



Installation Guide

ProCurve Switch zl Modules



Power over Ethernet Devices

ProCurve Switch zl Modules

Installation Guide

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Applicable Products

Management Module	J8726A
24-port Gig-T zl Module	J8702A
20-port Gig-T/SFP zl Module	J8705A
24-port mini-GBIC zl Module	J8706A
4-port 10Gig-X2 zl Module	J8707A
4-port 10Gig-CX4 zl Module	J8708A
ProCurve Switch 5406zl	J8697A
ProCurve Switch 5406zl-48G	J8699A
ProCurve Switch 5412zl	J8698A
ProCurve Switch 5412zl-96G	J8700A

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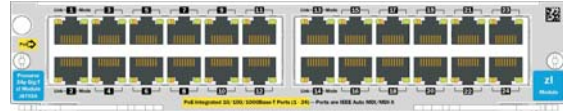
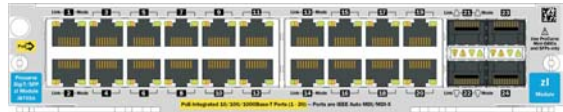
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ProCurve Switch zl Modules

For the ProCurve Series 5400zl Switches

Descriptions. The ProCurve Switch zl Modules are components that you can add to a ProCurve zl switch to provide a variety of network connectivity options. The following modules are available as of this printing:




Module	Image	Description
ProCurve Switch 5400zl Management Module (J8726A) ¹		<p>The switch requires a management module to operate. The management module maintains persistent images of all software that runs on the system. The primary non-volatile storage medium is a Compact Flash card located on the module.</p>
ProCurve Switch 5400zl 24 port Gig-T PoE Module (J8702A) ¹		<p>24 twisted-pair ports with RJ-45 connectors for 10/100/1000 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 (HP Auto-MDIX) feature and support IEEE 802.3af PoE.</p>
ProCurve Switch 5400zl 20 port Gig-T + 4 port mGBIC Module (J8705A) ¹		<p>20 twisted-pair with RJ-45 connectors for 10/100/1000 Base-T ports that support PoE and 4 ports for installing any of the supported ProCurve mini-GBICs or SFPs. All ports have the IEEE 802.3ab Auto MDI/MDI-X (HP Auto-MDIX) feature and support PoE. The mini-GBIC/SFP ports do not support IEEE 802.3af PoE.</p>

Supported mini-GBICs: The following ProCurve mini-GBICs are supported by the Gig-T/SFP zl Module (as of this printing):

- Gigabit-SX LC mini-GBIC (J4858B)
- Gigabit-LX LC mini-GBIC (J4859B)
- Gigabit-LH LC mini-GBIC (J4860B)
- Gigabit 1000Base-T mini-GBIC (J8177B)

ProCurve Switch zl Modules

Descriptions

Module	Module	Description
ProCurve Switch 5400zl 24 port mini-GBIC Module (J8706A) ²		24 mini-GBIC/SFP ports for connecting any of the supported mini-GBICs. do not support IEEE 802.3af PoE.
Supported mini-GBICs: The following ProCurve mini-GBICs are supported by the mini-GBIC zl Module (as of this printing): <ul style="list-style-type: none">• Gigabit-SX LC mini-GBIC (J4858B)• Gigabit-LX LC mini-GBIC (J4859B)• Gigabit-LH LC mini-GBIC (J4860B)• Gigabit 1000Base-T mini-GBIC (J8177B)		
ProCurve Switch 5400zl 4 port 10-GbE X2 Module (J8707A) ¹		4 ports for installing any of the supported ProCurve 10 Gig X2 transceivers.
ProCurve Switch 5400zl 4 port 10-GbE CX4 Module (J8708A) ²		4 ports for connecting 10-GbE copper cable.
Supported transceivers: The following ProCurve transceivers are supported by the J8707A zl Module (as of this printing): <ul style="list-style-type: none">• ProCurve 10-GbE X2-SR SC Optic (J8436A)• ProCurve 10-GbE X2-LR SC Optic (J8437A)• ProCurve 10-GbE X2-ER SC Optic (J8438A)• ProCurve 10-GbE X2 CX4 Xcvr (J8440B)• ProCurve 10-GbE CX4 Media Converter (J8439A)		

¹ These modules require switch software version K.11.00 or greater to be installed in the switch.

² These modules require switch software version K.11.3x or greater to be installed in the switch

Contact your ProCurve authorized networking products reseller or your ProCurve Networking representative for information on availability of other modules and mini-GBICs. You can also visit the ProCurve Networking products Web site <http://www.procurve.com> to get more information.

Features

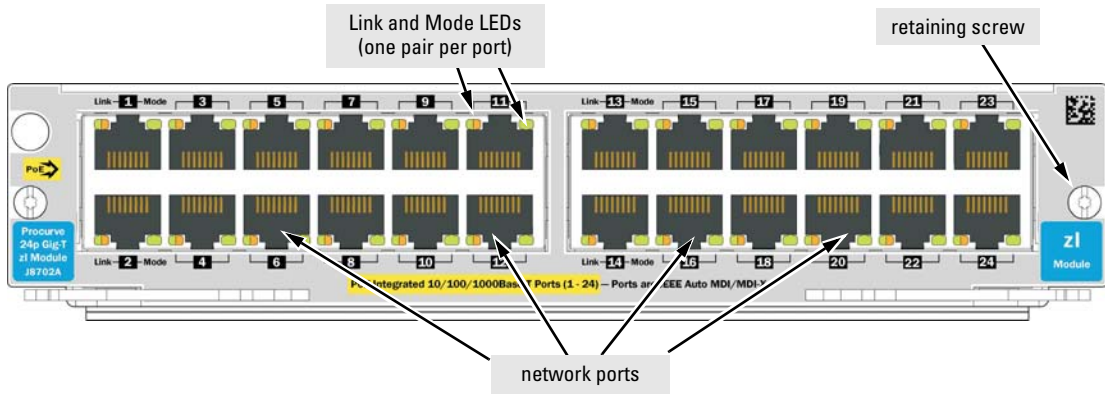


Figure 1. Example: ProCurve 24-Port 10/100/1000-T zl Module

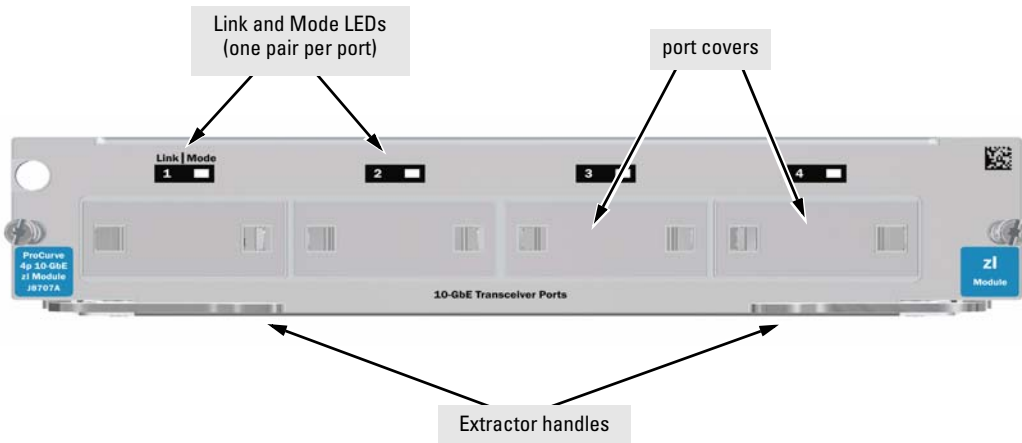


Figure 2. Example: ProCurve Switch 4-port 10 Gig-X2 zl Module

The ProCurve Switch zl 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), presence of specific network error packets on the port, and PoE state and configuration.
- “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 the Gig-T + 4 port mGBIC Module, without having to first remove the module, and without having to shut down the switch
- the RJ-45 ports on all modules have the **HP Auto-MDIX** and 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. (See the note on “Automatic Cable Sensing” on [page 14](#).)
- all RJ-45 twisted-pair ports support Power over Ethernet (PoE) technology
- standards adherence:
 - the 10/100/1000Base-T ports are compatible with 802.3 (10Base-T), 802.3u (100Base-TX), 802.3ab (1000Base-T), and the 802.3af Power over Ethernet IEEE standards
 - the ports on the SX and LX mini-GBICs that are installed in the 20 port Gig-T + 4 port mGBIC Module are compatible with the IEEE 802.3z Gigabit-SX and Gigabit-LX standards respectively
 - the 4 port 10G X2 module ports are compatible with the IEEE 802.3ak CX-4, IEEE 802.3ae XAUI, and X2 MSA's

Installing the Modules

Overview

Before installing any module, ensure you have loaded the most current software for that module onto your switch, see [page 2](#) for module software codes. You can install any of the modules into any of the ProCurve zl Switches that have a compatible module slot. As of this printing, those are the ProCurve Series 5400zl Switches:

- 5406zl (J8697A)
- 5406zl-48G (J8699A)
- 5412zl (J8698A)
- 5412zl-96G (J8700A)

“Hot Swap” Notes

The mini-GBICs can be “hot swapped”. That is, they can be installed or removed after the Module is installed in the switch and the module is receiving power, see [page 8](#).

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, see [page 17](#). You may have to reconfigure the switch if the modules are not the same type, check your configuration.

You can install the modules 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 ([page 6](#)).
If you have installed any modules into slots that were previously occupied by a different type module, you need to reset the switch ([page 18](#)).
2. If you are using the zl Module that supports mini-GBICs, install the mini-GBICs in the module. You can install the mini-GBICs before or after installing that module into the switch ([page 8](#)).
3. Verify the modules are installed correctly ([page 11](#)).
4. Connect the network cabling ([page 13](#)).
5. Verify the network connections are working properly ([page 15](#)).
6. Optionally, customize the configuration for the modules’ ports (unless the default port configuration is satisfactory for your network application ([page 16](#))).

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 zl 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 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.
- Ensure you check the temperature specifications for each module that will be installed into the chassis as different modules have different temperature requirements.

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. Open the extractor handles.
4. Insert the module aligning with the guides in the slot and slide it into the slot until it stops.
5. Once the contacts have engaged, use the extractor handles to seat the module completely.
6. Tighten the screws.

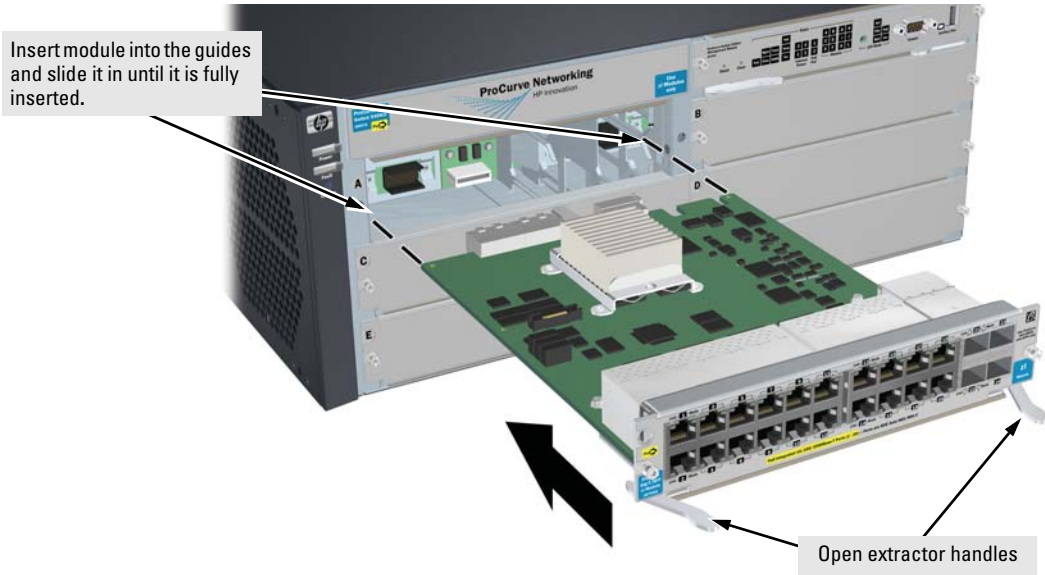


Figure 3. Example: Module being installed

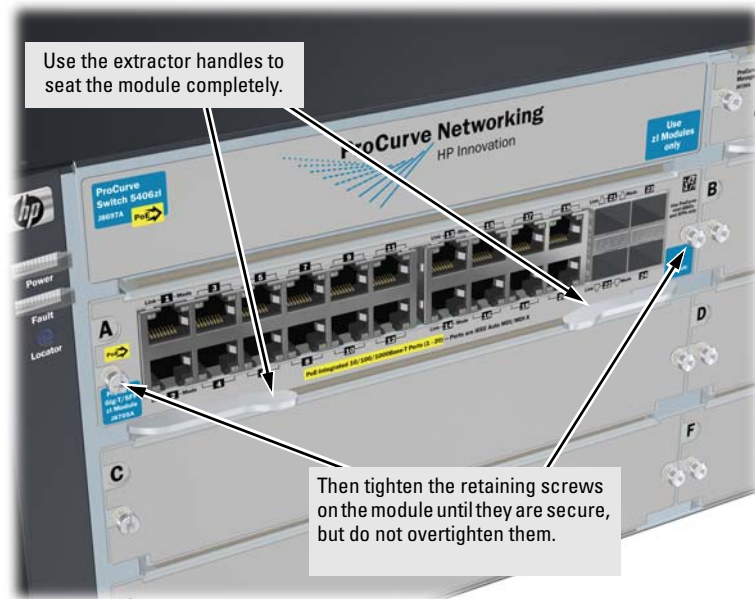


Figure 4. Module fully installed

Installing or Removing the mini-GBICs

You can install or remove a mini-GBIC from the mini-GBIC zl Module without having to power off the switch. Use only ProCurve mini-GBICs.

WARNING

The ProCurve 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.

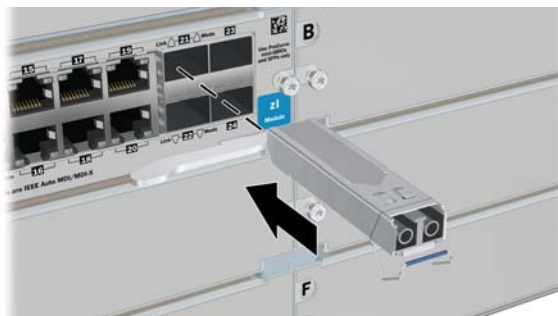


Figure 5. Example: Mini-GBIC being installed

Removing the mini-GBICs:

Disconnect the network cable 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 plastic tab on the bottom of the mini-GBIC, a wire bail, or a plastic collar around the mini-GBIC.

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

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

PoE Power Requirements

When a powered device (PD) is initially connected to a PoE port, a minimum of 17 watts of available power is required to begin the power-up sequence. This 17 watts is needed to determine the type of PD requesting power. Once the power classification is determined and power is supplied, any power beyond the actual PD power usage is available for use by other ports.

In the default switch configuration all PoE ports have a Low priority. If the switch has less than 17 W of PoE power available, the switch transfers power from lower-priority ports to higher-priority ports. Within each priority class, a lower numbered port is supplied power before a higher numbered port. For more information refer to “Power over Ethernet (PoE) Operation” in the *Management and Configuration Guide*.

Disconnecting a PD from a port causes the switch to stop providing power to that port and makes that power available to other ports configured for PoE operation. For more information on PoE power requirements refer to the *ProCurve Power over Ethernet (PoE) for zl and yl Products Planning and Implementation Guide* that came with your switch.

Module LEDs

Port LEDs

There are two LEDs for each port:

- The Link LED lights green with a valid connection and orange if there is a fault or alert condition.
- The Mode LED lights according to the LED mode selected on the chassis. If the module’s LED mode selection is Std (standard), then the Mode LED behaves as other ProCurve switch modules:

There are five LEDs for each module on the switch chassis management module:.

Chassis Mode Switch Setting	Description	Port Indication - LED On
Act	Activity	Transmit or Receive Traffic Present
FDx	Full Duplex	Full Duplex Mode of Operation
Spd	Indicates the Port LEDs are displaying the connection speed at which each port is operating.	<ul style="list-style-type: none"> • If the Port LED is on continuously, the port is operating at 1000 Mbps. • If the Port LED is off, the port is operating at 10 Mbps. • If the Port LED is blinking, the port is operating at 100 Mbps.
PoE	Power over Ethernet	<ul style="list-style-type: none"> • If the Mode LED is on the port is providing PoE power. • If the Mode LED is off the port is not providing PoE power. • If the Link LED is on the port is enabled for PoE. • If the Link LED is off the port is disabled for PoE. • If the Link LED is blinking, the port has an error or the port is denied power due to insufficient power.
Usr	For future development	

Verifying the Module is Installed Correctly

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

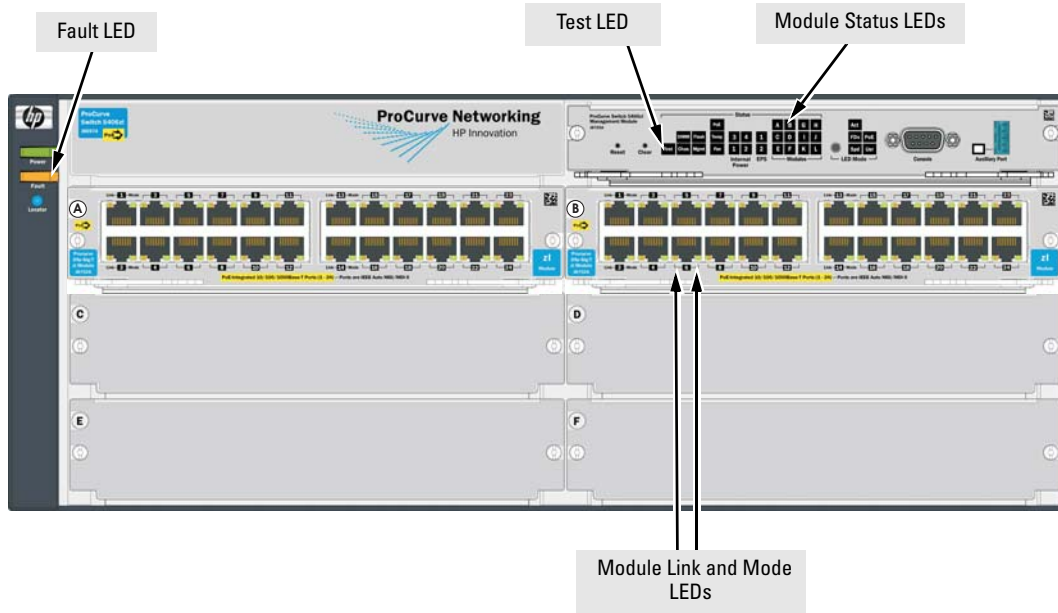


Figure 6. Module Status LEDs

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) The LED goes ON as soon as the module is installed and the switch is powered on, and stays ON steadily.
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 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. Then, the Test LED on the switch goes OFF. 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 the switch is being tested.

Error Condition

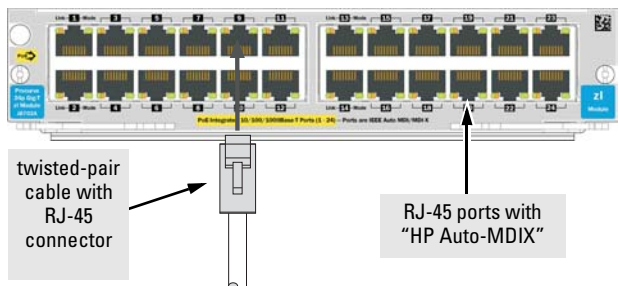
If the link LED on the module is blinking orange and the Fault LED on the switch is on, then there is a fault condition on the port with the blinking orange LED. The module letter, on the Management Module, corresponding to the module with the blinking orange LED will also be blinking simultaneously.

Connecting the Network Cables

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 21](#).

Supported Cable Types

Module	Cable Type	Maximum Length
10/100/1000-T PoE zl Module	<p>10 Mbps operation: category 3, 4, or 5, 100-ohm balanced twisted-pair cable</p> <p>100 Mbps operation: category 5, 100-ohm balanced twisted-pair cable. For 1000 Mbps (gigabit) operation, category 5e cabling or better is recommended.</p>	<p>100 meters (recommended)</p> <p>100 meters</p>



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 14](#).
- 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.

4 port 10G X2 zl Module (J8707A)



10 Gigabit SR operation:

62.5 μ m cable

160 Mhz*km = 2-26 meters
200 Mhz*km = 2-33 meters

50 μ m cable

400 Mhz*km = 2-66 meters
500 Mhz*km = 2-82 meters
2000 Mhz*km = 2-300 meters

LR operation:

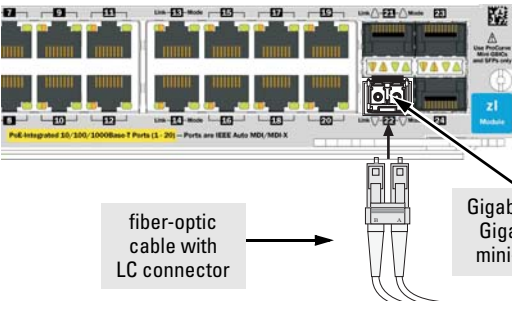
single-mode cable

2-10 kilometers

Note: Conditioning patch cord cables are not supported on 10-GbE speeds.

ProCurve Switch zl Modules

Installing the Modules

Module	Cable Type	Maximum Length
<p>mini-GBICs on the 10/100/1000-T zl Modules</p>  <p>fiber-optic cable with LC connector</p> <p>Gigabit-SX or Gigabit-LX mini-GBICs</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 22.</p> <p>Gigabit-LH operation: the same single-mode fiber-optic cables used for Gigabit-LX.</p>	<p>220 meters to 550 meters, depending on the cable used. See “Fiber-Optic Cables” on page 22 for more information.</p> <ul style="list-style-type: none"> • single-mode cable: 10 kilometers • multimode cable: 550 meters <p>70 kilometers</p>

Notes:

Gigabit-LX – If multimode cable is used, a **mode conditioning patch cord** may be needed — see “Mode Conditioning Patch Cord” on [page 24](#) for more information.

Gigabit-LH – Between the transmit and receive ends of the cable, at least 5dB of attenuation is required for a reliable connection. This is equivalent to 20 km of the fiber-optic cable. For distances less than 20 km, you must add attenuators to bring the total attenuation to at least 5dB. Most cable vendors carry attenuators.

Note

Automatic Cable Sensing on Twisted-Pair Ports:

When the ports for these zl Modules are in their default configuration, **Auto**, they 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.

Operation of these features depend 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.

Verifying the Network Connections Are Working

Check the port LEDs for the newly-installed module to ensure 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.

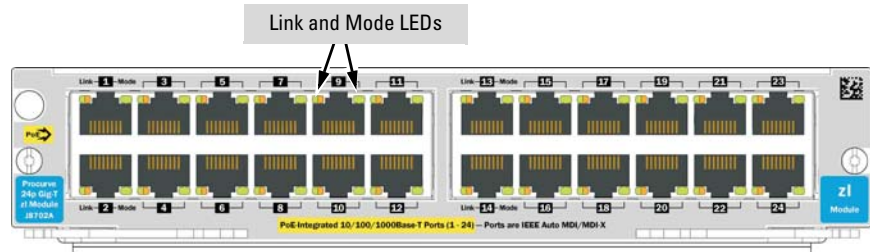


Figure 7. Example: Link and Mode LEDs

- 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 19](#).
- 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 port is in AUTO, the duplex mode LED will be off.
- If the Mode is set to display maximum link speed operation (the **Spd** mode indicator LED is lit), then the Mode LED will be lit for each port that is operating at its maximum possible link speed:
 - Off = 10 Mbps
 - Blinking = 100 Mbps (the blinking behavior is a repeated on/off cycle once every 0.5 sec.)
 - On = 1000 Mbps
 - If the port is in AUTO, the spd mode LED will be off.

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:**
 - **10/100/1000-T zl 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.

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.

-
- **Dual Personality ports - (mini-GBIC ports using Gigabit-SX, Gigabit-LX, and Gigabit-LH ports):** Auto — The port always operates at 1000 Mbps and full duplex. The setting is Auto for best link establishment with other devices.
 - **Gigabit-SX, Gigabit-LX, and Gigabit-LH ports in mini-GBIC zl Module:** Auto — The port always operates at 1000 Mbps and full duplex. The setting is Auto for best link establishment with other devices.
 - **Flow Control:** Disabled
 - **Advanced features** — Spanning Tree, Trunking, Meshing, VLANs, IGMP, LACP, Routing, Class of Service, Security, and so forth: all 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 interfaces. If the default port configuration listed above is acceptable for your network, then skip this process.

Note

By default, all ports on the J8702A and J8705A modules have PoE power enabled. For information regarding customizing PoE ports refer to “Power over Ethernet (PoE) Operation” in the *Management and Configuration Guide* and the *ProCurve Power over Ethernet (PoE) for zl and yl Products Planning and Implementation Guide* that came with your switch.

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.

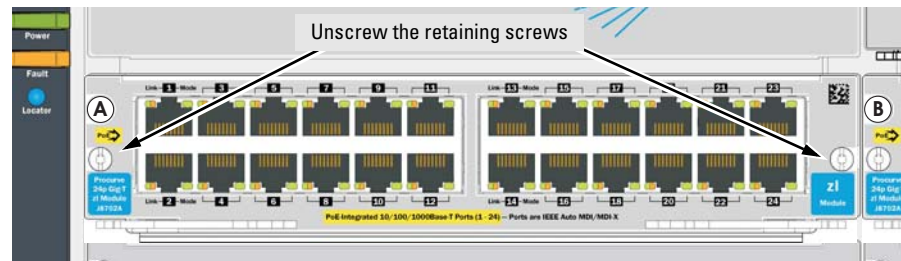


Figure 8. Removing a module

3. Using the extractor handles pull the module out from the 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 6](#) 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. Reset the switch, as described under “Resetting the Switch” on [page 18](#), if you are exchanging one type of module with a different type of module in the same slot.

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, 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 (orange) for the slot will blink, the chassis fault LED will blink simultaneously, 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** 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 are 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.

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, <http://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

Modules Temperature		
Module	Operating	Non-Operating
J8702A	0°C to 55°C (32°F to 131°F)	-40°C to 70°C (-40°F to 158°F)
J8705A	0°C to 40°C (32°F to 104°F)	-40°C to 70°C (-40°F to 158°F)
J8707A	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 90% at 65°C (149°F)
Maximum altitude:	4.6 km (15,000 ft)	4.6 km (15,000 ft)

Lasers

The Gigabit-SX, Gigabit-LX, and Gigabit-LH mini-GBICs, and the 10-GbE X2-SR SC Xcvr, 10-GbE X2-LR SC Xcvr, and 10-GbE X2 CX4 Xcvr are Class 1 Laser products.

The 10-GbE X2-SR SC Xcvr is a Class 1M Laser product.

Laser Klasse 1 and 1M.

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

Connectors

Twisted-Pair

■ **10/100/1000-T zl Modules.**

They are compatible with the IEEE 802.3 10Base-T, 802.3u 100Base-TX, and IEEE 802.3ab 1000Base-T standards, and accepts the 10 Mbps, 100 Mbps, or 1000 Mbps cables listed on [page 21](#).

Fiber-Optic

■ **Gigabit-SX LC – On the Gigabit-SX mini-GBIC.**

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 [page 22](#).

- **Gigabit-LX LC** – On the **Gigabit-LX mini-GBIC**.
Transmits at 1310 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 [page 22](#).
- **Gigabit-LH LC** – On the **Gigabit-LH mini-GBIC**.
Transmits at 1550 nm wavelength, and accepts the low metal content, single-mode fiber-optic cables for Gigabit-LH described on [page 22](#).

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>(please 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, but for the most robust connections you should use cabling that complies with the Category 5e (or better) 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 Gigabit 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	<ul style="list-style-type: none"> • full-duplex connections: 2 kilometers • half-duplex connections: 412 meters
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, 1310 nm, 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 24 for more information.			
Gigabit-LH	9/125 μm (core/cladding) diameter, 1550 nm, 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: Between the transmit and receive ends of the cable, at least 5dB of attenuation is required for a reliable connection. This is equivalent to 20 km of the fiber-optic cable. For distances less than 20 km, you must add attenuators to bring the total attenuation to at least 5dB. Most cable vendors carry attenuators.			

Fiber-Optic 10-GbE 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 , 850 nm, 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, 1480 nm, 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: 2-10 kilometers
10-GbE ER	9/125 μm (core/cladding) diameter, 1550 nm, 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: 2-30 kilometers (40 kilometers, on an engineered fiber optic link that meets standards in the specification).
Note: Conditioning patch cord cables are not supported.			
OMC CX4 Fiber	12 fiber 50/125 mm (core/cladding) diameter, multimode Fiber ribbon cable. 12 fiber 62.5/125 μm (core/cladding) diameter, multimode Fiber ribbon cable is also supported.	Optical Media Converter	1-300 meters

Copper 10-GbE Cables

Port Type	Cable Specifications	Connector Type	Supported Length
CX4	Speed 3.125Gbx4 (Cables compliant with the 802.3ak standard)	CX4	0.5-15 meters

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 22](#), 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.

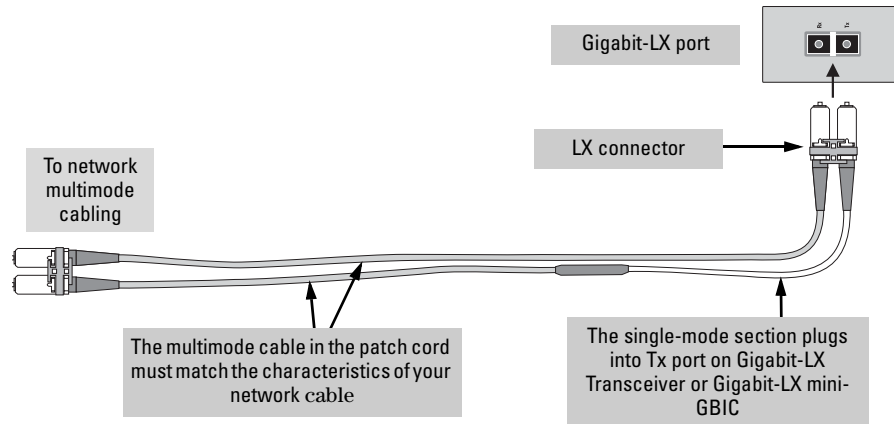


Figure 9. Example: Mode Conditioning Patch Cord

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 zl 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. Okamžitě 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 ringlussevõtmine kõrvaldamise ajal aitab kaitsta loodusvarasid ning tagada, et ringlussevõtmine toimub viisil, mis kaitseb inimeste tervist ning keskkonda. Lisateabe saamiseks selle kohta, kuhu oma seadmete jäätmed ringlussevõtmiseks viia, võtke palun ühendust oma kohaliku linnakantseliga, 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 selejtezési 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 elárúsító 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, jāvērsas savas dzīves vietas pašvaldībā, sadzīves atkritumu savākšanas dienestā vai veikalā, kurā izstrādājums tika nopirkts.

**Vartotojū iš privačių namų ūkių įrangos atliekų šalinimas Europos Sąjungoje**

Šis simbols ant gaminio arba jo pakuotės rodo, kad šio gaminio šalinti kartu su kitomis namų ūkio atliekoms 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.



Odstranjanje odslužene opreme uporabnikov v zasebnih gospodinjstvih v Evropski uniji

Ta znak na izdelku ali njegovi embalaži pomeni, da izdelka ne smete odvreči med gospodinjske odpadke. Nasprotno, odsluženo opremo morate predati na zbirališče, pooblaščen 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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