installation guide

hp procurve switch
gl modules

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HP Procurve Switch GL Modules

Installation Guide

Applicable Products

HP Procurve Switch 10/100-TX GL Module (HP J4862A)
HP Procurve Switch 100/1000-T GL Module (HP J4863A)
HP Procurve Switch Gigabit Transceivers GL Module
 (HP J4864A)

Contents

HP Procurve Switch GL Modules

For the HP Procurve Switch 4108GL

Descriptions

The HP Procurve Switch GL Modules are components that you can add to an HP Procurve GL switch to provide a variety of network connectivity options.

The following modules are available as of this printing:

Module	Description
HP Procurve Switch 10/100-T GL Module (HP J4862A)	24 twisted-pair ports with RJ-45 connectors for 10 Mbps or 100 Mbps operation over 100-ohm unshielded (UTP) or shielded (STP) twisted-pair cable -- all ports have the **HP Auto-MDIX** feature
HP Procurve Switch 100/1000-T GL Module (HP J4863A)	6 twisted-pair ports with RJ-45 connectors for 1000 Mbps (Gigabit) or 100 Mbps operation over Category 5 or better 100-ohm UTP or STP cable *(category 5E recommended for Gigabit)* -- all ports have the IEEE 802.3ab **Auto MDI/MDI-X** feature
HP Procurve Switch Gigabit Transceiver GL Module (HP J4864A)	3 transceiver slots for installing any of the supported HP Procurve transceivers*.

* The following HP Procurve transceivers are supported by the Gigabit Transceiver GL Module (as of this printing):

- 100-FX Transceiver (HP J4853A)
- Gigabit-SX Transceiver (HP J4131A)
- Gigabit-LX Transceiver (HP J4132A)
- 100/1000-T Transceiver (HP J4834A)
- Gigabit Stacking (part of the HP Procurve Switch Gigabit Stacking Kit -- HP J4116A)

Contact your HP-authorized networking products reseller or your HP representative for information on availability of other modules and transceivers. You can also visit the HP networking products Web site at *http://www.hp.com/go/hpprocurve* to get more information.
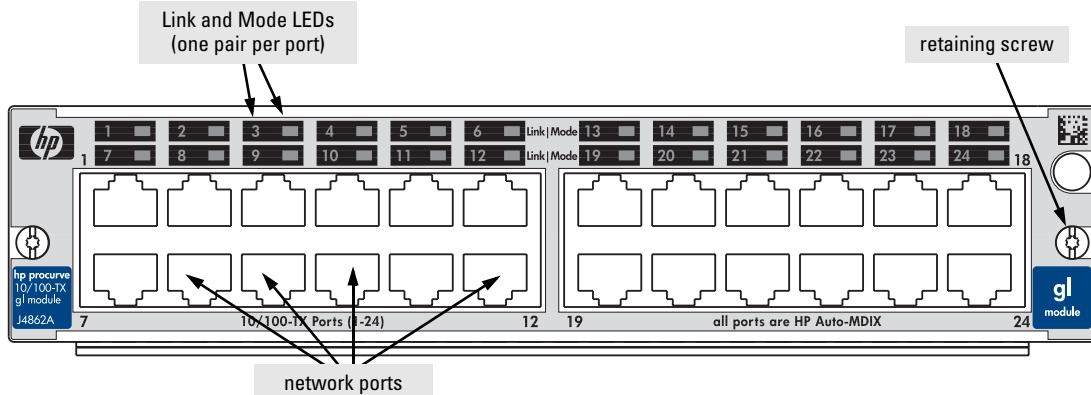
Example: The HP Procurve 24-Port 10/100-TX GL Module

Features: The HP Procurve Switch GL Modules have the following features:

■ auto-enabled ports—the ports are all configured to be ready for network operation as soon as a viable network cable is connected

■ auto-configuration—a default configuration is applied to the module when the switch is powered on and the module passes self test; this default configuration works well for most network installations

■ LEDs that provide information on the link status, network activity, connection bandwidth, and communication mode (half or full duplex)

■ "hot swap" operation—you can add a module or replace a module without having to shut down the switch (changing the module type in a given slot *does* require a switch reset)

■ the ports on the 10/100-TX GL Module have the **HP Auto-MDIX** feature, and the ports on the 100/1000-T GL Module have the IEEE 802.3ab **Auto MDI/MDI-X** feature. These features operate the same way and allow you to use either "straight-through" or "crossover" twisted-pair cables for all the twisted-pair network connections. Please see the note on "Automatic Cable Sensing" on page 7.

■ standards adherence:
   • the 10/100-TX GL Module is compatible with the IEEE 802.3 10Base-T and IEEE 802.3u 100Base-TX standards
   • the 100/1000-T GL Module is compatible with the IEEE 802.3ab 1000Base-T and IEEE 802.3u 100Base-TX standards
   • the ports on the transceivers that are installed in the Gigabit Transceiver GL Module are compatible with their appropriate standards. See the *Installation Guide* the comes with the transceivers.

Installing the Module

Overview

You can install any of the modules into any of the HP Procurve switches that have a compatible module slot. As of this printing, those are the HP Procurve Switch 4108GL (J4865A) and the HP Procurve Switch 4108GL Bundle (J4861A).

The installation steps are:

1. If you are using the Gigabit Transceiver GL Module, install the transceivers in the module, before installing that module into the switch. Please see the *Installation Guide* that came with the transceivers for more information on installing the transceivers.

2. Install the modules in a switch slot (see page 4).

3. Reset the switch, only if you have installed any modules into slots that were previously occupied by a different type module (see page 12).

4. Verify that the modules are installed correctly (see page 6).

5. Connect the network cabling (see page 7).

6. Optionally, customize the configuration for the modules' ports (unless the default port configuration is satisfactory for your network application - see page 10).

N o t e   If necessary, you can "hot-swap" one module for another; that is, replace one module with another while the switch is still powered on, without interrupting the operation of the rest of the switch ports. For more information, see page 11.
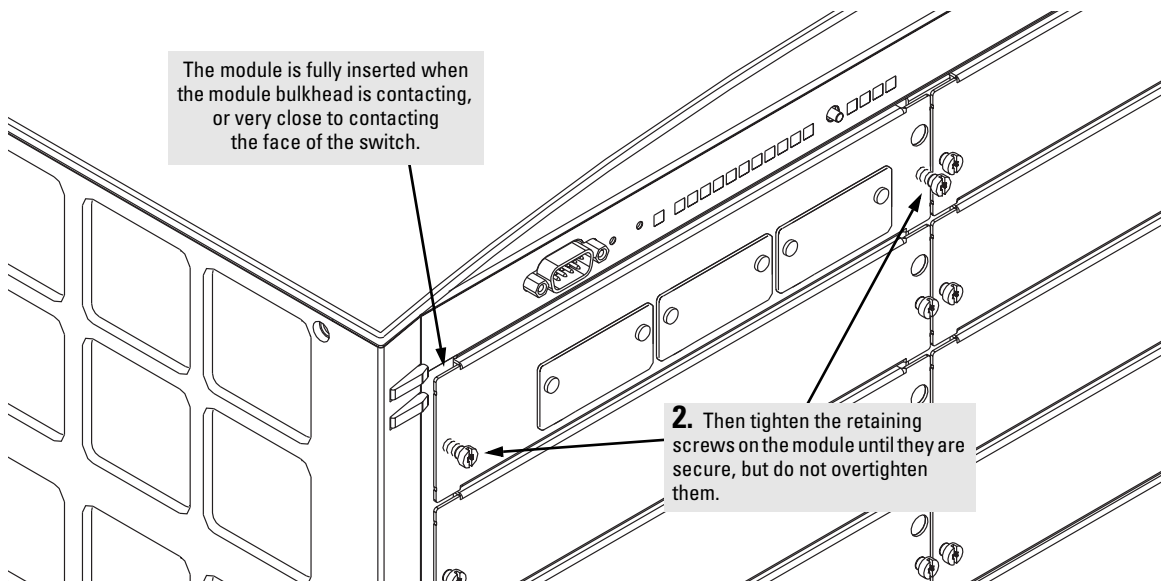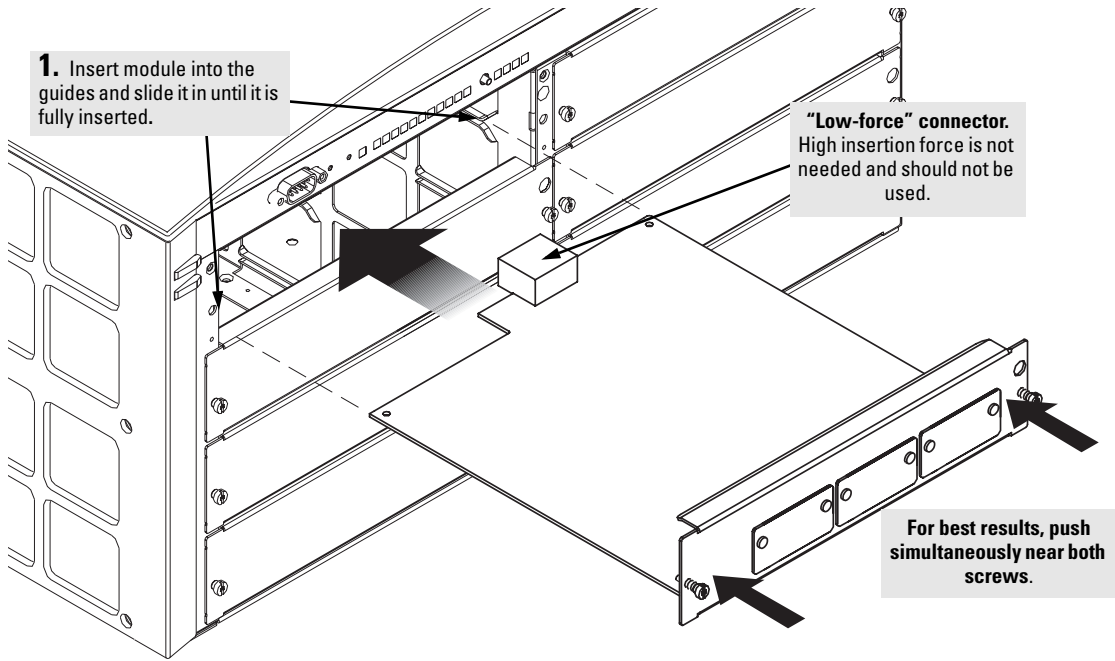
Installing the Module in an Unused Slot

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Installation Precautions:

■ Static electricity can severely damage the electronic components on the modules. When handling and installing the modules in your switch, follow these procedures to avoid damage from static electricity:

- Handle the module by its bulkhead or edges and avoid touching the components and the circuitry on the board.

- When installing the module, equalize any static charge difference between your body and the switch by wearing a grounding wrist strap and attaching it to the switch's metal body, or by frequently touching the switch's metal body.

■ *The HP Procurve Switch GL Modules have "low-force", high-performance connectors. High insertion forces are not necessary to install the modules, and should not be used.*

■ *Make sure that you fully insert the modules.* That is, press the module into the slot until the bulkhead on the module is contacting or is very close to contacting the front face of the switch chassis.

■ Once the module is fully inserted, make sure that you screw in the two retaining screws to secure the module in place.

■ For safe operation, proper switch cooling, and reduction of electromagnetic emissions, ensure that a slot cover is installed on any unused module slot. *For safety, no more than one slot should be uncovered at a time when the switch is powered on.*

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1. Use a Torx T-10 or flat-bladed screwdriver to unscrew the screws in the cover plate over the slot you want to use, and remove the cover. Store the cover plate for possible future use.

2. Hold the module by its bulkhead—taking care not to touch the metal connectors or components on the board.

3. Insert the module into the slot guides and slide it into the slot until it stops. Then press near the two screws on the module bulkhead to seat the module connector into the switch backplane. The module bulkhead should be in contact with or very close to contact with the back face of the switch.

   Note: The HP Procurve Switch GL Modules have "low-force", high-performance connectors. High insertion forces are not necessary to install the modules and should not be used.

1. Insert module into the guides and slide it in until it is fully inserted.

"Low-force" connector. High insertion force is not needed and should not be used.

For best results, push simultaneously near both screws.

The module is fully inserted when the module bulkhead is contacting, or very close to contacting the face of the switch.

2. Then tighten the retaining screws on the module until they are secure, but do not overtighten them.

4. Reset the switch only if you have installed a module in place of a different type of module. (See "Resetting the Switch" on page 12 for more information about when the switch must be reset.)

5. Verify the module is installed correctly. Observe the Module Status LED for the slot in which the module is being installed, and the Self Test and Fault LEDs on the switch to verify that the module is installed properly.

Fault LED   Self Test LED   Module Status LEDs

Module Link and Mode
LEDs
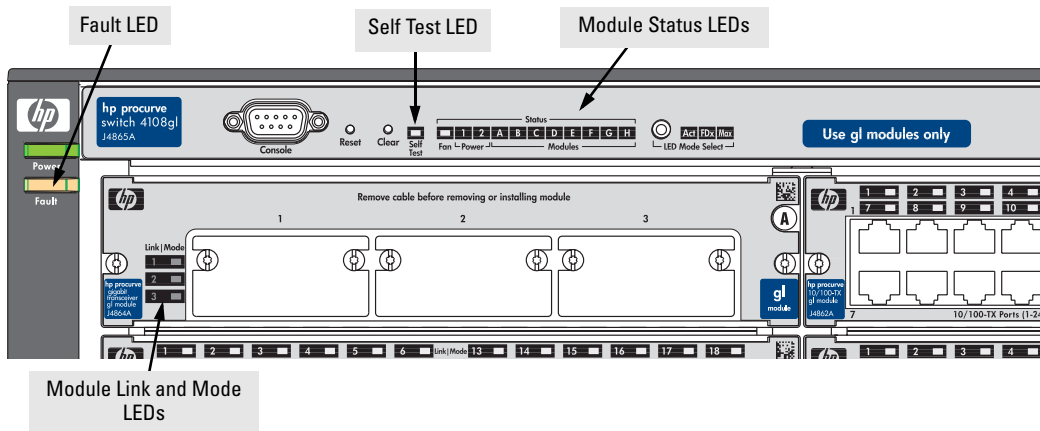
When the module is installed properly and the switch is powered on, or the module is installed when the switch already has power, the module undergoes a self test that takes a few seconds. You can use the LEDs to determine that the module is installed properly and has passed the self test, as described in the "LED Behavior" table below.

LED Behavior

LED	Display for a Properly Installed Module
Module Status	(for the slot in which you are installing the module) Goes ON as soon as the module is installed and the switch is powered on, and stays ON steadily.
Self Test	ON briefly while the module is being tested, then OFF. **Note:** If the switch was powered off while the module was installed, when the switch is powered on, the Self Test LED will stay ON for the duration of the whole switch self test.
Fault	OFF
Link and Mode (on the modules)	For a module that is installed while the switch is powered on, all the Link and Mode LEDs on the module go ON for approximately 15 to 20 seconds, then OFF for 5 to 10 seconds depending on the module. Then, the Self Test LED on the switch goes OFF. If the module is already installed when the switch is powered on or reset, this process occurs approximately 30 seconds after the power on or reset, during which the chassis is being tested.

6. Connect the appropriate network cables to the module's ports as shown in the table on the next page. The table shows the supported cable types for the 10/100-TX GL Module and the 100/1000-T GL Module. The cabling that you would use for the transceivers that are installed in the Gigabit Transceiver GL Module depends on the types of transceivers you are using. Please see the manual that came with the transceivers for information on the appropriate cabling.

For more information on the cable specifications, see "Cables" on page 17.

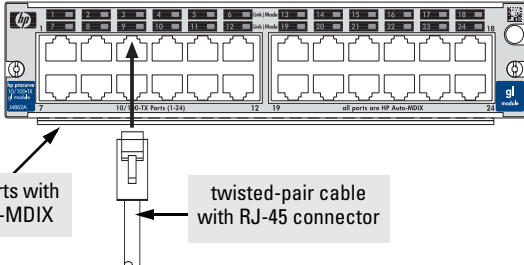| **N o t e**	**Automatic Cable Sensing:**
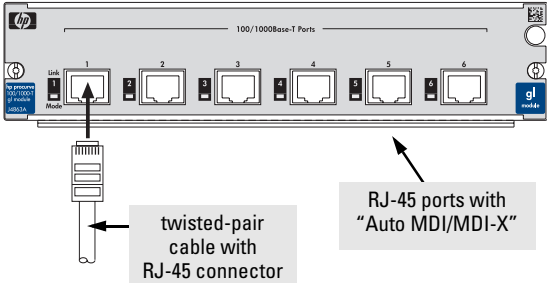
Automatic Cable Sensing:
When the ports for the 10/100-TX GL Module and the 100/1000-T GL Module are in their default configuration, Auto, both modules automatically negotiate whether the ports operate as MDI or MDI-X, depending on the cable type and the connected device's operation. As a result, you can use either "straight-through" or "crossover" twisted-pair cable for all network connections to these modules.

On the 10/100-TX GL Module, this feature is identified as **HP Auto-MDIX**; on the 100/1000-T GL Module, it comes with compliance with the IEEE 802.3ab standard, and is identified as **Auto MDI/MDI-X**. Both features operate the same.

Operation of this feature depends on the port configurations being kept at Auto. If the configuration is changed to one of the available fixed options though (for example, 100-Full Duplex), the port operates as an MDI-X port. In that case, to connect the module to another switch or hub, use a crossover cable; to connect to an end node, use a straight-through cable.

Supported Cable Types

Module	Cable Type	Maximum Length
10/100-TX GL Module	**10 Mbps operation:** category 3, 4, or 5, 100-ohm differential twisted-pair cable	100 meters (recommended)
	100 Mbps operation: category 5, 100-ohm differential twisted-pair cable	100 meters

RJ-45 ports with HP Auto-MDIX

twisted-pair cable with RJ-45 connector

Notes:

- *The RJ-45 ports on this module have the HP Auto-MDIX feature. In the module's default configuration, Auto, **either a straight-through or crossover cable can be used** to connect the module to any other 100Base-TX or 10Base-T device. See the Note on page 7.*
- Since the 10Base-T operation is through the 10/100Base-TX ports, if you ever want to upgrade the ports to 100Base-TX, it would be best to cable the ports initially with category 5 cable.

Module	Cable Type	Maximum Length
100/1000-T GL Module	**100 Mbps operation:** category 5, 100-ohm differential twisted-pair cable	100 meters
	1000 Mbps (Gigabit) operation: category 5E, 100-ohm cable is recommended, although category 5 cable may also work.	100 meters

twisted-pair cable with RJ-45 connector

RJ-45 ports with "Auto MDI/MDI-X"

*Note: In the module's default configuration, Auto, **either a straight-through or crossover cable can be used** to connect the module to either another Gigabit device or to a 100Base-T device. See the Note on page 7.*

7. Check the port LEDs for the newly-installed module to ensure that the port(s) connected in the preceding step are operating correctly. Each port on the switch modules has Link and Mode LEDs near it as shown in the next illustration.

Example Link and Mode LEDs
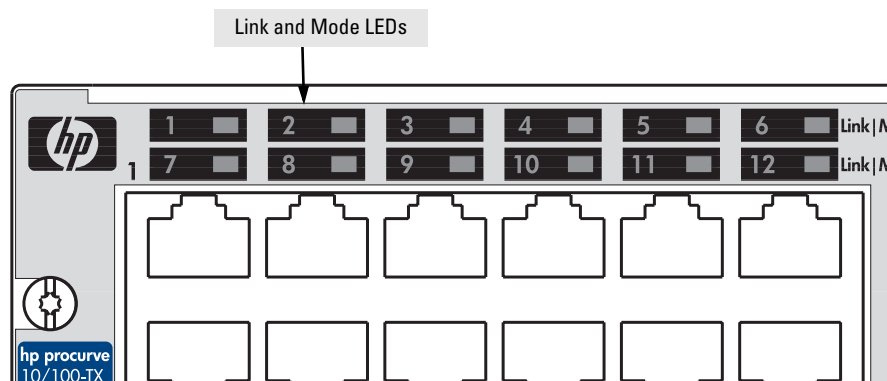
- The Link LED will be lit for each port that is connected properly to an active network device.

  If the Link LED does not go on when an active network cable is connected to the port, there may be something wrong with the cable, the cable connectors, or the device at the other end of the cable. See the troubleshooting information on page 13.

- If the switch Mode is set to display activity (the `Act` mode indicator LED is lit), then the Mode LED for each port that is transmitting and/ or receiving packets will flicker when traffic is detected on the port.

- If the Mode is set to display full duplex (the `FDx` mode indicator LED is lit), then the Mode LED will be lit for each port that is operating in full duplex.

- If the Mode is set to display maximum link speed operation (the `Max` mode indicator LED is lit), then the Mode LED will be lit for each port that is operating at its maximum possible link speed. *For gigabit-capable ports, that speed would be 1000 Mbps (Gigabit); for 10/100 ports, that speed would be 100 Mbps.*

8. Customize the port configuration, if necessary. (See "Customizing the Port Configuration" on page 10.)

Customizing the Port Configuration

If the slot in which you installed the module was empty the last time the switch was either rebooted or reset (or the power to the switch was cycled), then the module will use preconfigured default parameter values that will work for most networks.

The default port configurations for the modules are:

- **Ports Enabled:** Yes
- **Mode:**
  - **10/100-TX GL Module:** Auto — The port auto negotiates speed (10 or 100 Mbps), communication mode (half or full duplex), and MDI or MDI-X port operation. *Note: if you configure the port to one of the fixed 100 Mbps modes, the port will then operate only as an MDI-X port.*
  - **100/1000-T GL Module:** Auto — The port auto negotiates speed (1000 or 100 Mbps), communication mode (half or full duplex), and MDI or MDI-X port operation. *Note: if you configure the port to one of the fixed 100 Mbps modes, the port will then operate only as an MDI-X port.*
- **Flow Control:** Disabled

If necessary, configure the port(s) in the module by using the switch console or the web browser interface. For more information, see the *Management and Configuration Guide* shipped on the documentation CD that came with the switch, and the online Help provided in the console and web browser interface.

If the default port configuration listed above is acceptable for your network, then skip this process.

Replacing or Removing a Module

Follow these procedures to replace one module with another, or to remove a module without replacing it:

1. Remove any network cables from the ports on the module.

2. On the module you want to remove from the switch, unscrew the retaining screws enough to disconnect them from the threaded holes in the switch.

unscrew the retaining screws
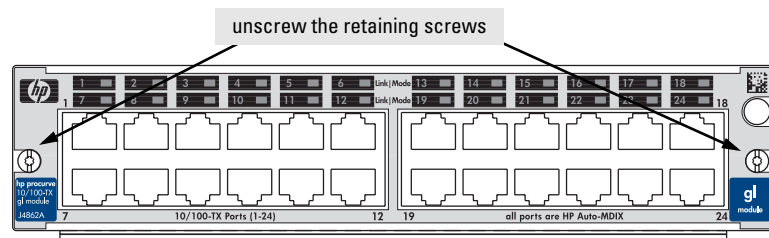
3. Grab the screws and pull the module out from the slot. It may help to brace your hands against the face of the switch and "lever" the module out from the switch slot.

4. Do one of the following:
    *   If you will be installing another module in the slot, go to "Installing the Module in an Unused Slot" on page 4 and begin with step 2.
    *   If you will not install another module in the slot (that is, leave it empty), then re-install a slot cover plate over the empty slot opening.

Caution   For proper cooling and reduction of electromagnetic emissions, ensure that a slot cover is installed on any unused slot.

5. Reset the switch, as described under "Resetting the Switch" on page 12, if you are exchanging one type of module with a different type of module in the same slot (for example, replacing a 10/100-TX GL Module with a 100/1000-T GL Module).

    If you are replacing a module with another one of the *same* type in the same slot, it is not necessary to reset the switch. The current configuration for ports in that slot will apply to the new module.

Resetting the Switch

Reasons for Resetting the Switch

Generally, you only need to reset the switch when it needs to recognize a change in its hardware or software (console) configuration. Some circumstances in which you will need to reset the switch are:

■ Installing a module in a slot that was previously occupied by a different type of module—for example, installing a 100/1000-T GL Module in a slot that was previously used for a 10/100-TX GL Module—the switch must be reset after the new module is installed so the switch processor can properly initialize and configure the new module type.

N o t e   When a module is exchanged for a different type, until the switch is reset the module will not operate, the Module Status LED for the slot will continue to flash, and all the LEDs on the module will stay on continuously.

■ Changing certain switch configuration parameters through the console interface. (In this case, the console provides indications when the switch must be reset for the configuration change to be activated.)

You do not need to reset the switch when:

■ Installing a module in a previously unused slot.

■ Replacing a module with the *same* type of module.

Methods of Resetting the Switch

You can reset the switch by any of these methods:

■ pressing the Reset button on the front of the switch

■ power cycling the switch

■ issuing the **reboot system** command from the switch console CLI, or selecting the Reset or Reboot option from the switch console menu, web browser interface, or HP TopTools for Hubs & Switches

Troubleshooting

The primary tools for troubleshooting the switch modules are the LEDs on the front of the switch and on the modules. Refer to "LED Behavior" on page 6. Also, refer to the *Installation and Getting Started Guide* for more detailed troubleshooting information.

The following tables describe switch and module LED displays that indicate that the module or connections to the ports on the module are not operating correctly.

Switch and Module LED Error Indicators:

Fault	Self Test	Module Status	Port Link	Diagnostic Tips
Blinking[†]	Blinking[†]	Blinking[†]	All Link and Mode LEDs On	❶
Blinking[†]	Off	Blinking[†]	On briefly, then Off	❷
Off	Off	Blinking[†]	Off	❸
Off	Off	On	Off with cable connected	❹

[†] **The blinking behavior is an on/off cycle once every 1.6 seconds, approximately.**

Diagnostic Tips:

See the tables on the next two pages to diagnose the LED error indicators in the previous table.

Tip Number	Problem	Solution
❶	The module installed in the slot has experienced a self test or initialization fault.	The module is tested whenever the switch is powered on, or reset (through the Reset button on the switch, or the Reboot or Reset options in the console or web browser interface), and when it is hot swapped (installed when the switch is powered on).
		Try reinstalling the module. You can do this without having to power down the switch. When the module is reinstalled, it will be retested automatically. Make sure to screw in the retaining screws so that the module cannot be inadvertently pulled out by pulling on the network cables.
		If the fault indication reoccurs, the module may have failed. Remove the module from the switch and replace it with another module, or recover the slot with the cover plate. Call your HP-authorized LAN dealer, or use the electronic support services from HP to get assistance. See the Customer Support/Warranty booklet for more information.
❷	The module installed in the slot that corresponds to the letter that is flashing has experienced a downloading fault.	Operating code and configuration information is downloaded to each switch module whenever the switch is powered on, or reset (through the Reset button on the switch, or the Reboot or Reset options in the console or web browser interface), and when they are hot swapped (installed when the switch is powered on). In this fault condition, an error has occurred in the download process.
		Try reinstalling the module. You can do this without having to power down the switch. When the module is reinstalled, it will be retested automatically.
		If the fault indication reoccurs, the module may have failed. Remove the module from the switch and replace it with another module, or recover the slot with the cover plate. Call your HP-authorized LAN dealer, or use the electronic support services from HP to get assistance. See the Customer Support/Warranty card for more information.
❸	A module was installed in the slot that is a different type than the previously installed module, and the switch has not yet been reset.	When you "hot swap" modules in the switch slot, if you install a different module type than the one that was previously installed in the slot, you must reset the switch so the switch processor can properly initialize and configure the new module type. The flashing LED informs you that this change of module types has occurred. The module will not work properly until the switch is reset as indicated by all the module's LEDs staying on until the switch is reset.
		See "Resetting the Switch" on page 12.

Tip Number	Problem	Solution
❹	The network connection is not working properly.	Try the following procedures:

Try the following procedures:

- For the indicated port, verify that both ends of the cabling, at the switch and the connected device, are securely connected.

- Verify the connected device and switch are both powered *on* and operating correctly.

- Verify that you have used the correct cable type for the connection.

  – for twisted-pair connections, in general, for connecting to an end node (MDI port), use "straight- through" cable; for connecting to MDI-X ports on hubs or other switches, use "crossover" cable.

    Note: For the 10/100-TX GL Module and the 100/1000-T GL Module in the default configuration (Auto), the modules automatically negotiate whether each port operates as MDI or MDI-X, depending on the cable type and the connected device's operation, and either a straight-through or crossover cable can be used. If the module configuration is changed to one of the fixed configuration options though (for example, 100-Full Duplex), then the port operates as MDI-X only and the above statement about straight-through and crossover cables applies.

  – for fiber-optic connections, verify that the transmit port on the switch is connected to the receive port on the connected device, and the switch receive port is connected to the transmit port on the connected device.

- For a 1000 Mbps connection, verify that the network cabling complies with the IEEE 802.3ab standard. The cable should be installed according to the ANSI/ TIA/EIA-568-A-5 specifications. Cable testing should comply with the stated limitations for Attenuation, Near-End Crosstalk, Far-End Crosstalk, Equal-Level Far-End Crosstalk (ELFEXT), Multiple Disturber ELFEXT, and Return Loss.

  The cable verification must include all patch cables from any end devices, including the switch, to any patch panels in the cabling path.

- Verify that the port has not been disabled through a switch configuration change.

  You can use the console interface, or, if you have configured an IP address on the switch, use the web browser interface, or HP TopTools for Hubs & Switches network management software to determine the state of the port and re-enable the port if necessary.

- If the other procedures don't resolve the problem, try using a different port or a different cable.

Customer Support Services

If you are having any trouble with your module or switch, Hewlett-Packard offers support 24 hours a day, seven days a week through the use of a number of automated electronic services. See the Customer Support/Warranty booklet that came with your switch for information on how to use these services to get technical support. The HP networking products World Wide Web site, *http://www.hp.com/go/procurve* also provides up-to-date support information. Additionally, your HP-authorized network reseller can also provide you with assistance, both with services that they offer and with services offered by HP.

Specifications

Environmental

	Operating	Non-Operating
Temperature:	0°C to 55°C (32°F to 131°F)	-40°C to 70°C (-40°F to 158°F)
Relative humidity: (non-condensing)	15% to 95% at 40°C (104°F)	15% to 90% at 65°C (149°F)
Maximum altitude:	4.6 Km (15,000 ft)	4.6 Km (15,000 ft)

Lasers

The Gigabit-SX Transceiver, and the Gigabit-LX Transceiver, both of which can be installed in the Gigabit Transceiver GL Module, are Class 1 Laser Products. Laser Klasse 1
These transceivers comply with IEC 825-2: 1993.

Connectors

- The ports on the **10/100-TX GL Module** are compatible with the IEEE 802.3 10Base-T and 802.3u 100Base-TX standards and accept the 10 Mbps or 100 Mbps cables listed below.

- The ports on the **100/1000-T GL Module** and the **100/1000-T Transceiver**, which can be installed in the **Gigabit Transceiver GL Module**, are compatible with the IEEE 802.3u 100Base-TX and IEEE 802.3ab 1000Base-T standards, and accept the 100 Mbps or 1000 Mbps cables listed below. *For 1000 Mbps operation, Category 5E twisted-pair cable is recommended.*

- The port on the **100-FX SC Transceiver**, which can be installed in the **Gigabit Transceiver GL Module**, transmits at 1300 nm wavelength, and is compatible with the IEEE 802.3u 100Base-FX standard. It accepts the multimode fiber-optic cables for 100Base-FX described on the next page.

- The port on the **Gigabit-SX Transceiver**, which can be installed in the **Gigabit Transceiver GL Module**, transmits at 850 nm wavelength, and is compatible with the IEEE 802.3z Gigabit-SX standard. It accepts the low metal content, multimode fiber-optic cables for Gigabit-SX described on the next page.

- The port on the **Gigabit-LX Transceiver**, which can be installed in the **Gigabit Transceiver GL Module**, transmits at 1300 nm wavelength, and is compatible with the IEEE 802.3z Gigabit-LX standard. It accepts the low metal content, single mode or multimode fiber-optic cables for Gigabit-LX described on the next page.

Cables

Twisted-Pair

10 Mbps Operation	Category 3, 4, or 5 100-ohm differential unshielded twisted-pair (UTP) or shielded twisted-pair (STP) cable, complying with IEEE 802.3 10Base-T specifications, fitted with RJ-45 connectors
100 Mbps Operation	Category 5 100-ohm differential UTP or STP cable, complying with IEEE 802.3u 100Base-TX specifications, fitted with RJ-45 connectors
1000 Mbps Operation	Category 5E 100-ohm differential UTP or STP cable, complying with IEEE 802.3ab 1000Base-T specifications, fitted with RJ-45 connectors *(please see "Note on 1000Base-T Cable Requirements", below)*

Note on 1000Base-T Cable Requirements. The Category 5 networking cables that work for 100Base-TX connections should also work for 1000Base-T, but for the most robust connections you should use cabling that complies with the Category 5E specifications, as described in Addendum 5 to the TIA-568-A standard (ANSI/TIA/EIA-568-A-5).

Because of the increased speed provided by 1000Base-T (Gigabit-T), network cable quality is more important than for either 10Base-T or 100Base-TX. Cabling plants being used to carry 1000Base-T networking must comply with the IEEE 802.3ab standards. In particular, the cabling must pass tests for Attenuation, Near-End Crosstalk (NEXT), and Far-End Crosstalk (FEXT). Additionally, unlike the cables for 100Base-TX, the 1000Base-T cables must pass tests for Equal-Level Far-End Crosstalk (ELFEXT), Multiple Disturber ELFEXT, and Return Loss.

When testing your cabling, be sure to include the patch cables that connect the switch and other end devices to the patch panels on your site. The patch cables are frequently overlooked when testing cable and they must also comply with the cabling standards.

Fiber-Optic

100Base-FX	62.5/125 µm or 50/125 µm (core/cladding) diameter, graded-index, multimode fiber-optic cables, complying with the ITU-T G.651 and ISO/IEC 793-2 Type A1b or A1a respectively, fitted with SC connectors
Gigabit-SX	62.5/125 µm or 50/125 µm (core/cladding) diameter, graded-index, low metal content, multimode fiber-optic cables, complying with the ITU-T G.651 and ISO/IEC 793-2 Type A1b or A1a respectively, fitted with SC connectors
Gigabit-LX	low metal content, single mode fiber-optic cables, complying with the ITU-T G.652 and ISO/IEC 793-2 Type B1 standards, fitted with SC connectors OR 62.5/125 µm or 50/125 µm (core/cladding) diameter, graded-index, low metal content, multimode fiber-optic cables, complying with the ITU-T G.651 and ISO/IEC 793-2 Type A1b or A1a respectively, fitted with SC connectors

EMC Regulatory Statements

U.S.A.

FCC Class A

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause interference to radio communications. Operation of this equipment in a residential area may cause interference in which case the user will be required to correct the interference at his own expense.

Canada

This product complies with Class A Canadian EMC requirements.

Australia/New Zealand

This product complies with Australia/New Zealand EMC Class A requirements.

Japan

VCCI Class A

この装置は、情報処理装置等電波障害自主規制協議会（ＶＣＣＩ）の基準に基づくクラスＡ情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

Korea

사용자 안내문 : A 급기기

이기기는 업무용으로 전자파 적합등록을 받은 기기
이오니, 판매자 또는 사용자는 이점을 주의하시기
바라며, 만약 잘못 구입하셨을 때에는 구입한 곳에
서 비업무용으로 교환하시기 바랍니다.

Taiwan

警告使用者：這是甲類的資訊產品，在居住的
環境中使用時，可能會造成射頻干擾，在這種
情況下，使用者會被要求採取某些適當的對策。

European Community Declaration of Conformity

This product is designed for operation with the HP Procurve switches that
have GL module slots. Please see the Declarations of Conformity included in
the Installation Guides for those products.