. Verify that the SYSTEM LED blinks initially then becomes solid green.
4. Make sure that the network devices connected to the switch ports are powered on, then verify that each Link/Activity LED is ON (solid green or blinking green).
5. At the device connected to the console port, perform the following:
   a. Enter **admin** for Username.
   b. At the Password prompt, press **ENTER** (RETURN).

c. For details on how to configure the G-Series using the command line interface, refer to the *Enterasys G-Series CLI Reference*. The CLI commands enable you to set a new password and perform more involved management configurations on the G-Series.

Note: It is strongly recommended that you change the admin password from its default state of blank (no password), once the G-Series switch becomes operational in your network. For more information, refer to the *Enterasys G-Series CLI Reference*.

If you require assistance, contact Enterasys Networks using one of the methods described in "Getting Help" on page xvii.

Installing an Optional PoE Module in the G3G124-24 Switch

Installing PoE capability in the G3G124-24 base switch requires significant disassembly of the switch. Before installing the PoE module, you must complete the following steps:

1. Unplug all power and network connections to the switch.
2. Remove IOM(s). Refer to "Removing an IOM" on page 2-13.
3. Remove power supplies. Refer to "Removing a Power Supply" on page 2-9.
4. Remove and retain screws securing the switch cover top and compact flash coverplate and remove the switch cover. Refer to "Removing the Switch Cover" on page 2-23.

Note: Instructions for installing PoE on the base switch do not apply to the G3G124-24P model since it is already equipped with a PoE card.

Removing the Switch Cover

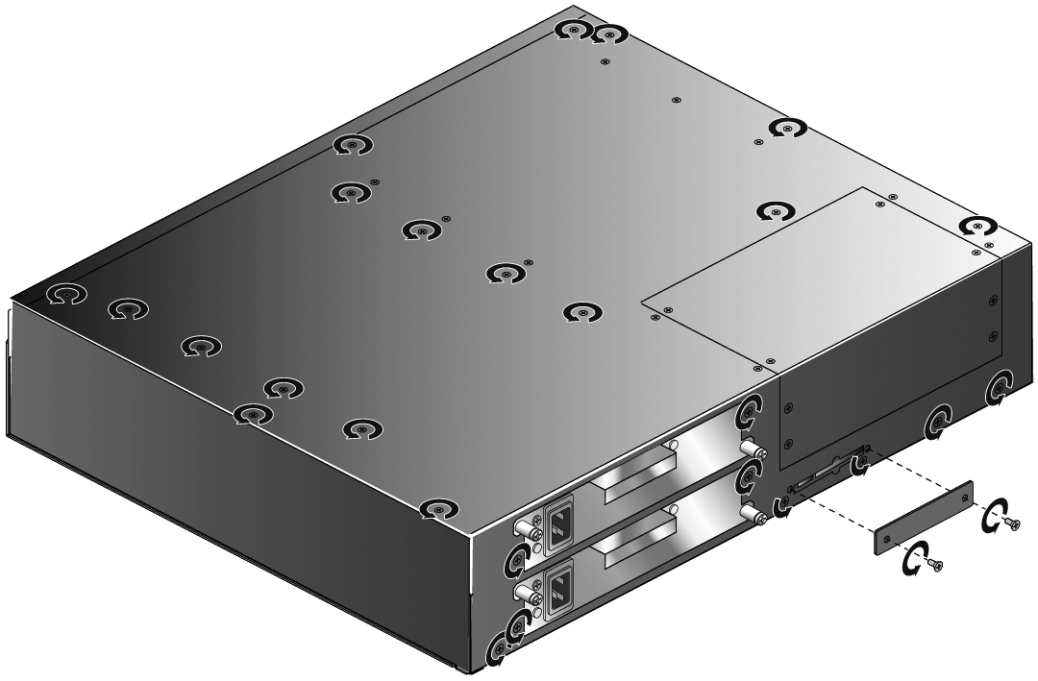
If you have purchased an optional PoE module (G3G-POE), have unplugged all network and power connections and removed power supplies, you must remove the switch cover as follows to access the PoE board connectors in the G3G124-24 base chassis.

Caution: Be sure to retain all screws removed from the G-Series switch cover in a secure location to avoid misplacing them. Leaving any loose screws inside the switch could result in severe damage to switch components.

Precaución: Asegúrese de colocar todos los tornillos que haya retirado de la cubierta del switch G-Series en un lugar seguro, para evitar perderlos. Cualquier tornillo suelto que se deje en el interior del switch podría dañar sus componentes.

1. Refer to Figure 2-12 on page 2-24 to locate all screws necessary for removing the cover.

Figure 2-12 Screw and Coverplate Removal for Removing the G3G124-24 Cover



2. Using a Phillips screwdriver and a counter-clockwise motion, remove all necessary screws.
3. Retain screws and the Compact Flash coverplate in a secure location until the PoE module installation is complete and you are ready to reinstall the switch cover.
4. Lift the cover off the switch.

Installing the PoE Module

Once you have completed the steps described in "Removing the Switch Cover" on page 2-23, you can install the PoE module in the base switch. Installation instructions and the location of standoffs and PoE-to-motherboard connections (behind the ports) are the same as previously described for installing PoE on the G3G-24TX IOM.

To install an optional PoE module in the G-Series base switch:

1. Using Figure 2-3 on page 2-11 as a guideline for locating standoffs on the base switch, follow the procedure in "Installing an Optional PoE Module on the G3G-24TX IOM" on page 2-10.
2. Replace the switch cover and Compact Flash coverplate and secure all screws.
3. Reinstall all necessary components in the switch.

3

Troubleshooting

This chapter contains instructions on troubleshooting the G-Series Ethernet switch as required. This can include:

Electrical Hazard: Only qualified personnel should install or service this unit.

Riesgo Eléctrico: Nada mas personal capacitado debe de instalar o darle servicio a esta unida.

Elektrischer Gefahrenhinweis: Installationen oder Servicearbeiten sollten nur durch ausgebildetes und qualifiziertes Personal vorgenommen werden.

Warning: Do not connect or disconnect any connections while circuit is live, unless area is known to be non-hazardous. Secure any external connections that mate to this equipment by using the screws, safety bars, or other means provided with this equipment.

Advertencia: No conecte ni desconecte ninguna conexión mientras el circuito tenga corriente, a menos que esté seguro de que el área no es peligrosa. Asegure cualquier conexión externa que se una a este equipo usando tornillos, barras de seguridad u otros medios que se proporcionen con el mismo.

Warnhinweis: Ist der Stromkreis in Betrieb dürfen keine Verbindungen getrennt oder hergestellt werden, es sei denn, die Umgebung gilt als ungefährlich. Alle externen Verbindungen zu diesem Gerät müssen mithilfe von Schrauben, Sicherheitsvorrichtungen o. ä. gesichert werden.

Electrical Hazard: This unit may receive power from 2 power sources. Disconnect power from both power sources before servicing or removing connections in a Hazardous environment.

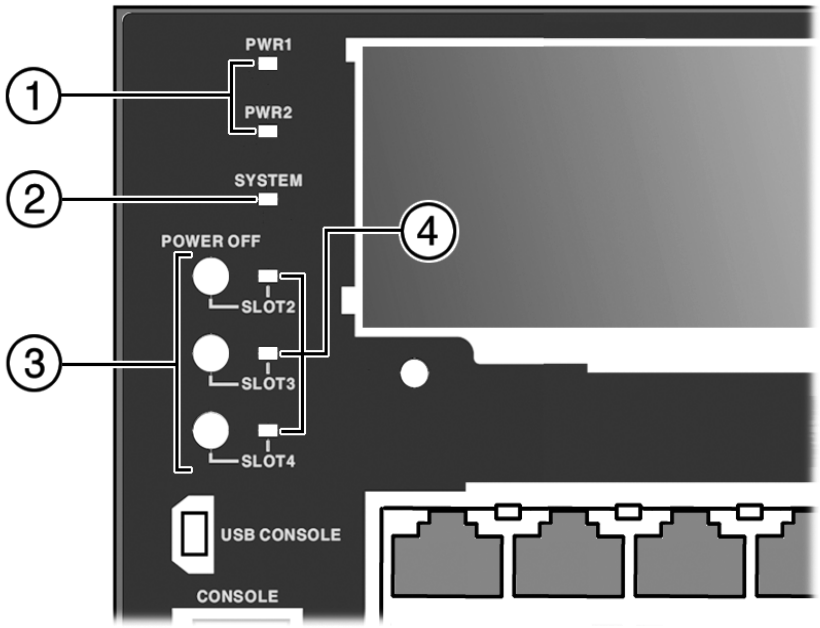
Riesgo Eléctrico: Esta unidad puede recibir energía de dos fuentes. Es necesario desconectar la corriente de las dos fuentes antes de darle servicio o quitar las conexiones en un entorno peligroso.

Elektrischer Gefahrenhinweis: Das Gerät kann Strom aus zwei Stromquellen beziehen. Stellen Sie sicher, dass die Stromzufuhr von beiden Stromquellen unterbrochen ist, bevor Sie Reparaturen vornehmen oder Verbindungen entfernen.

Checking the LEDs

The following sections define the behavior of the LEDs on the G-Series Ethernet switch chassis and on the IOMs. Refer to Figure 3-1 for the location of the LEDs on the chassis and IOMs.

Figure 3-1 G3 system LEDs (G3G124-24 shown)



1	Power Supply LEDs (PWR1 and PWR2)	**3**	IOM power off buttons (Slot 2, 3 and 4)
2	SYSTEM LED	**4**	IOM power off status LEDs (Slot 2, 3 and 4)

SYSTEM LED

The SYSTEM LED indicates the state of the system, as described in Table 3-1.

Table 3-1 SYSTEM LED Definitions

Display	Status
Off	No power.
Solid red	Major system failure, including failure to boot.
Blinking red	Power on self-test failed.
Solid amber	Diagnostics are running.
Blinking amber	Functional image is loaded.
Blinking green	System is booting.
Solid green	System is fully operational.

Power LEDs

The two power LEDs, marked PWR1 and PWR2, indicate voltage for the primary and secondary power inputs. Table 3-2 describes their status.

Table 3-2 Power LED Definitions

Display	Status
Off	Power supply not present.
Green	Normal operation.
Amber	Not enough power for redundancy. Operating in additive power mode.
Red	Power failure.

IOM Status LEDs

The three IOM status LEDs, marked POWER OFF - SLOT 2, SLOT 3, and SLOT 4, indicate operational status of installed modules as described in Table 3-3.

Table 3-3 IOM Status LED Definitions

Display	Status
Off	IOM not present.
Solid Green	Normal operation.
Blinking Green	Booting up / shutting down.
Amber	Safe to remove module. Refer to “Removing an IOM” on page 2-13 for correct procedure.
Red	Power failure.

Fixed and IOM Port LEDs

Table 3-4 describes the status of RJ45 and combo SFP port LEDs in the G-Series fixed front panel and installed IOM(s).

Table 3-4 Port LED Definitions

Display	Status
Off	No link established.
Solid Green	Ethernet link established without activity. For combo SFP ports, this indicates power up.
Blinking Green	Ethernet link established with activity.
Solid Amber (RJ45 only)	Link established without activity and failure to provide power to powered devices. For RJ45 ports, this indicates power up.
Blinking Amber (RJ45 only)	Link established with activity and failure to provide power to powered devices.

Using the Password Reset Button

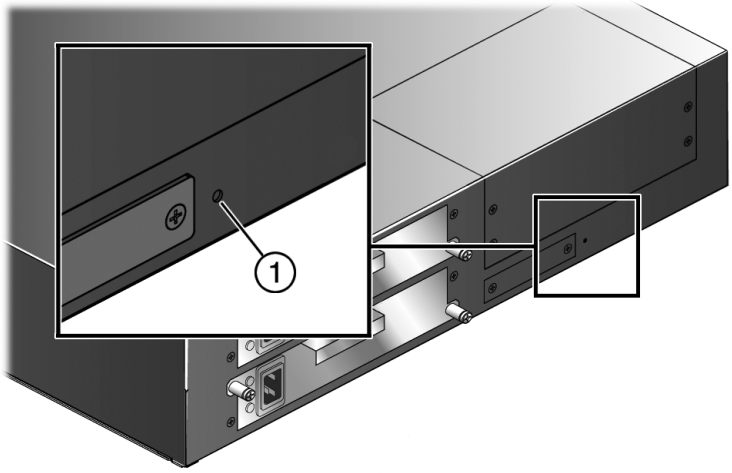
If you forget the G-Series login password, use the password reset button to reset the password to the default value as described in the following procedure.

Note: Notify the system manager before changing the password.

To reset the G-Series password:

1. Locate the password reset button on the back of the switch as shown in Figure 3-2.

Figure 3-2 Locating the Password Reset button



1 Password reset button

2. Press-and-hold the password reset button while the switch is operational. This changes the login password to the default password and will be indicated by means of the command line interface (CLI) only.
3. You can now logon to the switch using the default password via the Console port and assign a new password using the CLI.
4. To access switch management from your local PC, terminal, or modem connection, refer to the *Enterasys G-Series CLI Reference* for instructions on how to log in and enter a new password.

If you require assistance, contact Enterasys Networks using one of the methods described in "Getting Help" on page xvii.

Note: If the admin user account is locked out (typically because someone entered the wrong password multiple times), resetting the admin password with the password reset button will not unlock the admin user account. In order to unlock the admin user account, you can wait for the configured lockout time to expire or you can power cycle the switch to reboot it.

Removing the Switch from a Rack

To remove the G-Series Ethernet switch from a rack:

1. While supporting the switch so it does not fall, carefully remove the mounting screws from the two brackets that attach the switch to the rack.
2. If necessary, remove each bracket from the switch by removing the mounting kit screws as shown in Figure 2-1 on page 2-5.

A

Specifications

This appendix provides information about the following:

Enterasys Networks reserves the right to change the specifications at any time without notice.

Switch Specifications

Table A-1 provides the I/O ports, processors and memory, physical, and environmental specifications for the G3G124-24, G3G124-24P and G3G170-24.

Table A-1 G3 Switch Specifications

Item	Specification
G3G124-24 and G3G124-24P	
RJ45 ports 1 through 24	Twenty-four 10BASE-T/100BASE-TX/1000BASE-T compliant ports with auto-sensing and auto-negotiation via RJ45 connectors. These ports also support 802.3af PoE connections on the G3G124-24P base unit (or when the optional PoE module is installed on the G3G124-24 base unit).
Combo SFP ports 23 and 24	Two ports that support optional Mini-GBICs 100BASE-FX, 1000BASE-LX/SX fiber-optic connections and 1000BASE-T copper connections. When an SFP transceiver (Mini-GBIC) in SFP port 23 establishes a link, RJ45 port 23 is disabled. When an SFP transceiver in SFP port 24 establishes a link, RJ45 port 24 is disabled.
G3G170-24	
	Twenty-four slots that support Mini-GBICs100BASE-FX, 1000BASE-LX/SX fiber-optic connections and 1000BASE-T copper connections.

Table A-1 G3 Switch Specifications (continued)

Item	Specification
Processors/Memory	
Processor	MPC8245, 400 MHz processor
Dynamic Random Access Memory (DRAM)	256 MB
FLASH Memory	32 MB
Performance	
Throughput	Up to 214 Mbps
Switching capacity	384 Gbps
Physical	
Dimensions	8.8 H x 44.1 W x 48.1 D (cm) 3.5 H x 17.3 W x 19 D (in.)
Approximate Weight	One base unit without power supply: • G3G124-24 - 21.16 lb/9.598 kg • G3G124-24P - 21.30 lb/9.662 kg • G3G170-24 - 21.75 lb/9.866 kg
Predicted hours for Mean Time Between Failures (MTBF)	Calculated following Bellcore TR-331 Issue 6 standard, at room temperature of 25°C. • G3G124-24 - 119,152 hrs • G3G124-24P - 107,645 hrs • G3G170-24 - 134,153 hrs
Heat Dissipation (maximum)	Same as Power Consumption (below)
Power Specifications	
Input Voltage	100 to 240 VAC
Power Consumption	• G3G124-24 - 126 W (429 BTU/hr) • G3G124-24P - 130 W (443 BTU/hr) without PoE power draw • G3G170-24 - 92.18W (214 BTU/hr)
Input Frequency	50 to 60 Hz
Input Current	• G3G124-24 - 1.7A - 0.7A • G3G124-24P - 1.8A - 0.7A • G3G170-24 - 1.71A
Thermal Output	Same as Power Consumption (above)
Environmental	
Operating Temperature	0°C to 50°C (32°F to 122°F)
Storage Temperature	-40°C to 70°C (-40°F to 158°F)
Operating Relative Humidity	5% to 95% (non-condensing)

Power Supply Specifications

The G-Series switch accepts up to two G3-PWR or G3-PWR-POE power supplies, or a combination of the two. Table A-2 provides the specifications for the available G3 power supplies:

Table A-2 Power Supply Specifications

Item	Specification
G3-PWR	
Power cord plug accepted	IEC320 C13 (15A)
Input Frequency	50 to 60 Hz
Input Voltage/Current	100 - 240Vac / 6A
Output Power	400W
Power Efficiency (%)	0.87
ACVA	484
G3-PWR-POE	
Power cord plug accepted	IEC320 C19 (20A)
Input Frequency	50 to 60 Hz
Input Voltage/Current	100 - 125Vac / 12A to 200 - 240Vac / 7A
Output Power	1050 to 1200W
Power Efficiency (%)	0.87 to 0.9
ACVA	1404

IOM Specifications

Table A-3 through Table A-5 provide the I/O ports, physical, and environmental specifications for the G3G-24TX, G3G-24SFP, G3K-2XFP, and G3K-4XFP optional IOMs.

Table A-3 G3G-24TX IOM Specifications

Item	Specification
G3G-24TX	
RJ45 ports 1 through 24	Twenty-four 10BASE-T/100BASE-TX/1000BASE-T compliant ports with auto-sensing and auto-negotiation via RJ45 connectors. These ports can support 802.3af PoE connections by installing the optional G3G-POE module.
Combo SFP ports 23 and 24	Two ports that support optional Mini-GBIC 100BASE-FX, 1000BASE-LX/SX fiber-optic connections and 1000BASE-T copper connections. When an SFP transceiver (Mini-GBIC) in SFP port 23 establishes a link, RJ45 port 23 is disabled. When an SFP transceiver in SFP port 24 establishes a link, RJ45 port 24 is disabled.

Table A-3 G3G-24TX IOM Specifications (continued)

Item	Specification
Physical	
Dimensions	4.1 H x 20.5 W x 32 D cm / 1.6 H x 8.1 W x 12.6 D in (handle included)
Approximate Weight	1.1 kg (2.43 lb) without optional PoE
Predicted hours for Mean Time Between Failures (MTBF)	Calculated following Bellcore TR-331 Issue 6 standard, at room temperature of 25°C. 354,653 hours
Heat Dissipation (maximum)	Same as Power Consumption (below)
Power Specifications	
Input Voltage	54V DC
Power Consumption	35 W (119.35 BTU/hr)
Input Current	0.65
Thermal Output	Same as Power Consumption (above)
Environmental	
Operating Temperature	0°C to 50°C (32°F to 122°F)
Storage Temperature	-40°C to 70°C (-40°F to 158°F)
Operating Relative Humidity	5% to 95% (non-condensing)

Table A-4 G3G-24SFP IOM Specifications

Item	Specification
G3G-24SFP	
Twenty-four SFP ports that support Mini-GBIC 100BASE-FX, 1000BASE-LX/SX fiber-optic connections and 1000BASE-T copper connections.	
Physical	
Dimensions	4.1 H x 20.5 W x 32 D cm / 1.6 H x 8.1 W x 12.6 D in (handle included)
Approximate Weight	1.4 kg (3.09 lb)
Predicted hours for Mean Time Between Failures (MTBF)	Calculated following Bellcore TR-331 Issue 6 standard, at room temperature of 25°C. 394,524 hours
Heat Dissipation (maximum)	Same as Power Consumption (below)
Power Specifications	
Input Voltage	43V DC
Power Consumption	23 W (78.45 BTU/hr)
Input Current	0.43
Thermal Output	Same as Power Consumption (above)

Table A-4 G3G-24SFP IOM Specifications (continued)

Item	Specification
Environmental	
Operating Temperature	0°C to 50°C (32°F to 122°F)
Storage Temperature	-40°C to 70°C (-40°F to 158°F)
Operating Relative Humidity	5% to 95% (non-condensing)

Table A-5 G3K-2XFP and G3K-4XFP IOM Specifications

Item	Specification
G3K-2XFP and G3K-4XFP	
G3K-2XFP	Two XFP ports that support 10-Gigabit Ethernet connections.
G3K-4XFP	Four XFP ports that support 10-Gigabit Ethernet connections.
Physical	
Dimensions	4.1 H x 20.5 W x 32 D cm / 1.6 H x 8.1 W x 12.6 D in (handle included)
Approximate Weight	• G3K-2XFP = 1 kg (2.20 lb) • G3K-4XFP = 1.1 kg (2.43 lb)
Predicted hours for Mean Time Between Failures (MTBF)	Calculated following Bellcore TR-331 Issue 6 standard, at room temperature of 25°C. • G3K-2XFP = 343,139 hours • G3K-4XFP = 246,568 hours
Heat Dissipation (maximum)	Same as Power Consumption (below)
Power Specifications	
Input Voltage	54V DC
Power Consumption	• G3K-2XFP = 22 W (75.93 BTU/hr) • G3K-4XFP = 40 W (136.4BTU/hr)
Input Current	• G3K-2XFP = 0.41 • G3K-4XFP = 0.74
Thermal Output	Same as Power Consumption (above)
Environmental	
Operating Temperature	0°C to 50°C (32°F to 122°F)
Storage Temperature	-40°C to 70°C (-40°F to 158°F)
Operating Relative Humidity	5% to 95% (non-condensing)

PoE Daughter Card Specifications

Table A-6 provides the specifications for the G3G-POE daughter card.

Table A-6 G3G-POE Specifications

Item	Specification
Physical	
Dimensions	1.6 H x 17 W x 11.4 D cm / 0.63 H x 6.69 W x 4.49D in
Approximate Weight	0.064 kg (0.14 lb)
Predicted hours for Mean Time Between Failures (MTBF)	Calculated following Bellcore TR-331 Issue 6 standard, at room temperature of 25°C. 1,114,579 hours
Thermal Output (Volt-Amps)	54V-0.07A
Thermal Output (BTUs/Hr))	13.64
Power Specifications	
Input Voltage	54V DC
Power Consumption	4 W
Input Current	0.07
Environmental	
Operating Temperature	0°C to 50°C (32°F to 122°F)
Storage Temperature	-40°C to 70°C (-40°F to 158°F)
Operating Relative Humidity	5% to 95% (non-condensing)

Torque Values

Table A-7 lists the recommended torque values to use when installing the G-Series switch using standard threaded fastener machine screws and bolts.

Table A-7 Recommended Torque Values by Screw Size

Screw Size		Torque in Pounds			Bit Size
English	Metric	-%5	Nominal	+%5	
N/A	N/A	1.42	1.5	1.57	0
2 – 56	1.5	2.85	3.0	3.15	0
4 – 40	2.5	4.75	5.0	5.25	0/1
6 – 32	3.5	8.55	9.0	9.45	1
8 – 32	4.5	17.10	18.0	18.90	2
10 – 32	5	30.40	32.0	33.60	2
1/4 – 20	6.5	63.65	67.0	70.35	3

1-Gigabit Ethernet and 100Base-FX Transceiver (SFP) Specifications

The G3 SFP (Mini-GBIC) port interface slots support 1-Gbps fiber-optic and copper connections as described in Table A-8. These optional Mini-GBICs are hot swappable.

Table A-8 Mini-GBIC Input/Output Port Specifications

Item	Specification
MGBIC-LC01	1 LC fiber-optic multimode port that is compliant with the 1000BASE-SX standard and has an LC connector.
MGBIC-MT01	1 MT-RJ fiber-optic multi-mode port that is compliant with the 1000BASE-SX standard and has an MT-RJ connector.
MGBIC-02	1 RJ45 copper connection that is compliant with the 1000BASE-T standard and has an RJ45 connector.
MGBIC-LC03	1 LC fiber-optic multimode port that is compliant with the 1000BASE-SX standard and has an LC duplex style connector.
MGBIC-LC04	1 LC fiber-optic multimode port that is compliant with the 100BASE-FX standard and has an LC connector.
MGBIC-LC05	1 LC fiber-optic single-mode port that is compliant with the 100BASE-FX standard and has an LC connector.
MGBIC-LC07	1 LC long-haul (up to 110KM) single-mode port that meets or exceeds the 1000BASE-LX standard and has an LC connector.
MGBIC-08	1 LC long-haul (up to 110KM) single-mode port that meets or exceeds the 1000BASE-LX standard and has an LC connector.
MGBIC-LC09	1 LC fiber-optic single-mode port that is compliant with the 1000BASE-LX standard and has an LC connector.

The specifications for the Mini-GBICs shown in Table A-9 through Table A-23 meet or exceed the IEEE 802.3z-1998 standard.

MGBIC-LC01/MGBIC-MT01 Specifications (1000BASE-SX)

Table A-9 MGBIC-LC01/MGBIC-MT01 Optical Specifications

Item	62.5 µm MMF	50 µm MMF
Transmit Power (minimum)	-9.5 dBm	-9.5 dBm
Receive Sensitivity	-17 dBm	-17 dBm
Link Power Budget	7.5 dBm	7.5 dBm

Table A-10 MGBIC-LC01/MGBIC-MT01 Operating Range

Item	Modal Bandwidth @ 850 nm	Range
62.5 µm MMF	160 MHz/km	2-220 Meters
62.5 µm MMF	200 MHz/km	2-275 Meters
50 µm MMF	400 MHz/km	2-500 Meters
50 µm MMF	500 MHz/km	2-550 Meters

MGBIC-02 Specifications (1000BASE-T)

Table A-11 MGBIC-02 Specifications

Item	Specification
Supported Cable	
Type: Maximum Length	Copper, Category 5 UTP Up to 100 meters
Connector	RJ45
Data Rate	1 Gbps, IEEE 802.3:2000 compatible 1000BASE-T operation only Automatic crossover detection
TX Output impedance	100 ohms, typical at all frequencies between 1 MHz and 125 MHz
RX Input impedance	100 ohms, typical at all frequencies between 1 MHz and 125 Hz

MGBIC-LC03 Specifications (1000BASE-SX)

Table A-12 MGBIC-LC03 Optical Specifications

Item	62.5/125 µm MMF	50/125 µm MMF
Transmit Power (minimum)	-9.5 dBm	-9.5 dBm
Transmit Power (maximum)	-3 dBm	-3 dBm
Receive Sensitivity	-20 dBm	-20 dBm
Link Power Budget[1] (Multimode Only)	10.5 dB	10.5 dB

1. The maximum drive distance (up to 2 km) depends on the quality of the installed multimode fiber-optic cable segment. Use the Link Power Budget to calculate the maximum cable length of the attached segment. The Link Power Budget must not exceed those specified in this table. The MGBIC-LC03 input power must not exceed -3 dBm. Otherwise, saturation could occur.

Table A-13 MGBIC-LC03 Operating Range

Item	Modal Bandwidth @ 1310 nm	Range
62.5 µm MMF	160 MHz/km	2,000 Meters
50 µm MMF	400 MHz/km	2,000 Meters

MGBIC-LC04 Specifications (100BASE-FX)

Table A-14 MGBIC-LC04 Optical Specifications

Item	62.5 µm MMF	50 µm MMF
Transmit Power (minimum)	-20 dBm	-23.5 dBm
Receive Sensitivity	-31 dBm	-31 dBm
Link Power Budget[1] (Multimode Only)	11 dBm	7.5 dBm

1. The maximum drive distance (up to 2 km) depends on the quality of the installed multimode fiber-optic cable segment. Use the Link Power Budget to calculate the maximum cable length of the attached segment. The Link Power Budget must not exceed those specified in this table.

Table A-15 MGBIC LC04 Operating Range

Item	1310 nm	Range
9 or 10 µm SMF	N/A	2,000 Meters

MGBIC-LC05 Specifications (100BASE-FX)

Table A-16 MGBIC-LC05 Optical Specifications

Item	10 µm SMF
Transmit Power (minimum)	-15 dBm
Receive Sensitivity	-25 dBm
Link Power Budget [1]	10 dBm

1. The maximum drive distance (up to 10 km) depends on the quality of the installed single-mode fiber-optic cable segment. Use the Link Power Budget to calculate the maximum cable length of the attached segment. The Link Power Budget must not exceed those specified in this table.

Table A-17 MGBIC LC05 Operating Range

Item	1310 nm	Range
9 or 10 µm SMF	N/A	10,000 Meters

MGBIC-LC07 Specifications (1000BASE-ELX)

Table A-18 MGBIC-LC07 Optical Specifications

Item	
Transmit Power (minimum)	-2 dBm, min.
Receive Sensitivity	-30 dBm, min.
Maximum Input Power	-9 dBm
Link Power Budget[1] (Full Duplex Only)	28 dB

1. The maximum drive distance (up to 110 km) depends on the quality of the installed single-mode fiber-optic cable segment. Use the Link Power Budget to calculate the maximum cable length of the attached segment. The Link Power Budget must not exceed those specified in this table. The MGBIC-LC07 input power must not exceed -9 dBm. Otherwise, saturation could occur.

Table A-19 MGBIC-LC07 Operating Range

Item	1550 nm	Range
9 or 10 µm SMF	N/A	110,000 Meters

MGBIC-08 Specifications (1000BASE-ELX)

Table A-20 MGBIC-08 Optical Specifications

Item			
Transmit Power (minimum)	-0 dBm, min.	+2 dBm, typical	+5 dBm, max.
Receive Sensitivity	-24 dBm, min.	-26 dBm, typical	
Maximum Input Power	-3 dBm		
Link Power Budget[1] (Full Duplex Only)	23 dB	28 dB, typical	

1. The maximum drive distance (up to 80 km) depends on the quality of the installed single-mode fiber-optic cable segment. Use the Link Power Budget to calculate the maximum cable length of the attached segment. The Link Power Budget must not exceed those specified in this table. The MGBIC-08 input power must not exceed -3 dBm. Otherwise, saturation could occur.

Table A-21 MGBIC-08 Operating Range

Item	1550 nm	Range
9 or 10 µm SMF	N/A	80,000 Meters

MGBIC-LC09 Specifications (1000BASE-LX)

Table A-22 MGBIC-LC09 Optical Specifications

Item	62.5 µm MMF	50 µm MMF	10 µm SMF
Transmit Power (minimum)	-11.5 dBm	-11.5 dBm	-9.5 dBm
Receive Sensitivity	-20 dBm	-20 dBm	-20 dBm
Link Power Budget	8.5 dBm	8.5 dBm	10.5 dBm

Table A-23 MGBIC-LC09 Operating Range

Item	Modal Bandwidth @ 1300 nm	Range
62.5 µm MMF	500 MHz/km	2-550 Meters
50 µm MMF	400 MHz/km	2-550 Meters
50 µm MMF	500 MHz/km	2-550 Meters
10 µm SMF	N/A	2-10,000 Meters

10-Gigabit Ethernet Transceiver (XFP) Specifications

The 10-Gigabit Small Form Factor Pluggable (XFP) interface port slots on the G3 modules support various optional 10-Gigabit Ethernet (10 GbE) standard type fiber-optic and copper transceivers. Table A-24 provides the input/output specifications for each supported XFP version as specified in the IEEE 802.3ae-2002 standard.

Table A-24 XFP Specifications

Module	Wavelength	Tx Power Min/Max (avg.)	Rx Sensitivity Min/Max (avg.)	Link Power Budget	MTBF (hours)
10GBASE-LR-XFP	1310 nm DFB	-8.2 / 0.5 dBm	-14.4 / 0.5 dBm	9.4 dB	2,631,579
10GBASE-ER-XFP	1550 nm EML	-4.7 / 4.0 dBm	-15.8 / -1.0 dBm	15 dB	2,000,000
10GBASE-ZR-XFP	1550 nm EML	0 / 4.0 dBm	-25 / -7.0 dBm	18 dB	1,164,047
10GBASE-SR-XFP	850 nm VCSEL	-7.3 / -1.0 dBm	-9.9 / -1.0 dBm	7.3 dB	4,081,633
10GBASE-CX4-XFP	Copper	N/A	N/A	N/A	4,816,314

The specifications listed in Table A-25 meet or exceed the IEEE 802.3ae-2002 standard.

Table A-25 Recommended Cable Types and Specifications

Item	Type	Max. Reach	Min. Reach[1]	Connector
10GBASE-LR-XFP	SMF (Single Mode Fiber)	10 km (6.21 mi)	2 m (6.6 ft)	LC
10GBASE-ER-XFP	SMF (Single Mode Fiber)	40 km (24.85 mi)[2]	2 m (6.6 ft) with minimum of 5 dB attenuation	LC
10GBASE-ZR-XFP	SMF (Single Mode Fiber)	80 km (49.7 mi)	2 m (6.6 ft) with minimum of 11 dB attenuation	LC
10GBASE-SR-XFP	MMF (Multimode Fiber)	300 m (984 ft)	2 m (6.6 ft)	LC
10GBASE-CX4-XFP	CX4 TwinAxial	15 m (49.21 ft)	N/A	CX4

1. The limiting factor is saturation of the receiver by the transmitter. When presented with a signal at a strength above the saturation point, the receiver cannot distinguish between pulses, though no hardware damage occurs.
2. Links longer than 30 km for the same link power budget are considered engineered links. Attenuation for such links needs to be less than the minimum

Console Port Pinout Assignments

Refer back to Connecting to the RJ45 Console Port on page 2-14 for console port pinout information.

Regulatory Compliance

This product meets the safety, electromagnetic compatibility (EMC), and environmental requirements listed in Table A-26:

Table A-26 Compliance Standards

Regulatory Compliance	Standards
Safety	UL 60950-1, FDA 21 CFR 1040.10 and 1040.11, CAN/CSA C22.2 No. 60950-1, EN 60950-1, EN 60825-1, EN 60825-2, IEC 60950-1, 2006/95/EC (Low Voltage Directive)
Electromagnetic Compatibility (EMC)	FCC 47 CFR Part 15 (Class A), ICES-003 (Class A), EN 55022 (Class A), EN 55024, EN 61000-3-2, EN 61000-3-3, AS/NZ CISPR-22 (Class A). VCCI V-3. CNS 13438 (BSMI), 2004/108/EC (EMC Directive)
Environmental	2002/95/EC (RoHS Directive), 2002/96/EC (WEEE Directive), Ministry of Information Order #39 (China RoHS)

Index