



Installation Guide

ProCurve Switch vl Modules



Power over Ethernet Devices

ProCurve Switch v1 Modules

Installation Guide

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Applicable Products

ProCurve Switch 100-FX MTRJ v1 Module	(J8763A)
ProCurve Switch Gig-T v1 Module	(J8764A)
ProCurve Switch 10/100-TX v1 Module	(J8765A)
ProCurve Switch 24-port Gig-T v1 Module	(J8768A)
ProCurve Switch Mini-GBIC v1 Module	(J8776A)
ProCurve Switch v1 20-Port Gig-T + 4-Port SFP Module	(J9033A)
ProCurve Switch 10-GbE v1 Module	(J8766A)

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ProCurve Switch vl Modules

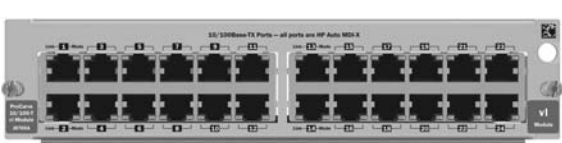

For the ProCurve Series 4200vl Switches

Descriptions. The ProCurve Switch vl Modules are components that you can add to a ProCurve vl switch to provide a variety of network connectivity options.

The following ProCurve vl switches are available as of this printing:

- ProCurve Switch 4204vl (J8770A), a chassis with four open slots.
- ProCurve Switch 4208vl (J8773A), a chassis with eight open slots.
- ProCurve Switch 4202vl-48G (J8771A), a chassis with 48 fixed 10/100/1000-T ports plus two open slots.
- ProCurve Switch 4202vl-72 (J8772A), a chassis with 72 fixed 10/100-TX ports plus two open slots.

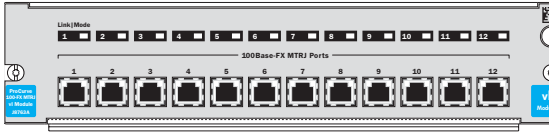
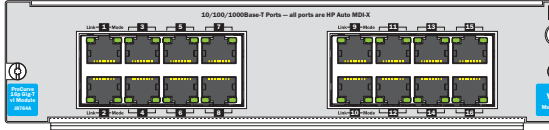
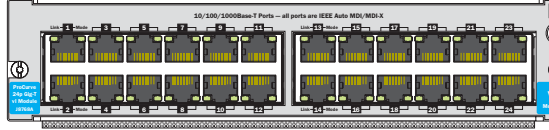
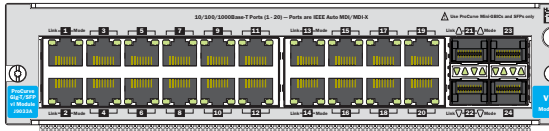

The following vl modules are available as of this printing:

Module	Image	Description
ProCurve Switch vl 24-Port 10/100-TX Module (J8765A)		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 MDI-X feature.
ProCurve Switch vl 4-Port Mini-GBIC Module (J8776A)		4 slots for installing any of the supported ProCurve mini-GBICs*.

***Supported mini-GBICs:** The following ProCurve mini-GBICs are supported by the mini-GBIC vl Module

- (as of this printing):
- Gigabit-SX LC mini-GBIC (J4858B, J4858C)
 - Gigabit-LX LC mini-GBIC (J4859B, J4859C)
 - Gigabit-LH LC mini-GBIC (J4860B, J4860C)
 - 1000Base-T mini-GBIC (J8177B)

ProCurve Switch vl Modules
Descriptions

Module	Image	Description
ProCurve Switch vl 12-Port 100-FX MTRJ Module (J8763A)		12 100-FX ports with MT-RJ connectors for 100 Mbps networking over multimode fiber-optic cable.
ProCurve Switch vl 16- Port Gig-T Module (J8764A)		16 twisted-pair ports with RJ-45 connectors for 10/100/1000 Mbps operation over Category 5 or better 100-ohm UTP or STP cable (<i>category 5e recommended for Gigabit</i>) -- all ports have the IEEE 802.3ab Auto MDI/MDI-X feature.
ProCurve Switch vl 24-Port Gig-T Module (J8768A)		24 twisted-pair ports with RJ-45 connectors for 10/100/1000 Mbps operation over Category 5 or better 100-ohm UTP or STP cable (<i>category 5e recommended for Gigabit</i>) -- all ports have the IEEE 802.3ab Auto MDI/MDI-X feature.
ProCurve Switch vl 20- Port Gig-T + 4-Port SFP Module (J9033A) See page 1 for supported mini-GBICs and this module also supports the J9054B ProCurve 100-FX SFP-LC Transceiver.		20 twisted-pair ports with RJ-45 connectors for 10/100/1000 Mbps operation over Category 5 or better 100-ohm UTP or STP cable (<i>category 5e recommended for Gigabit</i>) -- all ports have the IEEE 802.3ab Auto MDI/MDI-X feature, plus 4 mini-GBIC or SFP ports.
ProCurve Switch vl 1-Port 10-GbE Module (J8766A)		1 port for installing any of the supported ProCurve 10 Gig X2 transceivers.**

****Supported transceivers:** The following ProCurve transceivers are supported by the J8766A vl Module (as of this printing):

- ProCurve 10-GbE X2-SC SR Optic (J8436A)
- ProCurve 10-GbE X2-SC LR Optic (J8437A)
- ProCurve 10-GbE X2-SC ER Optic (J8438A)
- ProCurve 10-GbE X2 CX4 Xcvr (J8440B)
- ProCurve 10-GbE CX4 Optical Media Converter (J8439A)

Contact your ProCurve authorized networking reseller or your ProCurve representative for information on availability of other products. You can also visit the ProCurve Web site at www.procurve.com to get more information.

Features

The following two illustrations show the features found on the various modules.

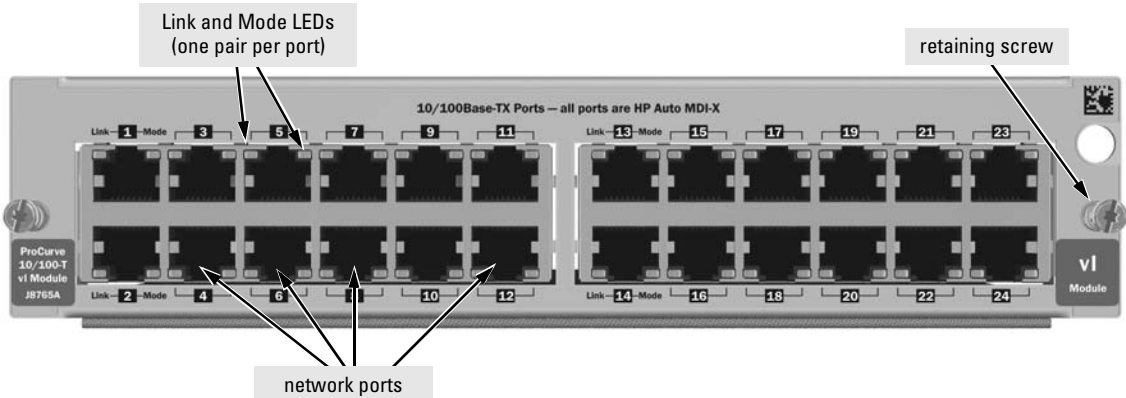


Figure 1. Example: ProCurve 24-Port 10/100-TX vl Module

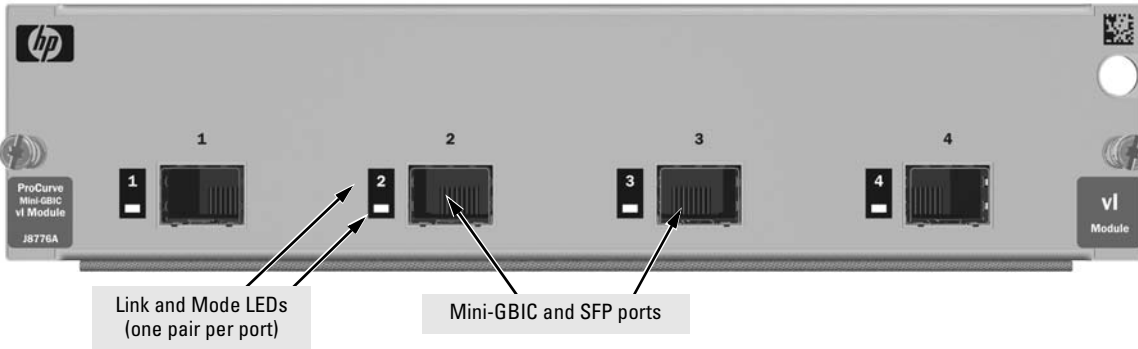


Figure 2. Example: ProCurve Switch Mini-GBIC vl Module

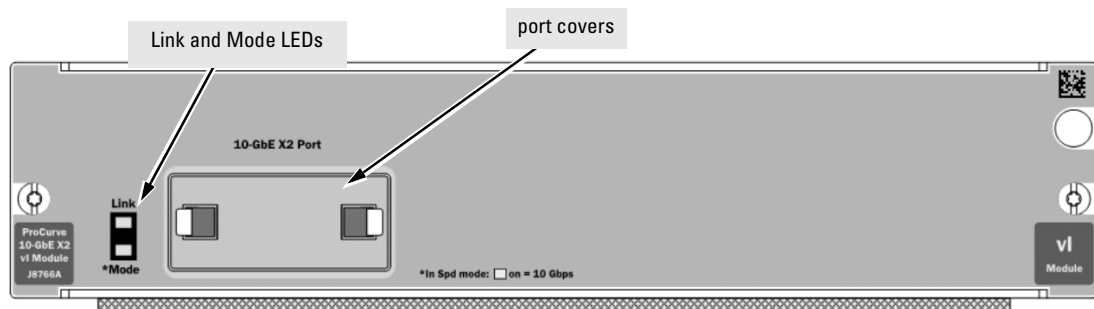


Figure 3. Example: ProCurve Switch 1-port 10 Gig-X2 vl Module

The ProCurve Switch vl 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 for each port on the link status, network activity, connection bandwidth (speed), communication mode (half or full duplex), and presence of specific network error packets on the port
- “hot swap modules” 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)
- “hot swap mini-GBICs” operation—you can add, replace, or change the type of any of the mini-GBICs that you use in any of the vl Modules that use mini-GBICs, without having to first remove the module, and without having to shut down the switch (you must remove the network cable before hot-swapping a mini-GBIC)
- “hot swap X2 transceiver” operation—you can add, replace, or change the type of any of the X2 transceivers that you use in the 10-GbE vl Module, without having to first remove the module, and without having to shut down the switch (you must remove the network cable before hot-swapping a transceiver)

- the ports on the 10/100-TX v1 Module have the **HP Auto MDI-X** feature, and the ports on the Gig-T v1 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 13](#).
- standards adherence:
 - the 10/100-TX v1 Module is compatible with the IEEE 802.3 10Base-T and IEEE 802.3u 100Base-TX standards
 - the Gig-T v1 Module is compatible with the IEEE 802.3 10Base-T, IEEE 802.3u 100Base-TX, and IEEE 802.3ab 1000Base-T standards
 - the ports on the mini-GBICs that are installed in any of the v1 Modules that accept mini-GBICs are compatible with the IEEE 802.3z standards
 - the ports on the 100-FX MTRJ v1 Module are compatible with the IEEE 802.3u 100-FX standard
 - the RJ-45 ports on the 20-port Gig-T + 4 port SFP module are compatible with the IEEE 802.3 10Base-T, IEEE 802.3u 100Base-TX, and IEEE 802.3ab 1000Base-T standards, and the 4 SFP ports are compatible with the IEEE 802.3z standards

Installing the Modules

Overview

You can install any of the v1 modules into any of the ProCurve v1 switches. The modules can be installed into the switch either with the switch powered on or off. The following procedures assume the switch is powered on.

1. Install the modules in a switch slot (see [page 7](#)).

If you have installed any modules into slots that were previously occupied by a different type module, you need to reset the switch (see [page 20](#)).

2. If you are using the mini-GBIC v1 Module, or the Gig-T/SFP v1 Module, install the mini-GBICs in the module. You can install the mini-GBICs before or after installing that module into the switch (see [page 9](#)).

Note

The mini-GBICs can be “hot swapped”. That is, they can be installed or removed after the mini-GBIC v1 Module, or the Gig-T/SFP v1 Module, is installed in the switch and the module is receiving power. The network cable must be removed from the mini-GBIC before installing or removing a mini-GBIC. For more information, see [page 9](#).

3. Verify the modules are installed correctly (see [page 12](#)).
4. Connect the network cabling (see [page 13](#)).
5. Verify the network connections are working properly (see [page 17](#)).
6. Optionally, customize the port configuration for each module unless the default port configuration is satisfactory for your network application - (see [page 18](#)).

Note

You can install, exchange, or remove modules after the switch has been powered on. Whenever a module is installed during this process, it is initialized and tested for correct operation. During this process, the switch Self Test LED is on. If you hot swap another module while the switch is initializing and testing the first module, it is possible to cause the first module or the entire switch to be reset. For more information, see [page 19](#).

To prevent the modules or switch from being reset when you must hot swap multiple modules, follow these precautions:

- Do not install/remove any modules from the switch while the switch Self Test LED is lit.
- Before removing or installing any modules, make sure that all network cables are disconnected from the module.

Installing the Module in an Unused Slot

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 ProCurve Switch v1 Modules have “low-force”, high-performance connectors. High insertion forces are not necessary to install the modules, and should not be used.
- Ensure 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 at a time should be uncovered to install a module, when the switch is powered on.

Installation Procedures:

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. As shown in the illustrations on the next page, 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 front face of the switch.
4. Screw in the two retaining screws to secure the module in place. The screws should be tightened until they are secure, but not overtightened.

ProCurve Switch v1 Modules

Installing the Modules

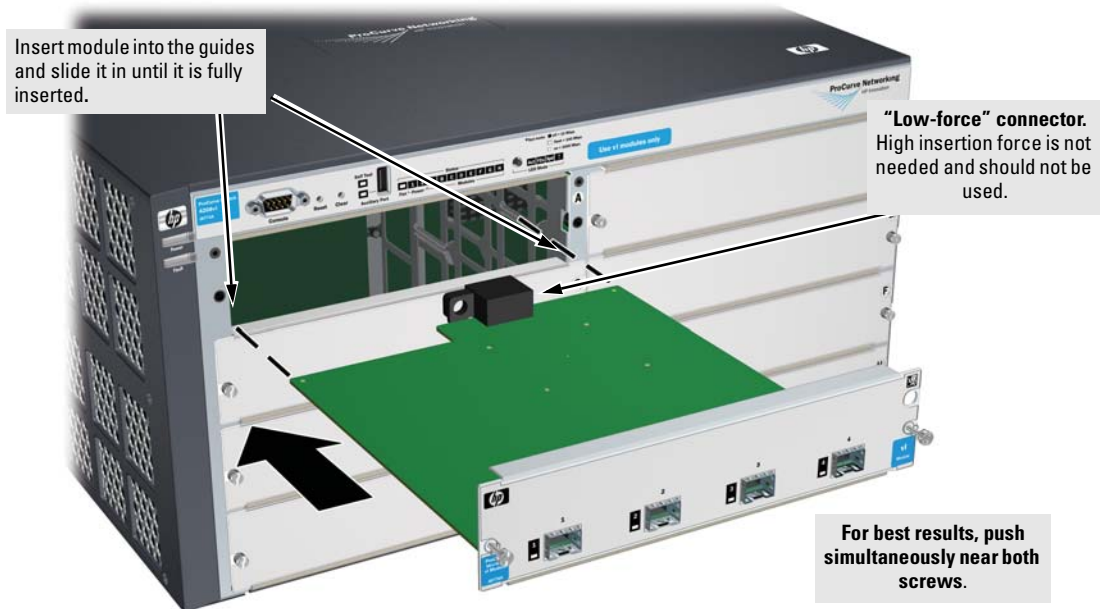


Figure 4. Installing a Module

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

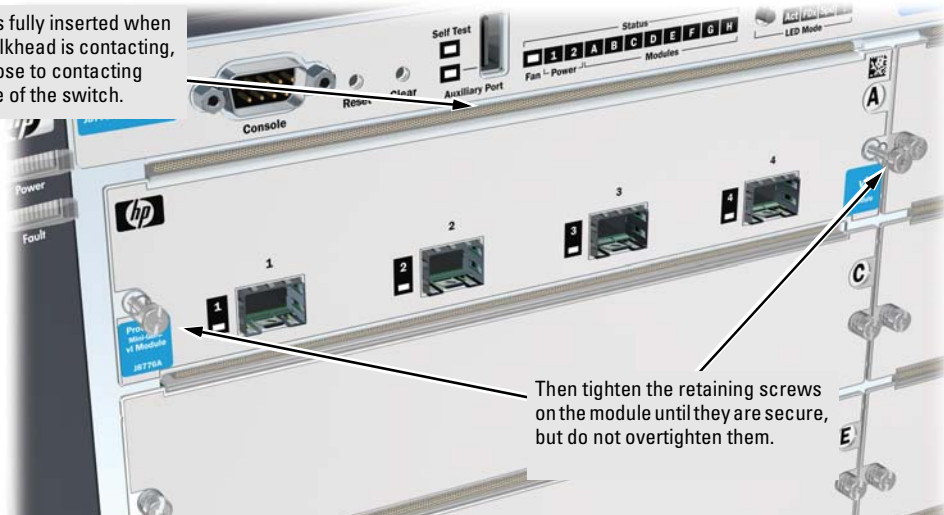


Figure 5. Tighten module retaining screws

Installing or Removing the Mini-GBICs

Note

Hot swapping mini-GBICs is supported. You can install or remove a mini-GBIC with the switch powered on, a reset will not occur.

You can install or remove the mini-GBIC from the mini-GBIC v1 Module, or the Gig-T/SFP v1 Module, without having to power off the switch. Use only ProCurve mini-GBICs with the letter “B” (or greater) at the end of the product number (for example, J4858B or J4860C).

WARNING

The ProCurve fiber optic mini-GBICs are Class 1 laser devices. Avoid direct eye exposure to the beam coming from the transmit port.

Caution

Use only supported genuine ProCurve mini-GBICs with your switch. Non-ProCurve mini-GBICs are not supported, and their use may result in product malfunction. Should you require additional ProCurve mini-GBICs, contact your ProCurve Networking Sales and Service Office or authorized dealer.

Installing the mini-GBICs:

Hold the mini-GBIC by its sides and gently insert it into any of the slots in the module until the mini-GBIC clicks into place.



Figure 6. Installing/removing a mini-GBIC

Removing the mini-GBICs:

The network cable should be disconnected from the mini-GBIC before removing it from the module.

Depending on when you purchased your ProCurve mini-GBICs, it may have either of three different release mechanisms: a metal latch, a wire bail, or a plastic collar around the mini-GBIC.

To remove the mini-GBICs that have the plastic collar, push in the plastic collar toward the switch until you see the mini-GBIC release from the switch (you can see it move outward slightly), and then pull the mini-GBIC from the slot.

To remove the mini-GBICs that have the wire bail or metal latch, lower the bail or latch until it is approximately horizontal, and then using the bail or latch, pull the mini-GBIC from the slot.

Install or Remove a Transceiver

Note

Hot swapping transceivers is supported. You can install or remove a transceiver with the switch powered on, a reset will not occur.

- a. Slide the transceiver in until it stops.



Figure 7. Installing an X2 transceiver

- b. Push firmly until the gasket seats against the bulkhead. The transceiver should “click” into place.



Figure 8. X2 transceiver fully installed

Note

If the switch is powered on when the transceiver is installed, the Link and Mode LEDs will come on for approximately two seconds and then go off. This is confirmation the transceiver is completely seated.

- c. If your transceiver has a bail, move the bail up, if not your transceiver is now completely installed.

Refer to page 30 for more transceiver details.

To remove the transceiver:

If your transceiver has a bail, lower the bail until it is approximately horizontal, and then using the bail, pull the transceiver from the slot. If your transceiver does not have a bail, pull the transceiver straight out.

Verifying 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 the module is installed properly.

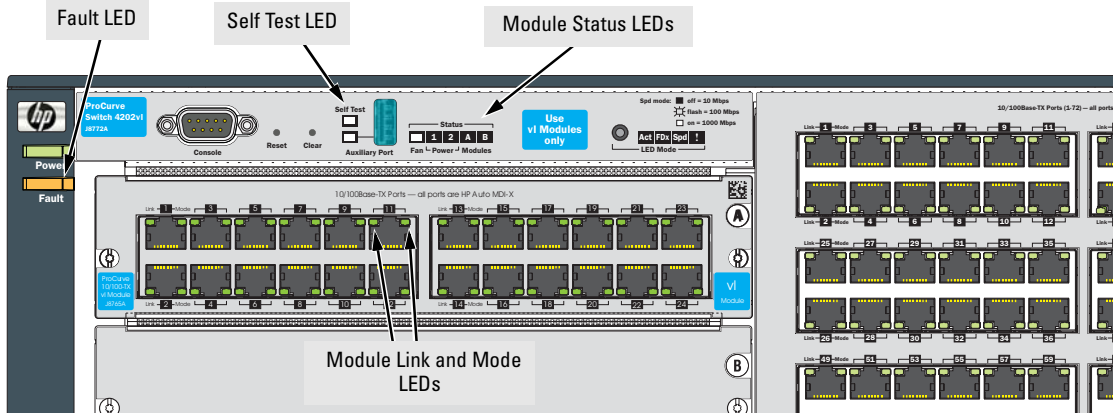


Figure 9. Checking LEDs for correct installation

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) The LED 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 when the switch is already powered on (hot swap), all the Link and Mode LEDs on the module go ON for approximately 3 to 10 seconds, then OFF for 5 to 10 seconds depending on the module. If the module is already installed when the switch is powered on or reset, the process described above occurs approximately 30 seconds after the power on or reset, during which time the switch is being tested.

Connecting the Network Cables

Note**Automatic Cable Sensing on Twisted-Pair Ports:**

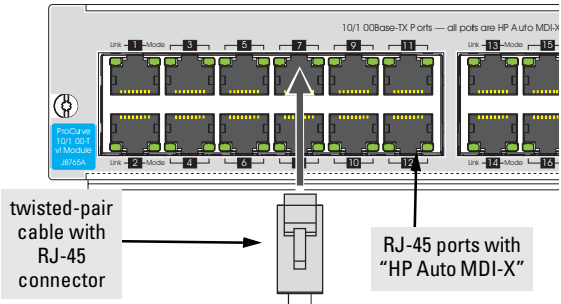
When the ports for the 10/100-TX and the Gig-T v1 Modules are in their default configuration, **Auto**, both modules automatically negotiate whether the ports operate as MDI or MDI-X, depending on the cable type and the connected device's operation. As a result, you can use either straight-through or crossover twisted-pair cables for all network connections to these modules.

On the 10/100-TX v1 Modules, this feature is identified as **HP Auto MDI-X**; on the Gig-T v1 Module, it is identified as **IEEE Auto MDI/MDI-X** and it is part of the IEEE 802.3ab standard. 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 (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.

Connect the appropriate network cables to the module's ports as shown in the table below. For more information on the cable specifications, see “Cables” on [page 28](#).

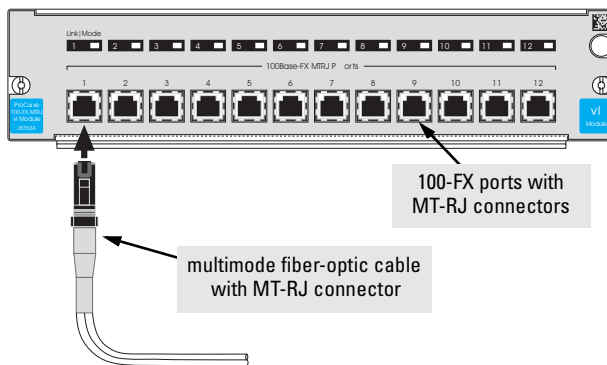
Supported Cable Types

Module	Cable Type	Maximum Length
10/100-TX, Gig-T, and Gig-T/SFP vl Modules 	10 Mbps operation: category 3, 4, or 5, 100-ohm balanced twisted-pair cable	100 meters (recommended)
	100 Mbps operation: category 5, 100-ohm balanced 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

Notes:

- The RJ-45 ports on this module have the HP Auto MDI-X feature. In the default configuration, Auto, **either a straight-through or crossover cable can be used** to connect the port to any other 1000Base-T, 100Base-TX or 10Base-T device. See the Note on [page 13](#).
- Since the 10Base-T operation is through the 10/100Base-TX or 10/100/1000-T 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 or better.

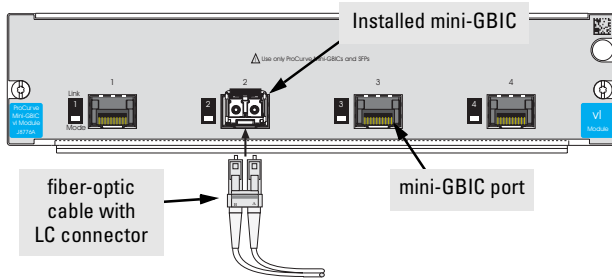

100-FX MTRJ vl Module



multimode fiber-optic cables fitted with MT-RJ connectors. See “Fiber-Optic Cables” on [page 29](#) for more information.

- **full-duplex connections:** 2 kilometers
- **half-duplex connections:** 412 meters

Continued on the next page.

Module	Cable Type	Maximum Length
<p>Mini-GBIC vl Module</p>  <p>The diagram shows a Mini-GBIC vl Module with four ports labeled 1, 2, 3, and 4. Port 2 is labeled 'Installed mini-GBIC'. A fiber-optic cable with an LC connector is plugged into the mini-GBIC port. A note above the module says 'Use only ProCurve SFPs, LCs and SFPs'. Labels include 'fiber-optic cable with LC connector' and 'mini-GBIC port'.</p>	<p>Gigabit-SX operation: multimode fiber-optic cables fitted with LC connectors</p> <p>Gigabit-LX operation: single-mode fiber-optic cables fitted with LC connectors. multimode fiber-optic cables may also be used—see “Fiber-Optic Cables” on page 29.</p> <p>Gigabit-LH operation: the same single-mode fiber-optic cables used for Gigabit-LX.</p> <p>1000Base-T operation: four pair category 5 (category 5e or greater is recommended), 100-ohm, balanced twisted-pair cable.</p>	<p>220 meters to 550 meters, depending on the cable used. See “Fiber-Optic Cables” on page 29 for more information.</p> <ul style="list-style-type: none"> single-mode cable: 10 kilometers multimode cable: 550 meters <p>70 kilometers</p> <p>100 meters</p>
<p>1 port 10-GbE X2 vl Module (J8766A)</p>  <p>The image shows a 1 port 10-GbE X2 vl Module (J8766A) with a 10-GbE X2 Port and status indicators for Link and Mode. A note at the bottom says '*No SFP needed. Max = 33 Mbps'.</p>	<p>10 Gigabit SR operation:</p> <p>62.5 μm cable</p> <p>50 μm cable</p> <p>LR operation: single-mode cable</p> <p>ER operation: single-mode cable</p>	<p>160 Mhz*km = 2-26 meters 200 Mhz*km = 2-33 meters</p> <p>400 Mhz*km = 2-66 meters 500 Mhz*km = 2-82 meters 2000 Mhz*km = 2-300 meters</p> <p>2 meters - 10 km</p> <p>2 meters - 30 km - (40 km supported on engineered links)</p>

Notes: Gigabit-LX – If multimode cable is used, a **mode conditioning patch cord** may be needed — see “Mode Conditioning Patch Cord” on page 34 for more information.

Gigabit-LH – The transmission distances are dependent on the particular fiber loss and coupling loss involved, among other factors, and can be estimated from the optical loss budget. For distances less than 20km, a 10dB attenuator must be used. For distances between 20km and 40km, a 5dB attenuator must be used. Attenuators can be purchased from most cable vendors.

Note: For more information on the cable specifications, see “Cables” on page 28.

Connecting the 10-GbE Network cables

Connecting a fiber cable.

1. Remove the dust covers from the cable connectors and the port.
2. Aligning the notches on the cable connectors with the slots of the port, press the cable connector into the port until it snaps into place.

If the Link LED does *not* go on when the network cable is connected to the port, see [“LED Error Indicators:” on page 21](#), in chapter 5, “Troubleshooting”.

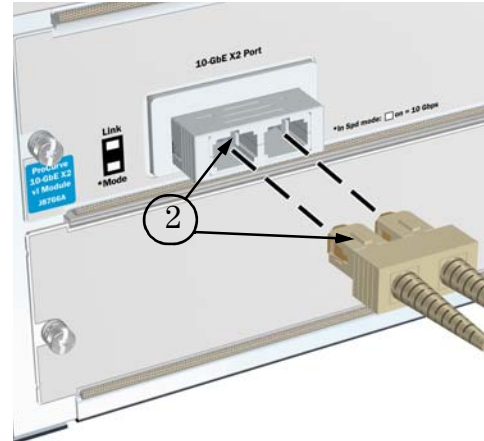


Figure 10. Connecting a fiber cable

To disconnect:

Pull the cable connector straight out.

Connecting a copper cable.

1. Push the copper cable connector into the copper port. Ensure the locking device locks the cable connector into place.

To disconnect:

Grasp the plastic pull tab and pull the cable connector straight out. This disengages the locking mechanism.

When a network cable from an active network device is connected to the port, the port LED for that port should go on. If the port LED does *not* go on when the network cable is connected to the port, see [“LED Error Indicators:” on page 21](#) in chapter 5, “Troubleshooting”.



Figure 11. Connecting a copper

Verifying the Network Connections Are Working

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.

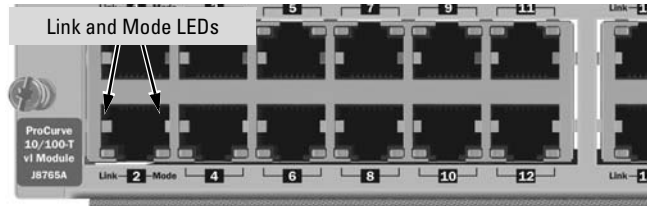


Figure 12. Checking Link and Mode LEDs

- 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, the device at the other end of the cable, or the device may be powered off. See the troubleshooting information on [page 21](#).
- 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 link speed operation (the **Spd** mode indicator LED is lit), then the port Mode LEDs behave as follows to indicate the connection speed for the port:
 - Off = 10 Mbps
 - Flashing = 100 Mbps
 - On = 1000 Mbps
- If the Mode is set to display packet errors on the port (the **!** mode indicator LED is lit), then the Mode LED will flash briefly for each packet that has any of six errors, including CRC errors and late collisions.

Default 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 connection parameters are:

- **Ports Enabled:** Yes
- **Mode:**
 - **10/100-TX v1 Module:** Auto — The port auto negotiates speed (10 or 100 Mbps), communication mode (half or full duplex), and MDI or MDI-X port operation. If you configure the port to one of the fixed 10 or 100 Mbps modes, the port will then operate only as an MDI-X port.
 - **All Gig-T v1 Modules:** Auto — The port auto negotiates speed (10, 100 or 1000 Mbps), communication mode (half or full duplex), and MDI or MDI-X port operation. If you configure the port to one of the fixed 10 or 100 Mbps modes, the port will then operate only as an MDI-X port.
 - **Gigabit-SX, Gigabit-LX, Gigabit-LH, 1000Base-T, and SFP ports in mini-GBIC and the Gig-T + 4-port SFP v1 Modules:** Auto — The port always operates at 1000 Mbps and full duplex. The setting is Auto for best link establishment with other devices.
 - **100-FX MTRJ v1 Modules:** 100FDX — The port operates at 100 Mbps and full-duplex.
- **Flow Control:** Disabled
- **Advanced features** — Spanning Tree, Trunking, Meshing, VLANs, IGMP, LACP, Routing, Class of Service, Security, and so forth: all Disabled

If the default port configuration listed above is not correct for your network, 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* for your switch, available on the ProCurve Web site www.procurve.com, and the online Help provided in the console and web browser interfaces.

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 to be removed.
2. Unscrew the retaining screws enough to disconnect them from the threaded holes in the switch.

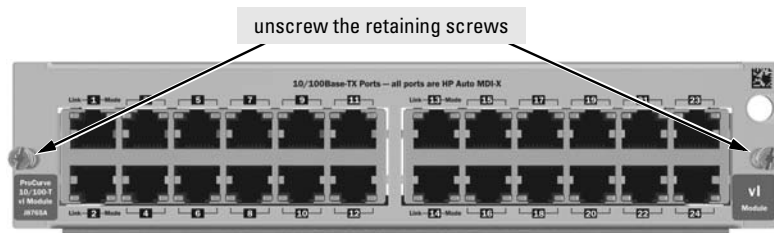


Figure 13. Retaining screws

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 7](#) 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 a slot cover is installed on any unused slot.

5. 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.

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 v1 Module with a Gig-T v1 Module), you must reset the switch as described under “Resetting the Switch” on [page 20](#).

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 Gig-T v1 Module in a slot that was previously used for a 10/100-TX v1 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.

Note

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 (if both power supplies are being used, you will have to disconnect both power cords)
- issuing the **boot system** command from the switch console CLI, or selecting the Reset or Boot option from the switch console menu, web browser interface, or ProCurve Manager

Troubleshooting

One of the primary tools for troubleshooting the switch modules is the LEDs on the front of the switch and on the modules. Refer to “LED Behavior” on [page 12](#) for a description of the normal LED behavior. Also, refer to the switch *Installation and Getting Started Guide* for more detailed troubleshooting information for the switch.

LED Error Indicators:

LED Pattern Indicating Problems							Diag Tips	Brief Problem Description
Power	Fault	Self Test	Fan Status	Power Status (one LED per power supply)	Module Status (one LED per module)	Port Link		
Off with power cord plugged in	1	1	1	1	1	1	A	No power
On	Prolonged On	Prolonged On	1	1	1	1	B	Self test fail - entire switch
On	Flashing ²	On	Flashing ²	1	1	1	C	Fan fail
On	Flashing ²	On	1	Flashing ²	1	1	D	Power supply fail
On	Flashing ²	Flashing ²	1	1	Off	1	E	Self test fail - backplane
On	Flashing ²	Flashing ²	1	1	1	Flashing ²	F	Fixed port self test fail
On	Flashing ²	Flashing ²	1	1	Flashing ²	1	G	Module self test fail
On	Flashing ²	Flashing ²	1	1	Flashing ²	Flashing ²	H	Module-based port self test fail
On	Off	Flashing ²	1	1	Flashing ²	1	I	Module invalid (wrong chassis) or unsupported (needs newer software)
On	Off	Flashing ²	1	1	Flashing ²	Flashing ²	J	SFP invalid (not ProCurve/not model B), or unsupported (needs newer software)
On	Off	Off	1	1	Flashing ²	On briefly then off	K	Different module hot swap

LED Pattern Indicating Problems							Diag Tips	Brief Problem Description
Power	Fault	Self Test	Fan Status	Power Status (one LED per power supply)	Module Status (one LED per module)	Port Link		
On	Off	Off	1	1	1	Fast Flashing ³	L	Port security disabled the port
On	Off	Off	1	1	1	Off with cable connected	M	No link on port
¹ This LED is not important for the diagnosis. ² The flashing behavior is an on/off cycle once every 1.6 seconds, approximately. ³ The fast flashing behavior is an on/off cycle once every 0.8 seconds, approximately.								

See the following tables to diagnose the LED error indicators in the previous table.

Diagnostic Tips:

Tip Letter	Problem	Solution
A	The power supplies installed in the switch are not plugged into active AC power sources, or the power supply may have failed.	<ol style="list-style-type: none"> 1. Verify the power cord is plugged into an active power source and to the switch. Ensure these connections are snug. 2. Try power cycling the switch by unplugging and plugging the power cord back in. 3. If the Power LED is still not on, verify the AC power source works by plugging another device into the outlet. Or try plugging the switch into a different outlet or try a different power cord. <p>If the power source and power cord are OK and this condition persists, the switch power supply may have failed. 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.</p>
B	A switch hardware failure has occurred. All the LEDs will stay on indefinitely.	Try power cycling the switch. If the fault indication reoccurs, the switch may have failed. 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.

Tip Letter	Problem	Solution
C	One or more of the switch cooling fans may have failed.	Try disconnecting power from the switch and wait a few moments. Then reconnect the power to the switch and check the LEDs again. If the error indication reoccurs, one or more of the fans have failed. The switch has multiple fans and may continue to operate OK under this condition if the ambient temperature does not exceed normal room temperature, but for best operation, the switch should be replaced. Contact 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.
D	A fault condition has been detected on the power supply installed in the slot corresponding to the flashing number.	<p>Because the Power LED is on, the switch is receiving power from one power supply, but the power supply in the slot corresponding to the flashing number may be unplugged from an active AC power source, or may be faulty.</p> <ul style="list-style-type: none"> • Verify the power cord for the power supply whose number is flashing is plugged into an active power source and to the switch. Ensure these connections are snug. • Disconnect the AC power cord from the power supply in the slot corresponding to the flashing number, then try removing and reinstalling the power supply. <p>Caution: Ensure the AC power cord is disconnected from the supply before removing and reinstalling the supply.</p> <p>Reconnect the power supply to the AC power source. If the error indication reoccurs after the supply is reinstalled, the power supply may be faulty. 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.</p>
E	The switch has experienced a backplane failure during self test.	<p>The failure may be just in the communications with a single module slot, or it might be more significant. Start a console session with the switch, and at the CLI prompt issue the command show logging. In the event log that is displayed, there will be messages that describe the extent of the problem. If the problem is with individual slots, the remainder of the switch slots will be fully operational and can be used until you get a chance to replace the switch.</p> <p>If necessary to resolve the problem, contact 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.</p>
F	The network port for which the Link LED is flashing has experienced a self test or initialization failure.	<p>When the switch is powered on, each network port is tested. If the port self test fails, the individual port is not usable, but the rest of the ports on the chassis, which have passed their self test, will continue to operate normally.</p> <p>To verify the port has failed, try power-cycling the switch. If the port fault indication reoccurs, and the port is one of the fixed ports on the chassis, you will have to replace the switch. In the meantime, all the other fixed ports on the chassis will operate normally.</p>

Tip Letter	Problem	Solution
G	The module installed in the slot that corresponds to the letter that is flashing has experienced a self test or initialization fault.	<p>The modules are all 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 they are hot swapped (installed when the switch is powered on).</p> <p>Try removing and reinstalling the module. You can do this without having to power down the switch. When the module is reinstalled, it will be retested automatically.</p> <p>If the fault indication reoccurs, the module may have failed. Remove the module from the switch and replace it with another module, or install a slot cover plate. Call your ProCurve authorized LAN dealer, or use the electronic support services from ProCurve to get assistance. See the Customer Support/Warranty card for more information.</p>
H	The module-based network port for which the Link LED is flashing has experienced a self test or initialization failure.	<p>During the module self test, described in tip letter G earlier in this table, each network port is also tested. If the port self test fails, the individual port is not usable, but the rest of the ports on the module, which have passed their self test, will continue to operate normally.</p> <p>To verify the port has failed, try removing and reinstalling the module. If the port is a mini-GBIC, you can remove and reinstall the mini-GBIC without having to remove the module. The mini-GBICs are tested when they are hot swapped. If the port fault indication reoccurs, and you need to be able to use the port, you will have to replace the mini-GBIC or the module. In the meantime, all the other module ports will operate normally.</p>
I	The module installed in the slot that corresponds to the letter that is flashing is an invalid or unsupported module.	<p>Ensure you have installed a vl module in the slot. ProCurve gl and xl modules will fit in the slot, but they are not compatible with your ProCurve vl switch. Check to ensure the module has a “vl module” label on it.</p> <p>If the module does not have a “vl module” label, remove the module from the switch and replace it with a vl module, or re-cover the slot with the cover plate. You can remove and replace the module without having to power down the switch. Call your ProCurve authorized LAN dealer, or use the electronic support services from ProCurve to get information on supported Switch vl modules. The vl modules that are available as of the printing of this manual are listed on page 1.</p> <p>If the module has a “vl module” label, then the LED pattern indicates that the module is unsupported in the version of software currently running on the switch. As ProCurve introduces new modules for the vl switches you may have to update the switch with new operating code that supports the new module. The documentation that came with the module will indicate which version of the operating code is needed to support the module. The latest code can be downloaded from the ProCurve Web site at www.procurve.com. Download the new code and retest the module by booting the switch with the new software.</p>

Tip Letter	Problem	Solution
J	The mini-GBIC or SFP installed in the mini-GBIC slot for which the Link LED is flashing is an invalid or unsupported transceiver.	<p>Ensure you have installed a model B or greater ProCurve mini-GBIC or SFP in the slot. Model A mini-GBICs are not supported in the Series 4200vl Switches.</p> <p>If the mini-GBIC or SFP is a model B or greater, then the LED pattern indicates the transceiver is unsupported in the version of software currently running on the switch. As ProCurve introduces new transceivers for the vl switches you may have to update the switch with new operating code that supports the new transceiver. The documentation that came with the transceiver will indicate which version of the operating code is needed to support the transceiver. The latest code can be downloaded from the ProCurve Web site at www.procurve.com. Download the new code and retest the transceiver by rebooting the switch with the new software.</p>
K	In the slot corresponding to the letter that is flashing, a module was installed that is a different type than the previously installed module, and the switch has not yet been reset.	<p>When you “hot swap” modules in the switch slots, 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.</p> <p>You can reset the switch by any of these methods:</p> <ul style="list-style-type: none"> • pressing the Reset button. • power cycling the switch. • selecting the reset or reboot option from the console, web browser interface, or ProCurve Manager.
L	The network port for which the Link LED is flashing has been disabled because port security has been configured on the switch and a security violation has been detected on the port.	<p>For the Port Security feature, you can configure the switch so that whenever a security violation is detected on a port, the switch will disable the port. When a port is disabled by this feature, the port Link LED will be continuously flashed at the fast rate of 0.8 seconds per cycle. The flashing continues until you clear the security violation through the switch console. In the console, you can view the identity of the connected device that committed the security violation.</p> <p>Once the security violation is cleared, you must re-enable the port through the console.</p> <p>For more information on the Port Security feature, see the <i>Management and Configuration Guide</i> for your switch, available on the ProCurve Web site.</p>

Tip Letter	Problem	Solution
M	The network connection is not working properly.	<p>Try the following procedures:</p> <ul style="list-style-type: none">• For the indicated port, verify both ends of the cabling, at the switch and the connected device, are securely connected.• Verify the connected device and switch are both powered <i>on</i> and operating correctly.• Verify you have used the correct cable type for the connection.<ul style="list-style-type: none">– for any of the twisted-pair connections, in the default configuration (Auto), either a straight-through or a crossover cable can be used and the switch will automatically adjust its operation. <hr/> <p>Note: <i>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 correct type of cable must be used. In general, for connecting to an end node (MDI port), use straight-through cable; for connecting to MDI-X ports on hubs, other switches, and routers, use crossover cable.</i></p> <hr/> <ul style="list-style-type: none">– 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, and that both devices are transmitting correctly.• For a 1000 Mbps connection, verify 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 the patch cables that connect the switch and other end devices to the patch panels in the cabling path.• Verify 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 telnet, the web browser interface, or ProCurve Manager network management software to determine the state of the port and re-enable the port if necessary.• Verify the switch port configuration matches the configuration of the attached device. For example, if the switch port is configured as "Auto", the port on the attached device also MUST be configured as "Auto" or "half-duplex". Depending on the port type, twisted-pair or fiber-optic, if the configurations don't match, the results could be a very unreliable connection, or no link at all. <p>If the other procedures don't resolve the problem, try using a different port or a different cable.</p>

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 ProCurve networking products Web site, www.procurve.com also provides up-to-date support information. Additionally, your HP-authorized network reseller can also provide you with assistance, both with services they offer and with services offered by HP.

Specifications

Environmental

	Operating	Non-Operating
Temperature:	0°C to 40°C (32°F to 104°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 95% at 65°C (149°F)
Maximum altitude:	4.6 km (15,000 ft)	4.6 km (15,000 ft)

Lasers

The following products are Class 1 Laser Products.

Laser Klasse 1:

- The 10-GbE X2-SC LR transceiver (J8437A)
- The 10-GbE X2-SC ER transceiver (J8438A)
- Gigabit-SX LC mini-GBIC (J4858B)
- Gigabit-LX LC mini-GBIC (J4859B)
- Gigabit-LH LC mini-GBIC (J4860B)
- 100-FX SFP-LC Transceiver (J9054B)

The following products are Class 1m Laser Products.

Laser Klasse 1m:

- The 10-GbE X2-SC SR transceiver (J8436A)

These mini-GBICs comply with IEC 825-2: 1993.

Cables

Twisted-Pair Cables

Port Type	Cable Specifications	Maximum Length
10 Mbps Operation	Category 3, 4, or 5 100-ohm balanced unshielded twisted-pair (UTP) or shielded twisted-pair (STP) cable, complying with IEEE 802.3 10Base-T specifications, fitted with RJ-45 connectors	100 meters
100 Mbps Operation	Category 5 100-ohm balanced UTP or STP cable, complying with IEEE 802.3u 100Base-TX specifications, fitted with RJ-45 connectors	100 meters
1000 Mbps Operation	Category 5e 100-ohm balanced UTP or STP cable, complying with IEEE 802.3ab 1000Base-T specifications, fitted with RJ-45 connectors (<i>see "Note on 1000Base-T Cable Requirements", below</i>)	100 meters

Note on 1000Base-T Cable Requirements. The Category 5 networking cables that work for 100Base-TX connections should also work for 1000Base-T, as long as all four pairs are connected. But for the most reliable 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 Cables

Port Type	Cable Specifications	Connector Type	Maximum Length
100Base-FX	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.	MT-RJ or LC	<ul style="list-style-type: none"> • full-duplex connections: 2 kilometers • half-duplex connections: 412 meters
Note: MT-RJ connector is on the module or an LC connector on the SFP transceiver.			
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.	LC	<ul style="list-style-type: none"> • 62.5 μm cable: <ul style="list-style-type: none"> – 160 MHz*km = 220 meters – 200 MHz*km = 275 meters • 50 μm cable: <ul style="list-style-type: none"> – 400 MHz*km = 500 meters – 500 MHz*km = 550 meters
Gigabit-LX	9/125 μm (core/cladding) diameter, graded-index, low metal content, single mode fiber-optic cables, complying with the ITU-T G.652 and ISO/IEC 793-2 Type B1 standards. OR the multimode fiber-optic cables listed for Gigabit-SX.	LC	<ul style="list-style-type: none"> • single-mode cable: 10 kilometers • multimode cable: 550 meters
Note: To use multimode cables for Gigabit-LX, a mode conditioning patch cord may be needed — see “Mode Conditioning Patch Cord for Gigabit-LX” on page 34 for more information.			
Gigabit-LH	9/125 μm (core/cladding) diameter, graded-index, low metal content, single mode fiber-optic cables, complying with the ITU-T G.652 and ISO/IEC 793-2 Type B1 standards.	LC	70 kilometers
Note: The transmission distances are dependent on the particular fiber loss and coupling loss involved, among other factors, and can be estimated from the optical loss budget. For distances less than 20km, a 10dB attenuator must be used. For distances between 20km and 40km, a 5dB attenuator must be used. Attenuators can be purchased from most cable vendors.			

Fiber-Optic Cables

Port Type	Cable Specifications	Connector Type	Supported Length
10-GbE SR	Multimode fiber-optic cable designed for Gigabit Ethernet: 62.5/125 μm (core/cladding) diameter or 50/125 μm , low metal content, complying with the ITU-T G.652 and ISO/IEC 793-2 Type B1 standards.	SC	<ul style="list-style-type: none"> ■ 62.5 μm cable: <ul style="list-style-type: none"> • 160 Mhz*km = 2-26 meters • 200 Mhz*km = 2-33 meters ■ 50 μm cable: <ul style="list-style-type: none"> • 400 Mhz*km = 2-66 meters • 500 Mhz*km = 2-82 meters • 2000 Mhz*km = 2-300 meters
10-GbE LR	9/125 μm (core/cladding) diameter, low metal content, single mode fiber-optic cables, complying with the ITU-T G.652 and ISO/IEC 793-2 Type B1 standards.	SC	single-mode cable: 2 meter - 10 km
10-GbE ER	9/125 μm (core/cladding) diameter, low metal content, single mode fiber-optic cables, complying with the ITU-T G.652 and ISO/IEC 793-2 Type B1 standards.	SC	single-mode cable: 2 meters - 30 km (40 kilometers, on an engineered fiber optic link that meets standards in the specification).
Note: Conditioning patch cord cables are not supported.			
CX4 Media Converter	12 fiber 50/125 μm (core/cladding) diameter, multimode Fiber ribbon cable. 12 fiber 62.5/125 μm (core/cladding) diameter, multimode Fiber ribbon cable is also supported.	MTP	1-300 meters

Copper 10-GbE Cables

Port Type	Cable Specifications	Connector Type	Supported Length
CX4	Shielded twisted-pair cables complying with the 802.3ak standard.	CX4	0.5-15 meters

Optical Specifications

ProCurve 10-GbE X2-SC SR optic

Transmitter Optical Characteristics:

Parameter	Minimum	Typical	Maximum	Notes
Center Wavelength	840nm	850nm	860nm	
Spectral Width			0.45 nm	
Average Launch Power	-7.3 dBm		-1.0 dBm	
Extinction Ratio	3 dB			
RIN (Relative Intensity Noise)			-128 dB/Hz	

Receiver Optical Characteristics:

Parameter	Minimum	Typical	Maximum	Notes
Center Wavelength	840nm	850nm	860nm	
Average Receive Power	-9.9 dBm		-1.0 dBm	
Saturation Receive Power			-1.0 dBm	
Receiver Sensitivity			-11.1 dBm	
Stressed Receiver Sensitivity in OMA			-7.5 dBm	

ProCurve 10-GbE X2-SC LR optic

Transmitter Optical Characteristics:

Parameter	Minimum	Typical	Maximum	Notes
Center Wavelength	1260nm	1310nm	1355nm	
Spectral Width			0.2 nm	
Average Launch Power	-8.2 dBm		0.5 dBm	
Extinction Ratio	3.5 dB	8.0 dB		
RIN (Relative Intensity Noise)			-128 dB/Hz	

Receiver Optical Characteristics:

Parameter	Minimum	Typical	Maximum	Notes
Center Wavelength	1260 nm	1310 nm	1355 nm	
Average Receive Power	- 14.4 dBm		0.5 dBm	
Receiver Sensitivity			-12.6 dBm	

ProCurve 10-GbE X2-SC ER optic

Transmitter Optical Characteristics:

Parameter	Minimum	Typical	Maximum	Notes
Center Wavelength	1530 nm	1550 nm	1565 nm	
Average Launch Power	-4.7 dBm		4.0 dBm	
Extinction Ratio	3.0 dB			
RIN (Relative Intensity Noise)			-128 dB/Hz	with 21 dB return loss

Receiver Optical Characteristics:

Parameter	Minimum	Typical	Maximum	Notes
Center Wavelength	1530nm	1550nm	1565nm	
Average Receive Power			4 dBm	Damage above this level is possible
Receiver Sensitivity			-14.1 dBm	

ProCurve 10-GbE X2-CX4 Transceiver

Copper Transceiver Characteristics:

Parameter	Minimum	Typical	Maximum	Notes
OMC Supply Voltage 3.3V*	3.13 VDC	3.3 VDC	4.37 VDC	
OMC Supply Current 3.3V*		196 mA	216 mA	
Impedance		100 ohms		Differential
Transmit Voltage	800 mVpp	1000 mVpp	1200 mVpp	
Receive Voltage	100 mVpp		1200 mVpp	
Rise Time	60 ps		130 ps	20%-80%
<p>* Note: The ProCurve J8440A/J8440B 10-GbE X2-CX4 copper interface is designed to support the J8439A 10-GbE CX4 Optical Media Converter (OMC), which receives its 3.3 V supply through this interface using an advanced ProCurve detection technique.</p>				

Mode Conditioning Patch Cord for Gigabit-LX

The following information applies to installations in which multimode fiber-optic cables are connected to a Gigabit-LX port.

Unlike Gigabit-SX, which connects to only multimode fiber-optic cabling, Gigabit-LX can use either single-mode or multimode cable. Multimode cable has a design characteristic called “Differential Mode Delay”, which requires that the transmission signals be “conditioned” to compensate for the cable design and thus prevent resulting transmission errors. Since Gigabit-SX is designed to operate only with multimode cable, Gigabit-SX mini-GBICs can provide that transmission conditioning internally.

Gigabit-LX mini-GBICs, since they are designed to operate with both single-mode and multimode cable, do not provide the transmission conditioning internally. Thus, under certain circumstances, depending on the cable used and the lengths of the cable runs, an external **Mode Conditioning Patch Cord** may need to be installed between the Gigabit-LX transmitting device and the multimode network cable to provide the transmission conditioning.

If you experience a high number of transmission errors on the Gigabit-LX ports, usually CRC or FCS errors, you may need to install one of these patch cords between the Gigabit-LX port in your switch and your multimode fiber-optic network cabling, and between the Gigabit-LX transmission device and the network cabling at the other end of the multimode fiber-optic cable run. A patch cord must be installed at both ends.

The patch cord consists of a short length of single-mode fiber cable coupled to graded-index multimode fiber cable on the transmit side, and only multimode cable on the receive side. The section of single-mode fiber is connected in such a way that it minimizes the effects of the differential mode delay in the multimode cable.

Note

Most of the time, if you are using good quality graded-index multimode fiber cable that adheres to the standards listed on [page 29](#), there should not be a need to use mode conditioning patch cords in your network. This is especially true if the fiber runs in your network are relatively short.

If you are using *single-mode* fiber-optic cabling in your network, there is no need to use mode conditioning patch cords. Connect the single-mode network cable directly to the Gigabit-LX mini-GBIC.

Installing the Patch Cord

As shown in the illustration below, connect the patch cord to the Gigabit-LX mini-GBIC with the section of single-mode fiber plugged in to the Tx (transmit) port. Then, connect the other end of the patch cord to your network cabling patch panel, or directly to the network multimode fiber.

If you connect the patch cord directly to the network cabling, you may need to install a **female-to-female adapter** to allow the cables to be connected together.

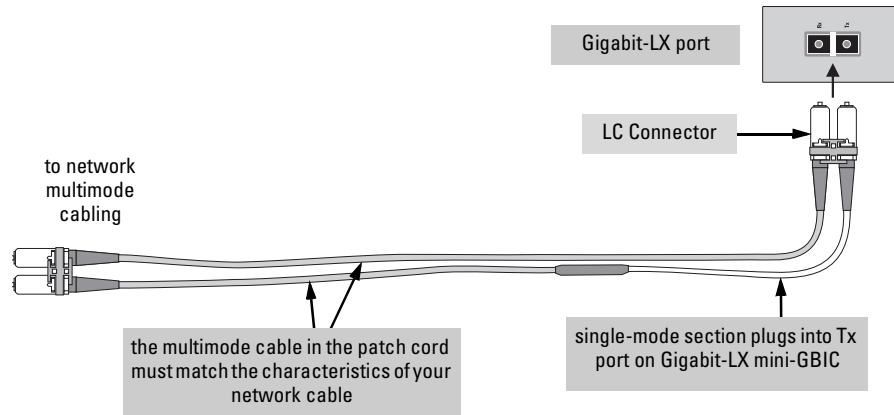


Figure 14. Mode Conditioning Patch Cord

Ensure you purchase a patch cord that has LC connectors on the end that connects to the Gigabit-LX mini-GBIC, and has multimode fibers that match the characteristics of the multimode fiber in your network.

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

이기는 업무용으로 전자파 적합등록을 받은 기기 이오니, 판매자 또는 사용자는 이점을 주의하시기 바라며, 만약 잘못 구입하셨을 때에는 구입한 곳에서 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

These products are designed for operation with the ProCurve switches that have vl module slots. Please see the Declarations of Conformity included in the Installation Guides for those products.

Waste Electrical and Electronic Equipment (WEEE) Statements



Disposal of Waste Equipment by Users in Private Household in the European Union

This symbol on the product or on its packaging indicates that this product must not be disposed of with your other household waste. Instead, it is your responsibility to dispose of your waste equipment by handing it over to a designated collection point for the recycling of waste electrical and electronic equipment. The separate collection and recycling of your waste equipment at the time of disposal will help to conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment. For more information about where you can drop off your waste equipment for recycling, please contact your local city office, your household waste disposal service or the shop where you purchased the product.



Likvidace zařízení soukromými domácími uživateli v Evropské unii

Tento symbol na produktu nebo balení označuje výrobek, který nesmí být vyhozen spolu s ostatním domácím odpadem. Povinností uživatele je předat takto označený odpad na předem určené sběrné místo pro recyklaci elektrických a elektronických zařízení. Okamžité třídění a recyklace odpadu pomůže uchovat přírodní prostředí a zajistí takový způsob recyklace, který ochrání zdraví a životní prostředí člověka. Další informace o možnostech odevzdání odpadu k recyklaci získáte na příslušném obecním nebo městském úřadě, od firmy zabývající se sběrem a svozem odpadu nebo v obchodě, kde jste produkt zakoupili.



Bortskaffelse af affald fra husstande i den Europæiske Union

Hvis produktet eller dets emballage er forsynet med dette symbol, angiver det, at produktet ikke må bortskaffes med andet almindeligt husholdningsaffald. I stedet er det dit ansvar at bortskaffe kasseret udstyr ved at aflevere det på den kommunale genbrugsstation, der forestår genvinding af kasseret elektrisk og elektronisk udstyr. Den centrale modtagelse og genvinding af kasseret udstyr i forbindelse med bortskaffelsen bidrager til bevarelse af naturlige ressourcer og sikrer, at udstyret genvindes på en måde, der beskytter både mennesker og miljø. Yderligere oplysninger om, hvor du kan aflevere kasseret udstyr til genvinding, kan du få hos kommunen, den lokale genbrugsstation eller i den butik, hvor du købte produktet.



Seadmete jäätmete kõrvaldamine eramajapidamistes Euroopa Liidus

See tootel või selle pakendil olev sümbol näitab, et kõnealust toodet ei tohi koos teiste majapidamisjäätmetega kõrvaldada. Teie kohus on oma seadmete jäätmed kõrvaldada, viies need elektri- ja elektroonikaseadmete jäätmete ringlussevõtmiseks selleks ettenähtud kogumispunkti. Seadmete jäätmete eraldi kogumine ja ringlussevõtmise kõrvaldamise ajal aitab kaitsta loodusvarasid ning tagada, et ringlussevõtmise toimub viisil, mis kaitseb inimeste tervist ning keskkonda. Lisateabe saamiseks selle kohta, kuhu oma seadmete jäätmed ringlussevõtmiseks viia, võtke palun ühendust oma kohaliku linnakantselei, majapidamisjäätmete kõrvaldamise teenistuse või kauplusega, kust Te toote ostsite.



Laitteiden hävittäminen kotitalouksissa Euroopan unionin alueella

Jos tuotteessa tai sen pakkauksessa on tämä merkki, tuotetta ei saa hävittää kotitalousjätteiden mukana. Tällöin hävitettävä laite on toimitettava sähkölaitteiden ja elektronisten laitteiden kierrätyspisteeseen. Hävitettävien laitteiden erillinen käsittely ja kierrätys auttavat säästämään luonnonvaroja ja varmistamaan, että laite kierrätetään tavalla, joka estää terveyshaitat ja suojelee luontoa. Lisätietoja paikoista, joihin hävitettävät laitteet voi toimittaa kierrätettäväksi, saa ottamalla yhteyttä jätehuoltoon tai liikkeeseen, josta tuote on ostettu.



Élimination des appareils mis au rebut par les ménages dans l'Union européenne

Le symbole apposé sur ce produit ou sur son emballage indique que ce produit ne doit pas être jeté avec les déchets ménagers ordinaires. Il est de votre responsabilité de mettre au rebut vos appareils en les déposant dans les centres de collecte publique désignés pour le recyclage des équipements électriques et électroniques. La collecte et le recyclage de vos appareils mis au rebut indépendamment du reste des déchets contribue à la préservation des ressources naturelles et garantit que ces appareils seront recyclés dans le respect de la santé humaine et de l'environnement. Pour obtenir plus d'informations sur les centres de collecte et de recyclage des appareils mis au rebut, veuillez contacter les autorités locales de votre région, les services de collecte des ordures ménagères ou le magasin dans lequel vous avez acheté ce produit.



Entsorgung von Altgeräten aus privaten Haushalten in der EU

Das Symbol auf dem Produkt oder seiner Verpackung weist darauf hin, dass das Produkt nicht über den normalen Hausmüll entsorgt werden darf. Benutzer sind verpflichtet, die Altgeräte an einer Rücknahmestelle für Elektro- und Elektronik-Altgeräte abzugeben. Die getrennte Sammlung und ordnungsgemäße Entsorgung Ihrer Altgeräte trägt zur Erhaltung der natürlichen Ressourcen bei und garantiert eine Wiederverwertung, die die Gesundheit des Menschen und die Umwelt schützt. Informationen dazu, wo Sie Rücknahmestellen für Ihre Altgeräte finden, erhalten Sie bei Ihrer Stadtverwaltung, den örtlichen Müllentsorgungsbetrieben oder im Geschäft, in dem Sie das Gerät erworben haben



Απόρριψη άχρηστου εξοπλισμού από χρήστες σε ιδιωτικά νοικοκυριά στην Ευρωπαϊκή Ένωση

Το σύμβολο αυτό στο προϊόν ή τη συσκευασία του υποδεικνύει ότι το συγκεκριμένο προϊόν δεν πρέπει να διατίθεται μαζί με τα άλλα οικιακά σας απορρίμματα. Αντίθετα, είναι δική σας ευθύνη να απορρίψετε τον άχρηστο εξοπλισμό σας παραδίδοντάς τον σε καθορισμένο σημείο συλλογής για την ανακύκλωση άχρηστου ηλεκτρικού και ηλεκτρονικού εξοπλισμού. Η ξεχωριστή συλλογή και ανακύκλωση του άχρηστου εξοπλισμού σας κατά την απόρριψη θα συμβάλει στη διατήρηση των φυσικών πόρων και θα διασφαλίσει ότι η ανακύκλωση γίνεται με τρόπο που προστατεύει την ανθρώπινη υγεία και το περιβάλλον. Για περισσότερες πληροφορίες σχετικά με το πού μπορείτε να παραδώσετε τον άχρηστο εξοπλισμό σας για ανακύκλωση, επικοινωνήστε με το αρμόδιο τοπικό γραφείο, την τοπική υπηρεσία διάθεσης οικιακών απορριμμάτων ή το κατάστημα όπου αγοράσατε το προϊόν.



Készülékek magánháztartásban történő selejtezése az Európai Unió területén

A készüléken, illetve a készülék csomagolásán látható azonos szimbólum annak jelzésére szolgál, hogy a készülék a selejtezés során az egyéb háztartási hulladéktól eltérő módon kezelendő. A vásárló a hulladékká vált készüléket köteles a kijelölt gyűjtőhelyre szállítani az elektromos és elektronikai készülékek újrahasznosítása céljából. A hulladékká vált készülékek selejtezés kori begyűjtése és újrahasznosítása hozzájárul a természeti erőforrások megőrzéséhez, valamint biztosítja a selejtezett termékek környezetre és emberi egészségre nézve biztonságos feldolgozását. A begyűjtés pontos helyéről bővebb tájékoztatást a lakhelye szerint illetékes önkormányzattól, az illetékes személtakarító vállalattól, illetve a terméket eláruló helyen kaphat.

**Smaltimento delle apparecchiature da parte di privati nel territorio dell'Unione Europea**

Questo simbolo presente sul prodotto o sulla sua confezione indica che il prodotto non può essere smaltito insieme ai rifiuti domestici. È responsabilità dell'utente smaltire le apparecchiature consegnandole presso un punto di raccolta designato al riciclo e allo smaltimento di apparecchiature elettriche ed elettroniche. La raccolta differenziata e il corretto riciclo delle apparecchiature da smaltire permette di proteggere la salute degli individui e l'ecosistema. Per ulteriori informazioni relative ai punti di raccolta delle apparecchiature, contattare l'ente locale per lo smaltimento dei rifiuti, oppure il negozio presso il quale è stato acquistato il prodotto.

**Nolietotu iekārtu iznīcināšanas noteikumi lietotājiem Eiropas Savienības privātajās mājāsaimniecībās**

Šāds simbols uz izstrādājuma vai uz tā iesaiņojuma norāda, ka šo izstrādājumu nedrīkst izmest kopā ar citiem sadzīves atkritumiem. Jūs atbildat par to, lai nolietotās iekārtas tiktu nodotas speciāli iekārtotos punktos, kas paredzēti izmantoto elektrisko un elektronisko iekārtu savākšanai otrreizējai pārstrādei. Atsevišķa nolietoto iekārtu savākšana un otrreizējā pārstrāde palīdzēs saglabāt dabas resursus un garantēs, ka šīs iekārtas tiks otrreizēji pārstrādātas tādā veidā, lai pasargātu vidi un cilvēku veselību. Lai uzzinātu, kur nolietotās iekārtas var izmest otrreizējai pārstrādei, jāvēršas savas dzīves vietas pašvaldībā, sadzīves atkritumu savākšanas dienestā vai veikalā, kurā izstrādājums tika nopirkts.

**Vartotojū iš privačū namū ūkiū īrangos atliekū šalinimas Europos Sajungoje**

Šis simbolis ant gaminio arba jo pakuotės rodo, kad šio gaminio šalinti kartu su kitomis namų ūkio atliekomis negalima. Šalintinas įrangos atliekas privalote pristatyti į specialią surinkimo vietą elektros ir elektroninės įrangos atliekoms perdirbti. Atskirai surenkamos ir perdirbamos šalintinos įrangos atliekos padės saugoti gamtinius išteklius ir užtikrinti, kad jos bus perdirbtos tokiu būdu, kuris nekenkia žmonių sveikatai ir aplinkai. Jeigu norite sužinoti daugiau apie tai, kur galima pristatyti perdirbtinas įrangos atliekas, kreipkitės į savo seniūniją, namų ūkio atliekų šalinimo tarnybą arba parduotuvę, kurioje įsigijote gaminį.

**Verwijdering van afgedankte apparatuur door privé-gebruikers in de Europese Unie**

Dit symbool op het product of de verpakking geeft aan dat dit product niet mag worden gedeponeerd bij het normale huishoudelijke afval. U bent zelf verantwoordelijk voor het inleveren van uw afgedankte apparatuur bij een inzamelingspunt voor het recyclen van oude elektrische en elektronische apparatuur. Door uw oude apparatuur apart aan te bieden en te recyclen, kunnen natuurlijke bronnen worden behouden en kan het materiaal worden hergebruikt op een manier waarmee de volksgezondheid en het milieu worden beschermd. Neem contact op met uw gemeente, het afvalinzamelingsbedrijf of de winkel waar u het product hebt gekocht voor meer informatie over inzamelingspunten waar u oude apparatuur kunt aanbieden voor recycling.

**Pozbywanie się zużytego sprzętu przez użytkowników w prywatnych gospodarstwach domowych w Unii Europejskiej**

Ten symbol na produkcie lub jego opakowaniu oznacza, że produktu nie wolno wyrzucać do zwykłych pojemników na śmieci. Obowiązkiem użytkownika jest przekazanie zużytego sprzętu do wyznaczonego punktu zbiórki w celu recyklingu odpadów powstałych ze sprzętu elektrycznego i elektronicznego. Osobna zbiórka oraz recykling zużytego sprzętu pomogą w ochronie zasobów naturalnych i zapewnią ponowne wprowadzenie go do obiegu w sposób chroniący zdrowie człowieka i środowisko. Aby uzyskać więcej informacji o tym, gdzie można przekazać zużyty sprzęt do recyklingu, należy się skontaktować z urzędem miasta, zakładem gospodarki odpadami lub sklepem, w którym zakupiono produkt.



Descarte de Lixo Elétrico na Comunidade Européia

Este símbolo encontrado no produto ou na embalagem indica que o produto não deve ser descartado no lixo doméstico comum. É responsabilidade do cliente descartar o material usado (lixo elétrico), encaminhando-o para um ponto de coleta para reciclagem. A coleta e a reciclagem seletivas desse tipo de lixo ajudarão a conservar as reservas naturais; sendo assim, a reciclagem será feita de uma forma segura, protegendo o ambiente e a saúde das pessoas. Para obter mais informações sobre locais que reciclam esse tipo de material, entre em contato com o escritório da HP em sua cidade, com o serviço de coleta de lixo ou com a loja em que o produto foi adquirido.



Likvidácia vyradených zariadení v domácnostiach v Európskej únii

Symbol na výrobku alebo jeho balení označuje, že daný výrobok sa nesmie likvidovať s domovým odpadom. Povinnosťou spotrebiteľa je odovzdať vyradené zariadenie v zbernom mieste, ktoré je určené na recykláciu vyradených elektrických a elektronických zariadení. Separovaný zber a recyklácia vyradených zariadení prispieva k ochrane prírodných zdrojov a zabezpečuje, že recyklácia sa vykonáva spôsobom chrániacim ľudské zdravie a životné prostredie. Informácie o zberných miestach na recykláciu vyradených zariadení vám poskytne miestne zastupiteľstvo, spoločnosť zabezpečujúca odvoz domového odpadu alebo obchod, v ktorom ste si výrobok zakúpili.



Odstranjevanje odslužene opreme uporabnikov v zasebnih gospodinjstvih v Evropski uniji

Ta znak na izdelku ali njegovi embalaži pomeni, da izdelka ne smete odvreči med gospodinjске odpadke. Nasprotno, odsluženo opremo morate predati na zbirališče, pooblaščeno za recikliranje odslužene električne in elektronske opreme. Ločeno zbiranje in recikliranje odslužene opreme prispeva k ohranjanju naravnih virov in zagotavlja recikliranje te opreme na zdravju in okolju neškodljiv način. Za podrobnejše informacije o tem, kam lahko odpeljete odsluženo opremo na recikliranje, se obrnite na pristojni organ, komunalno službo ali trgovino, kjer ste izdelek kupili.



Eliminación de residuos de equipos eléctricos y electrónicos por parte de usuarios particulares en la Unión Europea

Este símbolo en el producto o en su envase indica que no debe eliminarse junto con los desperdicios generales de la casa. Es responsabilidad del usuario eliminar los residuos de este tipo depositándolos en un "punto limpio" para el reciclado de residuos eléctricos y electrónicos. La recogida y el reciclado selectivos de los residuos de aparatos eléctricos en el momento de su eliminación contribuirá a conservar los recursos naturales y a garantizar el reciclado de estos residuos de forma que se proteja el medio ambiente y la salud. Para obtener más información sobre los puntos de recogida de residuos eléctricos y electrónicos para reciclado, póngase en contacto con su ayuntamiento, con el servicio de eliminación de residuos domésticos o con el establecimiento en el que adquirió el producto.



Bortskaffande av avfallsprodukter från användare i privathushåll inom Europeiska Unionen

Om den här symbolen visas på produkten eller förpackningen betyder det att produkten inte får slängas på samma ställe som hushållssopor. I stället är det ditt ansvar att bortskaffa avfallet genom att överlämna det till ett uppsamlingsställe avsett för återvinning av avfall från elektriska och elektroniska produkter. Separat insamling och återvinning av avfallet hjälper till att spara på våra naturresurser och gör att avfallet återvinns på ett sätt som skyddar människors hälsa och miljön. Kontakta ditt lokala kommunkontor, din närmsta återvinningsstation för hushållsavfall eller affären där du köpte produkten för att få mer information om var du kan lämna ditt avfall för återvinning.



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