IBM y-series of Ethernet Switches

Installation and User Guide

Service information: 4002-Y2A, 4002-Y4A, 4002-Y2B, 4002-Y4B, 4002-Y2C, 4002-Y4C

IBM y-series of Ethernet Switches

Installation and User Guide

Service information: 4002-Y2A, 4002-Y4A, 4002-Y2B, 4002-Y4B, 4002-Y2C, 4002-Y4C

Contents

Figures

Tables

Preface

This publication is provided for use with your particular IBM® Ethernet switch or router product or product family. It provides information on installing, configuring, maintaining, and using your product. Please retain this publication and the accompanying documentation CD in a convenient location for easy reference and future use.

The following sections provide information on safety and environmental considerations, related publications and resources, as well as how to get assistance, and how to send IBM feedback on this publication.

- "Safety notices"
- "Product recycling and disposal" on page xvii
- "Product documents" on page xviii
- "Getting help" on page xxii
- "How to send your comments" on page xxiii

Safety notices

This section contains important safety information that should be read before starting any installation or service procedure.

- "Safety notices and labels," including:
  - "Notes" on page x
  - "Attention notices" on page x
  - "Caution notices" on page x
  - "Danger notices" on page xi
  - "Safety labels" on page xiv
- "Rack safety" on page xvi

Safety notices and labels

When using this product, observe the danger, caution, and attention notices contained in this guide. The notices are accompanied by symbols that represent the severity of the safety condition. The danger and caution notices are listed in numerical order based on their IDs, which are displayed in parentheses, for example (D004), at the end of each notice. Use this ID to locate the translation of these danger and caution notices in the *IBM Systems Safety Notices* (G229–9054) publication, which is on the product documentation CD that accompanies this product.

The following notices and statements are used in IBM documents. They are listed below in order of increasing severity of potential hazards. Follow the links for more detailed descriptions and examples of the notes, attention notices, caution, and danger notices in the sections that follow.

- **"Notes" on page x:** These notices provide important tips, guidance, or advice.
- **"Attention notices" on page x:** These notices indicate potential damage to programs, devices, or data.
- **"Caution notices" on page x:** These statements indicate situations that can be potentially hazardous to you.

- **"Danger notices" on page xi:** These statements indicate situations that can be potentially lethal or extremely hazardous to you. Safety labels are also attached directly to products to warn of these situations.
- In addition to these notices, "Safety labels" on page xiv may be attached to the product to warn of potential hazards.

Notes

Notes can provide tips, guidance, suggestions, or advice for simplifying procedures, clarifying information, or avoiding potential problems. A sample note follows.

Note: Syslog messages and traps are generated.

Attention notices

An attention notice indicates the possibility of damage to a program, device, or system, or to data. An exclamation point symbol may accompany an attention notice, but is not required. A sample attention notice follows:
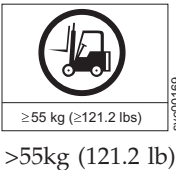
Attention: Do not bend a fibre cable to a radius less than 5 cm (2 in.); you can damage the cable. Tie wraps are not recommended for optical cables because they can be easily overtightened, causing damage to the cable.

ESD precautions:

Attention: Many of the field replaceable units (FRUs) are sensitive to electrostatic discharge (ESD), and can potentially be damaged by improper handling. Wear a wrist grounding strap connected to chassis ground (if the device is plugged in) or a bench ground. Store all ESD-sensitive components in antistatic packaging.

Caution notices

A caution notice calls attention to a situation that is potentially hazardous to people because of some existing condition. A caution notice can be accompanied by different symbols, as in the examples below:

If the symbol is...	It means....
	A hazardous electrical condition with less severity than electrical danger.
	A generally hazardous condition not represented by other safety symbols.
 ≥55 kg (≥121.2 lbs) svc00169 >55kg (121.2 lb)	A specification of product weight that requires safe lifting practices. The weight range of the product is listed below the graphic, and the wording of the caution varies, depending on the weight of the device.
 P/N 18P5850-8 SJ000752	A potential hazard of pinching the hand or other body parts between parts.
	A hazardous condition due to moving parts nearby.

If the symbol is...	It means....
Class I	A hazardous condition due to the use of a laser in the product. Laser symbols are always accompanied by the classification of the laser as defined by the U.S. Department of Health and Human Services (for example, Class I, Class II, and so forth).

Read and comply with the following caution notices before installing or servicing this device.

CAUTION:
Energy hazard present. Shorting may result in system outage and possible physical injury. Remove all metallic jewelry before servicing. (C001)

CAUTION:
This product is equipped with a 3-wire (two conductors and ground) power cable and plug. Use this power cable with a properly grounded electrical outlet to avoid electrical shock. (C018)

CAUTION:
Servicing of this product or unit is to be performed by trained service personnel only. (C032)

Danger notices

A danger notice calls attention to a situation that is potentially lethal or extremely hazardous to people. A lightning bolt symbol accompanies a danger notice to represent a dangerous electrical condition. Read and comply with the following danger notices before installing or servicing this device.

DANGER

> **To prevent a possible shock from touching two surfaces with different protective ground (earth), use one hand, when possible, to connect or disconnect signal cables. (D001)**

DANGER

> **Overloading a branch circuit is potentially a fire hazard and a shock hazard under certain conditions. To avoid these hazards, ensure that your system electrical requirements do not exceed branch circuit protection requirements. Refer to the information that is provided with your device or the power rating label for electrical specifications. (D002)**

DANGER

If the receptacle has a metal shell, do not touch the shell until you have completed the voltage and grounding checks. Improper wiring or grounding could place dangerous voltage on the metal shell. If any of the conditions are not as described, STOP. Ensure the improper voltage or impedance conditions are corrected before proceeding. (D003)

DANGER

An electrical outlet that is not correctly wired could place hazardous voltage on metal parts of the system or the devices that attach to the system. It is the responsibility of the customer to ensure that the outlet is correctly wired and grounded to prevent an electrical shock. (D004)

The following general electrical danger notice provides instructions on how to avoid shock hazards when servicing equipment. Unless instructed otherwise, follow the procedures in this danger notice.

DANGER

When working on or around the system, observe the following precautions:

Electrical voltage and current from power, telephone, and communication cables are hazardous. To avoid a shock hazard:

- Connect power to this unit only with the IBM provided power cord. Do not use the IBM provided power cord for any other product.
- Do not open or service any power supply assembly.
- Do not connect or disconnect any cables or perform installation, maintenance, or reconfiguration of this product during an electrical storm.
- The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords.
- Connect all power cords to a properly wired and grounded electrical outlet. Ensure that the outlet supplies proper voltage and phase rotation according to the system rating plate.
- Connect any equipment that will be attached to this product to properly wired outlets.
- When possible, use one hand only to connect or disconnect signal cables.
- Never turn on any equipment when there is evidence of fire, water, or structural damage.
- Disconnect the attached power cords, telecommunications systems, networks, and modems before you open the device covers, unless instructed otherwise in the installation and configuration procedures.
- Connect and disconnect cables as described below when installing, moving, or opening covers on this product or attached devices.

To Disconnect:
1. Turn off everything (unless instructed otherwise).
2. Remove the power cords from the outlets.
3. Remove the signal cables from the connectors.
4. Remove all cables from the devices.

To Connect:
1. Turn off everything (unless instructed otherwise).
2. Attach all cables to the devices.
3. Attach the signal cables to the connectors.
4. Attach the power cords to the outlets.
5. Turn on the devices.

(D005)

If the combined weight of the installed products and cabinet is greater than 227 kg (500 lb), the following statement and notice apply. This could apply if multiple products are installed in a single cabinet, and that cabinet and the installed devices need to be moved.

Delivery and subsequent transportation of the equipment: The customer should prepare his environment to accept the new product based on the installation planning information provided, with assistance from an IBM Installation Planning Representative (IPR) or IBM authorized service provider. In anticipation of the equipment delivery, the final installation site should be prepared in advance such that professional movers/riggers can transport the equipment to the final installation site within the computer room. If for some reason, this is not possible at the time of delivery, the customer will need to make arrangements to have professional movers/riggers return to finish the transportation at a later date. Only professional movers/riggers should transport the equipment. The IBM authorized service provider will only perform minimal frame repositioning within the computer room, as needed, to perform required service actions. The customer is also responsible for using professional movers/riggers in the case of equipment relocation or disposal.

DANGER

Heavy equipment—personal injury or equipment damage might result if mishandled. (D006)

Safety labels

As an added precaution, safety labels are often installed directly on products or product components to warn of potential hazards. These can be either danger or caution notices, depending upon the level of the hazard.

The actual product safety labels may differ from these sample safety labels:

DANGER

Hazardous voltage, current, or energy levels are present inside any component that has this label attached. Do not open any cover or barrier that contains this label. (L001)

DANGER

Rack-mounted devices are not to be used as a shelf or work space. (L002)
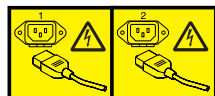
DANGER

Multiple power cords. The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords. (L003)

DANGER

Hazardous voltage present. Voltages present constitute a shock hazard, which can cause severe injury or death. (L004)

CAUTION:
Hazardous energy present. Voltages with hazardous energy might cause heating when shorted with metal, which might result in splattered metal, burns, or both. (L005)

>240VA

CAUTION:
Hazardous moving parts nearby (L008)

CAUTION:
Pinch hazard. (L012)

P/N 18P5850-B

SJ000752

Rack safety

Rack installation

DANGER

Observe the following precautions when working on or around your IT rack system:

- Heavy equipment—personal injury or equipment damage might result if mishandled.
- Always lower the leveling pads on the rack cabinet.
- Always install stabilizer brackets on the rack cabinet.
- To avoid hazardous conditions due to uneven mechanical loading, always install the heaviest devices in the bottom of the rack cabinet. Always install servers and optional devices starting from the bottom of the rack cabinet.
- Rack-mounted devices are not to be used as shelves or work spaces. Do not place objects on top of rack-mounted devices.

- Each rack cabinet might have more than one power cord. Be sure to disconnect all power cords in the rack cabinet when directed to disconnect power during servicing.
- Connect all devices installed in a rack cabinet to power devices installed in the same rack cabinet. Do not plug a power cord from a device installed in one rack cabinet into a power device installed in a different rack cabinet.
- An electrical outlet that is not correctly wired could place hazardous voltage on the metal parts of the system or the devices that attach to the system. It is the responsibility of the customer to ensure that the outlet is correctly wired and grounded to prevent an electrical shock.

(R001 part 1 of 2)

CAUTION:

- Do not install a unit in a rack where the internal rack ambient temperatures will exceed the manufacturer's recommended ambient temperature for all your rack-mounted devices.
- Do not install a unit in a rack where the air flow is compromised. Ensure that air flow is not blocked or reduced on any side, front, or back of a unit used for air flow through the unit.
- Consideration should be given to the connection of the equipment to the supply circuit so that overloading of the circuits does not compromise the supply wiring or overcurrent protection. To provide the correct power connection to a rack, refer to the rating labels located on the equipment in the rack to determine the total power requirement of the supply circuit.
- *(For sliding drawers)* Do not pull out or install any drawer or feature if the rack stabilizer brackets are not attached to the rack. Do not pull out more than one drawer at a time. The rack might become unstable if you pull out more than one drawer at a time.
- *(For fixed drawers)* This drawer is a fixed drawer and must not be moved for servicing unless specified by the manufacturer. Attempting to move the drawer partially or completely out of the rack might cause the rack to become unstable or cause the drawer to fall out of the rack.

(R001 part 2 of 2)

Rack relocation (19" rack)

CAUTION:
Removing components from the upper positions in the rack cabinet improves rack stability during relocation. Follow these general guidelines whenever you relocate a populated rack cabinet within a room or building:

- Reduce the weight of the rack cabinet by removing equipment starting at the top of the rack cabinet. When possible, restore the rack cabinet to the configuration of the rack cabinet as you received it. If this configuration is not known, you must do the following:
  - Remove all devices in the 32U position and above.
  - Ensure that the heaviest devices are installed in the bottom of the rack cabinet.
  - Ensure that there are no empty U-levels between devices installed in the rack cabinet below the 32U level.
  - If the rack cabinet you are relocating is part of a suite of rack cabinets, detach the rack cabinet from the suite.
  - Inspect the route that you plan to take when moving the rack to eliminate potential hazards.
  - Verify that the route that you choose can support the weight of the loaded rack cabinet. Refer to the documentation that came with your rack cabinet for the weight of a loaded rack cabinet.
  - Verify that all door openings are at least 760 x 2030 mm (30 x 80 in.).
  - Ensure that all devices, shelves, drawers, doors, and cables are secure.
  - Ensure that the four leveling pads are raised to their highest position.
  - Ensure that there is no stabilizer bracket installed on the rack cabinet during movement.
  - Do not use a ramp inclined at more than 10 degrees.
  - Once the rack cabinet is in the new location, do the following:
    - Lower the four leveling pads.
    - Install stabilizer brackets on the rack cabinet.
    - If you removed any devices from the rack cabinet, repopulate the rack cabinet from the lowest position to the highest position.
  - If a long distance relocation is required, restore the rack cabinet to the configuration of the rack cabinet as you received it. Pack the rack cabinet in the original packaging material, or equivalent. Also, lower the leveling pads to raise the casters off of the pallet and bolt the rack cabinet to the pallet.

(R002)

Product recycling and disposal

Refer to the *IBM Systems Environmental Notices and User Guide* (Z125-5823) for translated environmental statements and information regarding product recycling and disposal. This document may be provided either in printed version or on a documentation CD.

Product documents

The following documents contain information related to this product. The documentation may be printed material or may be on the documentation CD that is shipped with the product. Newer versions of product documentation may be available through the IBM Publications Center Web site www.ibm.com/shop/publications/order or through the IBM Systems Networking Support Web site www.ibm.com/systems/support/networking. Search by product, publication title, or publication number.

- *IBM y-series of Ethernet Switches Installation and User Guide*, GC27-2235 (this document)
- *IBM Systems Safety Notices*, G229–9054
- *IBM Systems Environmental Notices and User Guide*, Z125-5823
- *IBM Warranty*

Software documents

IBM Ethernet switch and router products use software licensed from Brocade Communications Systems, Inc. You can find software publications that support your product on the CD-ROM supplied with this product.

The software publications associated with this product are:

- *FastIron Configuration Guide*
- *FastIron CX Web Management Interface User Guide*
- *IronWare MIB Reference*

These software publications reflect only the original Brocade products names. Use the cross-reference of products in Table 1 to assist you when determining which information in those publications applies to your product. Brocade products with no IBM equivalents are not listed in the table. Note that the IBM products can be ordered with additional features, while Brocade products with those additional features may be offered as separate models.

Table 1. Comparable IBM and Brocade products.

IBM product name	IBM machine type	IBM model (HVEC/XCC model in parentheses)	Brief product description	Brocade product name	Brocade product part number
Ethernet Router B04M	4003	M04	4U modular Ethernet router with 4 interface slots	NetIron MLX-4	NI-MLX-4-AC
Ethernet Router B08M	4003	M08	7U modular Ethernet router with 8 interface slots	NetIron MLX-8	NI-MLX-8-AC
Ethernet Router B16M	4003	M16	14U modular Ethernet router with 16 interface slots	NetIron MLX-16	NI-MLX-16-AC
Ethernet Router B32M	4003	M32	33U modular Ethernet and IP router with 32 interface slots	NetIron MLX-32	NI-MLX-32-AC-A
Ethernet Switch B04R	4003	R04	4U modular Ethernet switch with 4 interface slots	BigIron RX-4	BI-RX-4-AC

Table 1. Comparable IBM and Brocade products. (continued)

IBM product name	IBM machine type	IBM model (HVEC/XCC model in parentheses)	Brief product description	Brocade product name	Brocade product part number
Ethernet Switch B08R	4003	R08	7U modular Ethernet switch with 8 interface slots	BigIron RX-8	BI-RX-8-AC
Ethernet Switch B16R	4003	R16	14U modular Ethernet switch with 16 interface slots	BigIron RX-16	BI-RX-16-AC-A
Ethernet Switch B08S	4003	S08	6U modular Ethernet switch with 8 interface slots	FastIron SX 800	FI-SX800-AC
Ethernet Switch B16S	4003	S16	14U modular Ethernet switch with 16 interface slots	FastIron SX 1600	FI-SX1600-AC
Ethernet Switch B24X	4002	X2A (4002AX2)	1U Ethernet switch with twenty-four 10/1 GbE SFP+/SFP ports plus four 10/100/1000 MbE RJ45 ports	TurboIron 24X	TI-24X-AC
Ethernet Switch B24C (C)	4002	C2A (4002AC2)	1U Ethernet switch with twenty-four 10/100/1000 MbE RJ45 ports including four combination 100/1000 MbE SFP ports and one module slot for optional 2-port 10 GbE XFP module	NetIron CES 2024C	NI-CES-2024C-AC
Ethernet Switch B24C (F)	4002	C2B (4002BC2)	1U Ethernet switch with twenty-four 100/1000 MbE SFP ports including four combination 10/100/1000 MbE RJ45 ports and one module slot for optional 2-port 10 GbE XFP module	NetIron CES 2024F	NI-CES-2024F-AC
Ethernet Switch B48C (C)	4002	C4A (4002AC4)	1U Ethernet switch with forty-eight 10/100/1000 MbE RJ45 ports including four combination 100/1000 SFP ports	NetIron CES 2048C	NI-CES-2048C-AC
Ethernet Switch B48C (F)	4002	C4B, (4002BC4)	1U Ethernet switch with forty-eight 100/1000 MbE SFP ports	NetIron CES 2048F	NI-CES-2048F-AC
Ethernet Switch B50C (C)	4002	C5A, (4002AC5)	1U Ethernet switch with forty-eight 10/100/1000 MbE RJ45 ports plus two 10 GbE XFP ports	NetIron CES 2048CX	NI-CES-2048CX-AC
Ethernet Switch B50C (F)	4002	C5B, (4002BC5)	1U Ethernet switch with forty-eight 100/1000 MbE SFP ports plus two 10 GbE XFP ports	NetIron CES 2048FX	NI-CES-2048FX-AC

Table 1. Comparable IBM and Brocade products. (continued)

IBM product name	IBM machine type	IBM model (HVEC/XCC model in parentheses)	Brief product description	Brocade product name	Brocade product part number
Ethernet Switch B48G	4002	G4A, (4002AG4)	1.5U Ethernet switch with forty-eight 10/100/1000 MbE RJ45 (PoE capable) ports including four combination 100/1000 MbE SFP ports and one module slot for optional 2-port 10 GbE (XFP or CX4) module	FastIron GS	FGS648P
Ethernet Switch B50G	4002	G5A, (4002AG5)	1.5U Ethernet switch with forty-eight 10/100/1000 MbE RJ45 (PoE capable) ports including four combination 100/1000 MbE SFP ports plus 2-port 10 GbE CX4 module supporting stacking	FastIron GS-STK	FGS648P-STK
Ethernet Switch B24Y (C)	4002	Y2A (4002AY2)	1U Ethernet switch with twenty-four 10/100/1000 MbE RJ45 ports and one module slot for either an optional 4-port 100/1000 MbE (SFP, works as combination ports) module or 4-port 10 GbE (SFP+) module. Port-to-non-port side airflow.	FastIron CX 624-E	FCX624-E
Ethernet Switch B48Y (C)	4002	Y4A (4002AY4)	1U Ethernet switch with forty-eight 10/100/1000 MbE RJ45 ports and one module slot for either an optional 4-port 100/1000 MbE (SFP, works as combination ports) module or 4-port 10 GbE (SFP+) module. Port-to-non-port side airflow.	FastIron CX 648-E	FCX648-E
Ethernet Switch B24Y (PoE)	4002	Y2B (4002BY2)	1U Ethernet switch with twenty-four 10/100/1000 MbE RJ45 ports including four combination 100/1000 MbE SFP ports, plus two dedicated 16 Gbps (CX4) ports for stacking and one module slot for optional 2-port 10 GbE (XFP) module.	FastIron CX 24S-HPOE	FCX624S-HPOE
Ethernet Switch B48Y (PoE)	4002	Y4B (4002BY4)	1U Ethernet switch with forty-eight 10/100/1000 MbE RJ45 ports including four combination 100/1000 MbE SFP ports, plus two dedicated 16 Gbps (CX4) ports for stacking and one module slot for optional 2-port 10 GbE (XFP) module.	FastIron CX 48S-HPOE	FCX648S-HPOE

Table 1. Comparable IBM and Brocade products. (continued)

IBM product name	IBM machine type	IBM model (HVEC/XCC model in parentheses)	Brief product description	Brocade product name	Brocade product part number
Ethernet Switch B24Y (C)	4002	Y2C (4002CY2)	1U Ethernet switch with twenty-four 10/100/1000 MbE RJ45 ports and one module slot for either an optional 4-port 100/1000 MbE (SFP, works as combination ports) module or 4-port 10 GbE (SFP+) module. Non-port to port side airflow.	FastIron CX 624-I	FCX624-I
Ethernet Switch B48Y (C)	4002	Y4C (4002CY4)	1U Ethernet switch with forty-eight 10/100/1000 MbE RJ45 ports and one module slot for either an optional 4-port 100/1000 MbE (SFP, works as combination ports) module or 4-port 10 GbE (SFP+) module. Non-port to port side airflow.	FastIron CX 648-I	FCX648-I

Accessibility features for the IBM y-series of Ethernet switches

Accessibility features help users who have a disability, such as restricted mobility or limited vision, to use information technology products successfully.

Accessibility features

Use and operation of this device is accomplished primarily through external devices which may provide different accessibility features.

The following list includes the major accessibility features in the product either directly or through external devices or interfaces:

- Keyboard-only operation
- Interfaces that are commonly used by screen readers
- Keys that are discernible by touch but do not activate just by touching them
- Industry-standard devices for ports and connectors
- The attachment of alternative input and output devices

Keyboard navigation

This product uses standard Microsoft® Windows® navigation keys.

Vendor software

These products include certain vendor software that is not covered under the IBM license agreement. IBM makes no representation about the accessibility features of these products. Contact the vendor for the accessibility information about its products.

Related accessibility information

You can view the publications for these products in Adobe Portable Document Format (PDF) using the Adobe Acrobat Reader. The PDFs are provided on a CD that is packaged with the product. An accessible HTML version of this document is also included on the documentation CD for this product.

IBM and accessibility

See the IBM Human Ability and Accessibility Center for more information about the commitment that IBM has to accessibility: www.ibm.com/able.

Getting help

For the latest version of your product documentation, visit the web at www.ibm.com/shop/publications/order. Search by form number or title.

For more information about this and other IBM products, visit the IBM web site: www.ibm.com/

For support information for this product and other IBM products, see the following Web site: www.ibm.com/systems/support/. Select the product family, and follow the web navigation to your specific product. To go directly to support pages for the IBM Systems networking products, see www.ibm.com/systems/support/networking.

For operating system release notes and access to software downloads, go to www.ibm.com/systems/support/networking. From the displayed page, select your product, then select **Download**. On the displayed page, in the **Recommended fix** section, click the release notes or firmware links. Follow the online instructions provided on the linked pages.

You can also contact IBM within the United States at 1-800-IBMSERV (1-800-426-7378). For support outside the United States, you can find the service number at: www.ibm.com/planetwide/.

Visit www.ibm.com/contact for the contact information for your country or region.

Taiwan Contact Information

IBM Taiwan Product Service Contact Info:
IBM Taiwan Corporation
3F, No 7, Song Ren Rd., Taipei Taiwan
Tel: 0800-016-888

台灣IBM 產品服務聯絡方式：
台灣國際商業機器股份有限公司
台北市松仁路7號3樓
電話：0800-016-888

How to send your comments

Your feedback is important in helping us provide the most accurate and high-quality information. If you have comments or suggestions for improving this document, send us your comments by e-mail to starpubs@us.ibm.com.

Be sure to include the following:
- Exact publication title
- Publication form number (for example, GC26-1234-02)
- Page, table, or illustration numbers
- A detailed description of any information that should be changed

Audience

This document is designed for system administrators with a working knowledge of Layer 2 and Layer 3 switching and routing. If you are using a Layer 3 Switch, you should be familiar with the following protocols if applicable to your network – IP, RIP, OSPF, BGP, ISIS, IGMP, PIM, DVMRP, and VRRP.

Text formatting

This guide uses the following text formatting conventions to convey information:
- **Bold** text
    - Identifies command names
    - Identifies the names of user-manipulated GUI elements
    - Identifies keywords, such as menu items or window names
    - Identifies text to enter at the GUI or CLI
- *Italic* text
    - Provides emphasis
    - Identifies variables
    - Identifies document titles
- `code` text identifies CLI output

For readability, command names in the narrative portions of this guide are presented in bold: for example, show version. In actual examples, commands are often all lowercase. Otherwise, this manual specifically notes those cases in which a command is case sensitive.

Chapter 1. Product overview

This guide describes the IBM y-series of Ethernet switches and includes procedures for installing the hardware, and configuring essential basic parameters such as permanent passwords and IP addresses. This guide also includes instructions for managing and maintaining the hardware. The term y-series is used to distinguish these Ethernet/IP switch models from other IBM Ethernet and IP router and switch products. Through the remainder of this publication, these products will be referred to generally as *switches*, by individual model names when necessary, and as y-series switches when needed to distinguish from other switch product series.

IBM y-series of Ethernet switches

IBM y-series of Ethernet switches provide high 10/100/1000 Mbps port density and available 10 Gbps Ethernet uplinks in a compact form factor. All y-series models support Layer 2 and Enterprise Layer 3 protocols. Enterprise Layer 3 includes support for IPv4 unicast RIP and OSPF and IPv4 multicast PIM.

This section describes the physical characteristics of the IBM y-series of Ethernet switches. For more details about physical dimensions, power supply specifications, and pinouts, refer to Chapter 5, "Hardware specifications," on page 49.

Note: Not all y-series models are available in all markets.

The IBM y-series of Ethernet switches includes the following models:
- The 4002-Y2A has twenty-four 10/100/1000 MbE RJ45 ports. The front panel has one module slot for an optional 4-port 10/100/1000 MbE SFP module that operates as combination (Combo) ports or a 4-port 10 GbE SFP+ module. Two rear power supply receptacles allow for up to two 210 W power supply units ("-E" versions). These switches support port to non-port side (front to back) airflow.
- The 4002-Y4A) has forty-eight 10/100/1000 MbE RJ45 ports. The front panel has one module slot for an optional 4-port 10/100/1000 MbE SFP module that operates as combination (Combo) ports or a 4-port 10 GbE SFP+ module. Two rear power supply receptacles allow for up to two 210 W power supply units ("-E" versions). These switches support port to non-port side (front to back) airflow.
- The 4002-Y2B) has twenty 10/100/1000 MbE RJ45 ports plus four combination (Combo) ports which include four 10/100/1000 MbE RJ45 ports and four 100/1000 MbE SFP ports. The RJ45 ports support Power over Ethernet Plus (PoE+). Two dedicated 16 Gbps CX4 ports on the rear panel allow stacking for up to eight units. The front panel also has one module slot for an optional 2-port 10 GbE XFP module. Two rear power supply receptacles allow for up to two 620 W power supply units. Airflow is from the left side to right side (when facing the port side of the switch).
- The 4002-Y4B has forty-four 10/100/1000 MbE RJ45 ports plus four combination (Combo) ports which include four 10/100/1000 MbE RJ45 ports and four 100/1000 MbE SFP ports. The RJ45 ports support Power over Ethernet Plus (PoE+). Two dedicated 16 Gbps CX4 ports on the rear panel allow stacking for up to eight units. The front panel also has one module slot for an optional 2-port

10 GbE XFP module. Two rear power supply receptacles allow for up to two 620 W power supply units. Airflow is from the left side to right side (when facing the port side of the switch).

- The 4002-Y2C has twenty-four 10/100/1000 MbE RJ45 ports. The front panel has one module slot for an optional 4-port 10/100/1000 MbE SFP module that operates as combination (Combo) ports or a 4-port 10 GbE SFP+ module. Two rear power supply receptacles allow for up to two 210 W power supply units ("-I" versions). These switches support non-port to port side (back to front) airflow.

- The 4002-Y4C) has forty-eight 10/100/1000 MbE RJ45 ports. The front panel has one module slot for an optional 4-port 10/100/1000 MbE SFP module that operates as combination (Combo) ports or a 4-port 10 GbE SFP+ module. Two rear power supply receptacles allow for up to two 210 W power supply units ("-I" versions). These switches support non-port to port side (back to front) airflow.

All devices contain two management interfaces: a DB9 serial port (Console) and a 10/100/1000 MbE RJ45 (Out-of-band) management port.

The following figures show the front and rear panels of the y-series models. For more information about Combo ports, see "Combination ports" on page 4. For more information about control features in general, see "Control features" on page 3.
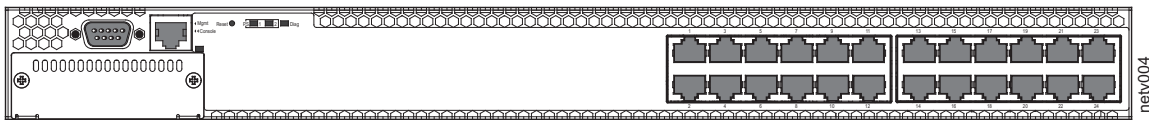
Figure 1. 4002-Y2A and Y2C front panel
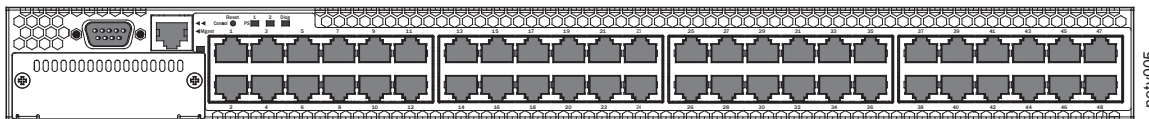
Figure 2. 4002-Y4A and Y4C front panel

Figure 3. 4002-Y2B front panel
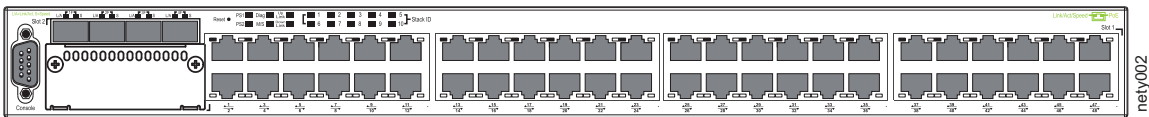
Figure 4. 4002-Y4B front panel
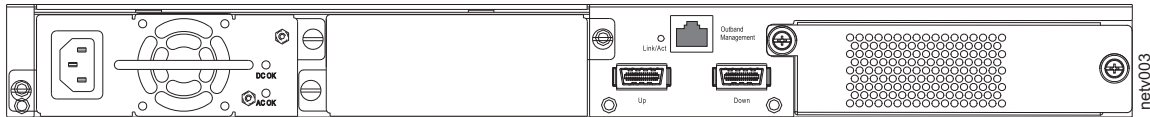
Figure 5. 4002-Y2B and 4002-Y4B rear panel
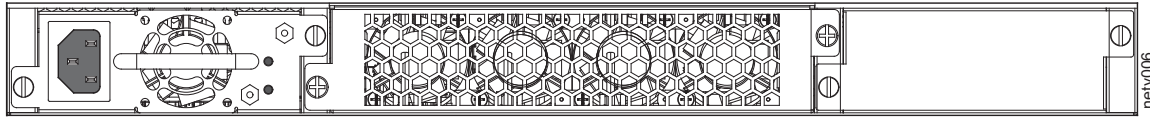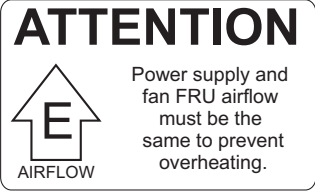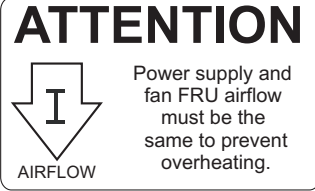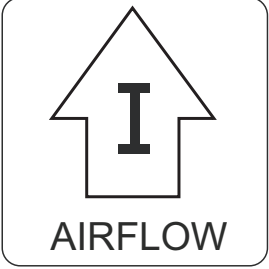
Figure 6. 4002-Y2A, Y4A, and Y2C and Y4C rear panels

CAUTION:

For the 4002-Y2A, Y4A, Y2C, and Y4C devices, be sure that the airflow direction of the power supply unit matches that of the installed resilient quad-fan tray. The power supplies and fan trays for the Y2A and Y4A models are labeled with an arrow with an "E", power supplies and fan trays for the Y2C and Y4C models are labeled with an arrow with an "I" as shown in Table 2.

Table 2. Power supply and fan tray labels for 4002-Y2A,Y4A, Y2C, and Y4C devices

Devices	Label on required power supply	Label on required fan tray
4002-Y2A and 4002-Y4A	4002-Y2A and Y4A power supply airflow label	4002-Y2A and Y4A fan tray airflow label
4002-Y2C and 4002-Y4C	4002-Y2C and Y4C power supply airflow label	4002-Y2C and Y4C fan tray airflow label

Control features

Each device front panel includes the following control features:

- Serial management interface (the DB9 port labeled **Console**)
- Out-of-band 10/100/1000 MbE RJ45 management interface

Serial management interface (DB9 Console port)

The serial management interface allows you to configure and manage the device using a third-party terminal emulation application on a directly-connected PC. A straight-through EIA or TIA DB9 serial cable ships with the device. The serial management interface (DB9 **Console** port) is located on the left side of the front panel.

Out-of-band 10/100/1000 MbE RJ45 management interface

The out-of-band 10/100/1000 MbE RJ45 management interface enables you to configure and manage the device on an Ethernet management network. The device can be managed using a variety of methods including the CLI via Telnet or SSH, using the web-based GUI via HTTP/HTTPS, and 3rd party SNMP applications such as IBM Systems Director.

Note: This port interfaces with the CPU only and not the data plane.

Network interfaces for 4002-Y2B and 4002-Y4B

The 4002-Y2B and 4002-Y4B models contain the following interfaces:

- 10/100/1000 MbE ports with RJ45 copper connectors
- 100/1000 MbE ports with mini-GBIC slots for MSA-compliant SFP transceivers
- Optional 2-port 10 GbE XFP module
- 16/10 Gbps CX4 ports

Network interfaces for 4002-Y2A, Y4A, Y2C, and Y4C

The 4002-Y2A ,Y4A, Y2C, and Y4C models contain the following interfaces:

- 10/100/1000 ports with RJ45 copper connectors
- 100/1000 ports with mini-GBIC slots for MSA-compliant SFP transceivers
- Optional 4-port 100/1000 MbE SFP module
- Optional 4-port 10 GbE SFP+ module

IBM y-series 10/100/1000 BASE-T ports: The RJ45 ports operate at 10 Mbps or 100 Mbps, half or full duplex, or at 1000 Mbps, full duplex. Because all ports support automatic MDI or MDI-X operation, you can use straight-through cables for all network connections to PCs or servers, or to other switches or hubs. In addition, it is ideal and preferred to use straight-through cable for switch-to-switch connections.

Each of these ports supports auto-negotiation, so the optimum transmission mode (half or full duplex), and the data rate (10, 100, or 1000 Mbps) can be selected automatically. If a device connected to one of these ports does not support auto-negotiation, the communication mode of the port can be configured manually.

Combination ports: The y-series devices can contain four combination ports, which are four Small Form Factor Pluggable (SFP) network interfaces (1F~4F) that are shared with four of the RJ45 ports (ports 1~4). In the default configuration, if an SFP transceiver is installed in a slot and has a valid link on its port, the associated RJ45 port is disabled and cannot be used. The switch can also be configured to force the use of a combination RJ45 port or SFP slot, as required.

Note: The 4002-Y2A, Y4A, Y2C, and Y4C devices do not ship with SFP ports. You can install an optional 4-port 10/100/1000 MbE SFP module which operate as combination ports, or an optional 4-port 10 GbE SFP+ module which

operates as uplinks to support optical connectivity.
The 4002-Y2B and 4002-Y4B models contain four combination ports on the base device.

Slot designations: Table 3 lists the slot designations for y-series models.

Table 3. Stack unit slots for y-series devices

Device	Slot 1	Slot 2	Slot 3
4002-Y2A and 4002-Y2C	Twenty-four 10/100/1000 MbE RJ45 ports. Also the ports on the optional 4-port 100/1000 MbE SFP module which act as Combo ports with the first four 10/100/100 MbE RJ45 ports.	(Optional) Ports on the 4-port 10 GbE SFP+ module	N/A
4002-Y4A and 4002-Y4C	Forty-eight 10/100/1000 MbE RJ45 ports. Also the ports on the optional 4-port 100/1000 MbE SFP module which act as Combo ports with the first four 10/100/100 MbE RJ45 ports.	(Optional) Ports on the 4-port 10 GbE SFP+ module	N/A
4002-Y2B	Twenty-four 10/100/1000 MbE RJ45 ports plus the four 100/1000 MbE SFP ports which act as Combo ports with the first four 10/100/100 MbE RJ45 ports.	Two 16/10 Gbps CX4 ports on rear panel	(Optional) Ports on the 2-port 10 GbE XFP module
4002-Y4B devices with optional four-port 10 Gbps SFP+ module	Forty-eight 10/100/1000 MbE RJ45 ports plus the four 100/1000 MbE SFP ports which act as Combo ports with the first four 10/100/100 MbE RJ45 ports.	Two 16/10 Gbps CX4 ports on rear panel	(Optional) Ports on the 2-port 10 GbE XFP module

SFP interfaces

Table 4 describes the network interfaces on y-series devices.

Table 4. SFP network interfaces

Interface	Show Media Description
1000Base-BX-D	M-GBXD
1000Base-BX-U	M-GBXU
1000Base-LHA	M-LHA
1000Base-LHB	M-LHB
1000Base-LX	M-LX
1000Base-LH	M-LH
1000Base-SX	M-SX
1000Base-SX2	M-SX2
1000Base-T	C
100Base-T	C**
10Base-T	C**
100Base-BX	M-FBX

Table 4. SFP network interfaces (continued)

Interface	Show Media Description
100Base-FX	M-FX

Optional two-port 10 Gbps XFP uplink module

The 4002-Y2B and 4002-Y4B devices include a slot on the front panel for a two-port 10 Gbps XFP uplink module. This module operates at 10 Gbps full duplex.

The two 10 Gbps ports on this module can also be configured to support stacking using the interface level CLI command, **default-port**. See the *FastIron Configuration Guide* for additional information.

Note: The two-port 10 Gbps XFP uplink module is hot-swappable but requires a reload for the ports to be discovered.
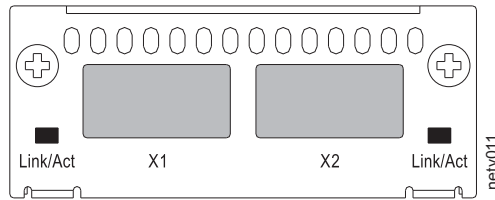
Figure 7. Two-port 10 Gbps XFP module

Table 5. 10 Gbps XFP module port status LEDs

LED	Condition	Status
Link or Act LED (Link or Activity)	On or flashing Green	Port has a valid link at 10 Gbps. Flashing indicates activity.
	Off	The link is down.

Optional four-port 100/1000 Mbps SFP and 10 Gbps SFP+ modules

The 4002-Y2A Y4A, Y2C, and Y4C devices include a slot on the front panel for a four-port 100/1000 Mbps SFP module, or a four-port 10 Gbps SFP+ module. The 100/1000 Mbps SFP module operates at 100 Mbps full duplex and 1000 Mbps full duplex, and the 10 Gbps SFP+ module operates at 10 Gbps full duplex.

These devices can be used in a y-series stack by installing the optional 10 Gbps SFP+ module, and connecting devices using standard fiber cables. These devices cannot be combined in a stack with non-y-series devices. For detailed information about how to configure y-series devices in an IronStack topology, see the *FastIron Configuration Guide*.

Note: The four-port 1 Gbps SFP and 10 Gbps SFP+ modules are not hot-swappable.
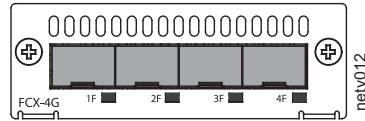
Figure 8. Four-port 1 Gbps SFP module

Table 6. Four-port 1 Gbps SFP module status LEDs

LED	Condition	Status
Link or Act LED (Link or Activity)	On or flashing Green	The SFP port has established a valid 100/1000 Mbps link. Flashing indicates the port is transmitting and receiving user packets.
	Off	A link is not established with a remote port.

Figure 9. Four-port 10 Gbps SFP+ module

Table 7. Four-port 10 Gbps SFP+ module status LEDs

LED	Condition	Status
Link or Act LED (Link or Activity)	On or flashing Green	The SFP+ port has established a valid 10 Gbps link. Flashing indicates the port is transmitting and receiving user packets.
	Off	A link is not established with a remote port.

Note: The two left ports (ports <stack id>/2/1 and <stack id>/2/2) on the four-port 10 Gbps SFP+ module do not pass regular Ethernet traffic by default. If you want all four ports on the four-port 10 Gbps SFP+ module to pass regular traffic, the global CLI command, **stack disable**, must be configured on the device to disable stacking. For more information, see the *FastIron Configuration Guide*.

16/10 Gbps Ethernet CX4 stacking ports

The 4002-Y2B and 4002-Y4B devices include two 16/10 Gbps Ethernet CX4 ports on the rear panel. The device can perform data transmission directly through copper links of up to 3 meters.

These CX4 ports are configured by default as 16 Gbps stacking ports which can connect to other 4002-Y2B and 4002-Y4B devices in a stack of up to eight members. Stacking simplifies deployment, management, and allows for data traffic to traverse over these high-speed stack links. The CX4 ports can also be configured to operate as 10 Gbps Ethernet ports by either disabling stacking on the device (**stack disable**) or configuring other ports to be the default stack ports (**default-ports**), and then setting the speed-duplex settings to 10 Gbps (**speed-duplex**). See the *FastIron Configuration Guide* for additional details on stacking and configuration.

The Up Link and Down Link LEDs on the front panel indicate operational status. If the **Up Link** or **Down Link** LED is on, the port is connected. If the **Up Link** or **Down Link** LED is off, no connection exists, or the link is down.

Cable specifications for CX4 stacking ports: The following cable specifications apply to the CX4 stacking ports:

- Support for 802.3ak or 10 Gbps Ethernet CX4 standard and 16 Gbps inter-unit stacking (up to 8 units in a stack)
- Support for cables up to 3 meters in length
- Requires latch-style receptacle or SFF-8470 plug

Note: 4002-Y2A and 4002-Y4A devices can inter-operate in a stack with the 4002-Y2B and 4002-Y4B devices by installing and configuring the optional 10 GbE modules on each device. See "Connecting devices in a stack" on page 19 and the *FastIron Configuration Guide* for additional information.

Port, system, and power status LEDs for the 4002-Y2B and 4002-Y4B

The 4002-Y2B and 4002-Y4B switches include a display panel for key system and port indicators that simplifies installation and network troubleshooting. The LEDs, which are located on the front panel for easy viewing, are shown below and described in the following tables.
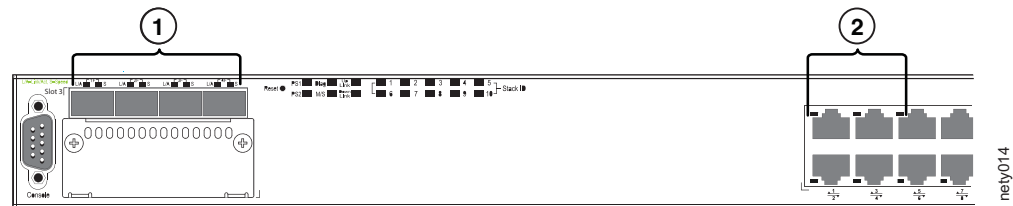
Figure 10. Port status LEDs

| **1** | RJ45 port status LEDs | **2** | SFP port status LEDs |

Table 8. Port status LEDs

LED	Condition	Status
Ethernet (1~24/48) Link or Activity or Speed	On/Flashing Green	The port has established a valid link at 1000 Mbps. Flashing indicates the port is transmitting and receiving user packets.
	On/Flashing Amber	The port has established a valid link at 10 or 100 Mbps. Flashing indicates the port is transmitting and receiving user packets.
	Off	A link is not established with a remote port.
HPoE (1~24/48)	On Green	The port is providing HPoE power to a connected device.
	Off	The port is not providing HPoE power.
SFP (1F~4F) Link or Activity	On/Flashing Green	The SFP port has established a valid link. Flashing indicates the port is transmitting and receiving user packets.
	Off	A link is not established with a remote port.
SFP (1F~4F) Speed	On Green	The SFP port is operating at 1000 Mbps.
	On Amber	The SFP port is operating at 100 Mbps.
	Off	A link is not established with a remote port.
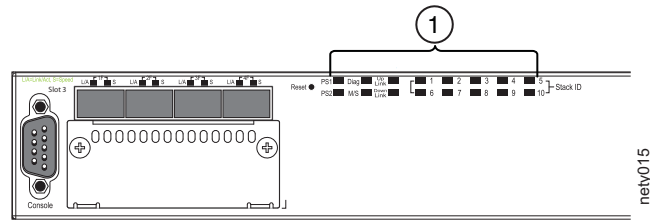
Figure 11. System status LEDs

1   System status LEDs

Table 9. System status LEDs

LED	Condition	Status
PS1 PS2 (Power Supply Status)	Green	Power supply is operating normally.
	Amber	Power supply fault.
	Off	Power off or failure.
Diag (Diagnostic)	Flashing Green	System self-diagnostic test in progress.
	Green	System self-diagnostic test successfully completed.
	Amber	System self-diagnostic test has detected a fault. (Blower, thermal or any interface fault.)
A or S (Active or Standby)	Green	"A" green device is the active controller for the stack. "S" green device is the standby controller for the stack.
	Flashing Green	Flashing device is the active controller for the stack, system is initializing.
	Amber	Device is operating as a stack member in the stack.
	Flashing Amber	System is in active controller arbitration or election state.
	Off	System in standalone mode.
Up Link or Down Link (Stacking uplink or downlink port status)	Green	Uplink operating normally.
	Off	Uplink has failed or no link.
Stack ID (1-8)	Green	Indicates the device stack ID.
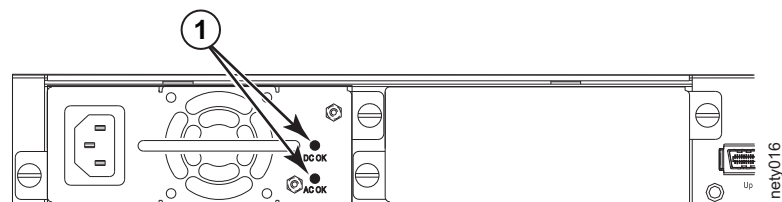
Figure 12. Power status LEDs

Table 10. Power status LEDs

LED	Condition	Status
DC OK	Green	DC output ok
	Red	DC output fail
AC OK	Green	AC input ok
	Off	AC input fail

Note: Both "AC OK" and "DC OK" LEDs must be green for the device to function normally.

Table 11. Switch status for two installed power supply units

State	LED	PSU1	PSU2	Switch Status	Load Sharing	HPoE Budget (HPoE models only)
Four Green PSU LEDs	AC OK	Green	Green	Running	Yes	820W
	DC OK	Green	Green			
Single Red `DC OK' LED	AC OK	Green	Green	Running	No	410W
	DC OK	Green	Red			
Both `DC OK' LEDs Red	AC OK	Green	Green	Failure	No	None
	DC OK	Red	Red			
One PSU with both `AC OK' `DC OK' LEDs Off	AC OK	Green	Off	Running	No	410W
	DC OK	Green	Off			
`DC OK' LEDs Red and Off	AC OK	Green	Off	Failure	No	None
	DC OK	Red	Off			
All `AC OK' LEDs Off	AC OK	Off	Off	Power Off or Failure	No	None
	DC OK	Off	Off			

Note: When two 620W power supplies are installed in an PoE system that has no load or light load on the PoE function, one of two power supplies may have its "DC OK" LED light red. There is no fault in the power supply or the system and the switch is functioning normally. The LED will turn to green automatically once the load is increased over the minimum load requirement. In configurations with a single power supply installed the "DC OK" LED will light green in a no-load or light-load condition.

Port, system, and power status LEDs for the 4002-Y2A, Y4A, Y2C, and Y4C

The 4002-Y2A, Y4A, Y2C, and Y4C switches include a display panel for key system and port indicators that simplifies installation and network troubleshooting. The LEDs, which are located on the front panel for easy viewing, are shown below and described in the following tables.
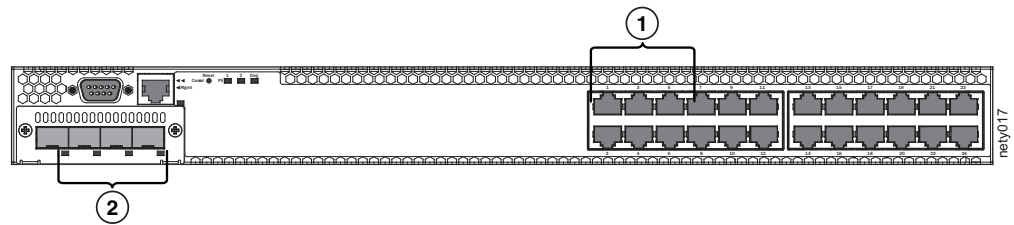
Figure 13. Port status LEDs

| 1 | | RJ45 port status LEDs | 2 | | SFP or SFP+ port status LEDs |

Table 12. Port status LEDs

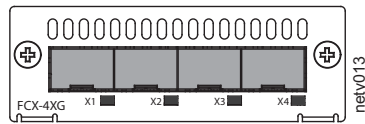| LED	Condition	Status
Ethernet (1~24/48) Link or Activity or Speed	On/Flashing Green	The port has established a valid link at 10/100/1000 Mbps. Flashing indicates the port is transmitting and receiving user packets.
	Off	A link is not established with a remote port.
SFP (1F~4F) Link or Activity	On/Flashing Green	The SFP port has established a valid 100/1000 Mbps link. Flashing indicates the port is transmitting and receiving user packets.
	Off	A link is not established with a remote port.
SFP+ (1F~4F) Link or Activity	On/Flashing Green	The SFP+ port has established a valid 10 Gbps link. Flashing indicates the port is transmitting and receiving user packets.
	Off	A link is not established with a remote port.

Figure 14. System status LEDs

| 1 | | System status LEDs |

Table 13. System status LEDs

LED	Condition	Status
PS1 PS2 (Power Supply Status)	Green	Power supply is operating normally. It is installed properly and the power cord is attached to a power source.
	Amber	Power supply fault. The power supply may not be installed properly.
	Off	Power off or failure.

Table 13. System status LEDs (continued)

LED	Condition	Status
Diag (Diagnostic)	Flashing Green	System self-diagnostic test in progress.
	Green	System self-diagnostic test successfully completed.
	Amber	System self-diagnostic test has detected a fault. (Blower, thermal or any interface fault.)
Out-of-band Management Link or Activity	On/Flashing Green	The port has established a valid link at 10/100/1000 Mbps. Flashing indicates the port is transmitting and receiving user packets.
	Off	A link is not established with a remote port.
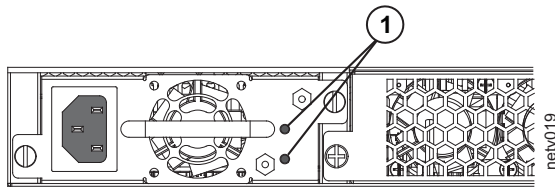
Figure 15. Power status LEDs

1   Power status LEDs

Table 14. Power status LEDs

LED	Condition	Status
DC OK	Green	DC output ok
	Red	DC output fail
AC OK	Green	AC input ok
	Off	AC input fail

Note: Both "AC OK" and "DC OK" LEDs must be green for the device to function normally.

Table 15. Switch status for two installed power supply units

State	LED	PSU1	PSU2	Switch Status	Redundancy
Four green PSU LEDs	AC OK	Green	Green	Running	Yes
	DC OK	Green	Green		
Single red `DC OK' LED	AC OK	Green	Green	Running	No
	DC OK	Green	Red		
Both `DC OK' LEDs red	AC OK	Green	Green	Failure	No
	DC OK	Red	Red		
One PSU with both `AC OK' `DC OK' LEDs off	AC OK	Green	Off	Running	No
	DC OK	Green	Off		
`DC OK' LEDs red and off	AC OK	Green	Off	Failure	No
	DC OK	Red	Off		

Table 15. Switch status for two installed power supply units (continued)

State	LED	PSU1	PSU2	Switch Status	Redundancy
All `AC OK' LEDs off	AC OK	Off	Off	Power off or failure	No
	DC OK	Off	Off		

Power supplies

The y-series switches have two power receptacles on the rear panel. Each device ships with one power supply unit (PSU) installed. The 4002-Y2A, Y4A, Y2C, and Y4C devices use a 210W PSU. The 4002-Y2B and 4002-Y4B devices use a 620W PSU.

Note: The 4002-Y2A and 4002-Y4A power supplies have an arrow with an "E" to indicate airflow from port side to non-port side (front to back). The 4002-Y2C and 4002-Y4C power supplies have an arrow with an "I" to indicate airflow from non-port side to port side (back to front). These power supplies must be matched with fan trays that also have the same corresponding "E" and "I" arrows on them (see Table 2 on page 3).

Each power supply has one standard (IEC-C14 inlet) power receptacle for the AC power cable, and AC and DC status LEDs for easy monitoring and troubleshooting.

A secondary power supply can be installed to provide backup power in case of a failure and for load-balancing when both power suppies are operational. Load-balancing gives the power supplies a longer life span. Both 210W and 620W PSUs are hot-swappable.

For instructions on installing and replacing a power supply refer to "Installing or replacing a power supply unit" on page 23. For information on LED status refer to Table 10 on page 10.
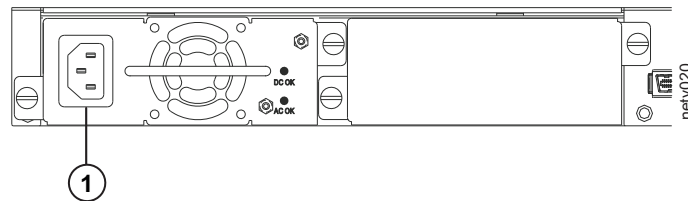
Figure 16. 4002-Y2B and 4002-Y4B AC power supply receptacle

1　　　　　AC power receptacle
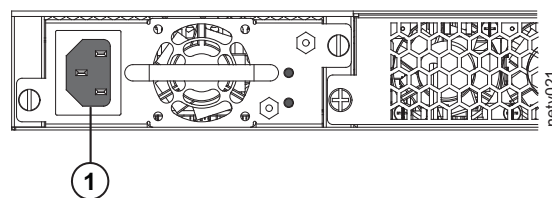
Figure 17. 4002-Y2A, Y4A, Y2C, and Y4C AC power supply receptacle

| 1 | AC power receptacle |

Power supply unit operation

When only one PSU is installed, both "AC OK" and "DC OK" LEDs on the installed PSU must be green for the y-series device to function normally.

When two PSUs are installed, both "AC OK" and "DC OK" LEDs for one of the installed PSUs must be green for the y-series device to function normally.

Power over Ethernet power supplies

The 4002-Y2B and 4002-Y4B devices use a 620W PSU. When one PSU is powering the switch, the PoE budget is 410W. If both PSUs are installed and powering the switch, each PSU provides 410W to the switch, increasing the PoE budget to 820W.

Chapter 2. Installing a y-series switch

Installation precautions

Attention: The procedures in this manual are intended for qualified service personnel.

Attention: Before beginning the installation, refer to the safety information in "Safety notices" on page ix.

Unpacking the device

The y-series devices ship with all of the items listed below. Verify the contents of your shipping container. If any items are missing, please contact your IBM representative.

Package contents

The following items are included in your shipping carton:

- y-series device
- rack mount brackets
- warranty
- printed documentation and CD-ROM
- a straight-through EIA or TIA DB-9 serial cable (F/F). If you prefer to build your own cable, see the pinout information in "Attaching a PC or terminal" on page 22
- four rubber feet
- 0.5 m CX4 cable (4002-Y2B and 4002-Y4B) devices only

General requirements

To manage the system, you need a management station, such as a PC running a terminal emulation application. Connect the management station to the Console serial port on the switch.

Use the serial connection to perform basic configuration tasks, including assigning an IP address and network mask to the system. This information is required to manage the system using the Web management interface, IronView Network Manager, or using the CLI through Telnet.

Installation tasks

Follow the steps listed in Table 16 to install your device. Details for each of these steps are provided on the pages indicated.

Table 16. Installation tasks

Task Number	Task	Where to Find More Information
1	Ensure that the physical environment that will host the device has the proper cabling and ventilation.	"Preparing the installation site" on page 16

Table 16. Installation tasks (continued)

Task Number	Task	Where to Find More Information
2	Install any required optional modules into the switch.	• "Installing an optional module on the 4002-Y2B and 4002-Y4B" on page 26 • "Installing an optional module on the 4002-Y2A, Y4A, Y2C, and Y4C" on page 27
3	Install the device on a desktop or in an equipment rack.	"Installing the device" on page 17
4	Once the device is physically installed, plug the device into a nearby power source that adheres to the regulatory requirements outlined in this manual.	"Powering on the system" on page 22
5	Attach a terminal or PC to the y-series device. This will enable you to configure the device through the **Command Line Interface (CLI)**.	"Attaching a PC or terminal" on page 22
6	No default password is assigned to the CLI. For additional access security, assign a password.	"Assigning permanent passwords" on page 29
7	Before attaching equipment to the device, you need to configure an interface IP address to the subnet on which it will be located. Initial IP address configuration is performed using the CLI with a direct serial connection. Subsequent IP address configuration can be performed using the Web management interface.	"Configuring IP addresses" on page 30
8	Once you power on the device and assign IP addresses, the system is ready to accept network equipment.	"Connecting network devices" on page 34
9	Test IP connectivity to other devices by pinging them and tracing routes.	"Testing connectivity" on page 38
10	Continue configuring the device using the CLI or the Web management interface. You also can use IronView Network Manager to manage the device.	*FastIron Configuration Guide*
11	Secure access to the device.	*FastIron Configuration Guide*

Preparing the installation site

Cabling infrastructure

Ensure that the proper cabling is installed at the site. Refer to "Cable specifications" on page 53 for a summary of supported cabling types and their specifications.

Installation location

Before installing the device, plan its location and orientation relative to other devices and equipment. Switches can be mounted in a standard 19-inch equipment rack that meets EIA-310D standards, or on a flat surface. Be sure to follow the guidelines below when choosing a location.

The site should meet the following requirements:

- Maintain temperatures within 0 to 40° C (32 to 104° F) and humidity levels within 5% to 95%, non-condensing.
- Allow a minimum of 7.6 cm (3 in.) of space between the sides and the back of the device and walls or other obstructions for proper air flow.

- Allow at least 7.6 cm (3 in.) of space at the front and back of the device for the twisted-pair, fiber-optic, and power cabling.
- Be accessible for installing, cabling, and maintaining the devices.
- Allow the status LEDs to be clearly visible.
- Allow for twisted-pair cable to be always routed away from power lines, fluorescent lighting fixtures and other sources of electrical interference, such as radios and transmitters.
- Allow for the unit to be connected to a separate grounded power outlet that provides 100 to 240 VAC, 50 to 60 Hz, is within 2 m (6.6 feet) of each device and is powered from an independent circuit breaker. As with any equipment, a filter or surge suppressor is recommended.

Installing the device

You can install y-series devices on a desktop or in an equipment rack.

Desktop installation
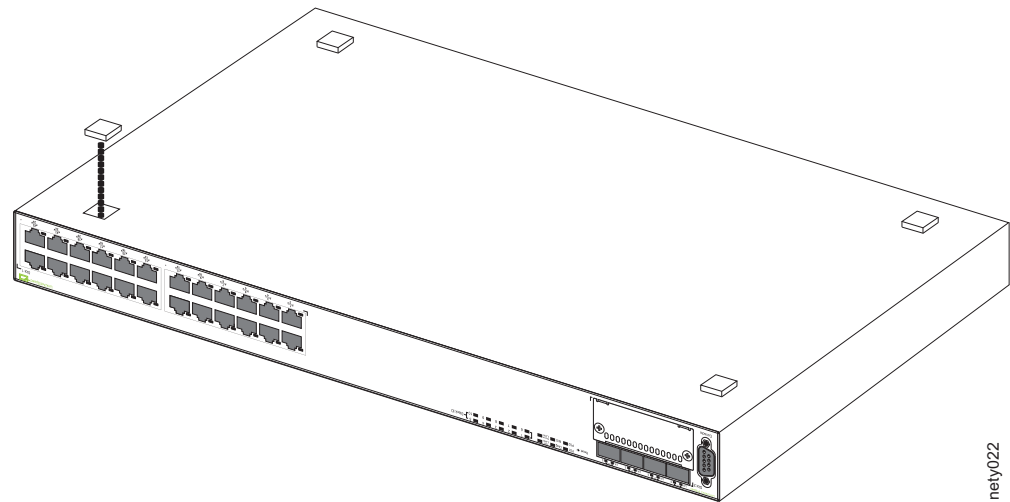
Figure 18. Attaching the adhesive feet

1. Attach the four rubber adhesive feet to the bottom of the first switch.
2. Set the device on a flat desktop, table, or shelf near an AC power source. Make sure that adequate ventilation is provided for the system. A 3 inch clearance is recommended on each side.
3. If installing a single switch only, refer to "Powering on the system" on page 22.
4. If installing multiple switches, attach the adhesive feet to each one. Place each device squarely on top of the one below, in any order.

Rack mount installation

Note: You need a #2 Phillips screwdriver for installation.

Before installing the switch in a rack, refer to "Rack installation" on page xvi for important safety information.

Before mounting the switch in a rack, pay particular attention to the following factors:

- Temperature: Since the temperature within a rack assembly may be higher than the ambient room temperature, check that the rack-environment temperature is within the specified operating temperature range. (Refer to "Displaying the temperature" on page 43.)
- Mechanical loading: Do not place any equipment on top of a rack-mounted unit.
- Circuit overloading: Be sure that the supply circuit to the rack assembly is not overloaded.
- Grounding: Rack-mounted equipment should be properly grounded. Particular attention should be given to supply connections other than direct connections to the mains.

Use the following steps to mount devices in rack.

1. Remove the rack mount kit from the shipping carton. The kit contains two L-shaped mounting brackets and mounting screws.
2. Attach the mounting brackets to the sides of the device as illustrated in Figure 19 and Figure 20.

   Note: 4002-Y2A, Y4A, Y2C, and Y4C device brackets are mounted using three screws, as shown in Figure 20.
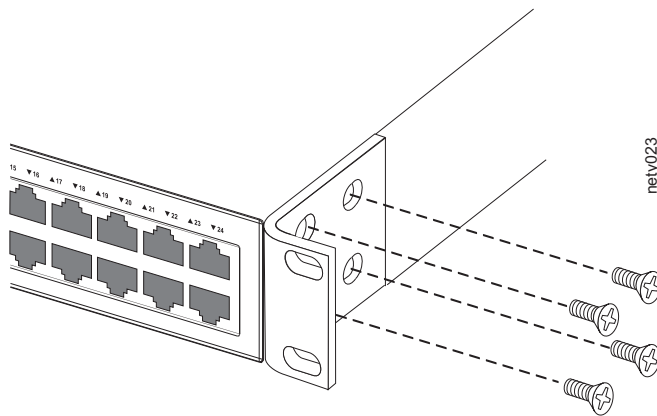
Figure 19. Attaching the brackets for 4002-Y2B and 4002-Y4B
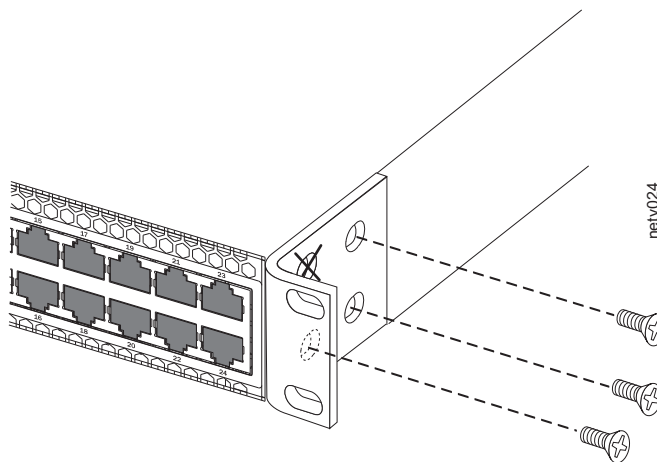
Figure 20. Attaching the brackets for 4002-Y2A, Y4A, Y2C, and Y4C

3. Attach the device in the rack as illustrated in Figure 21.
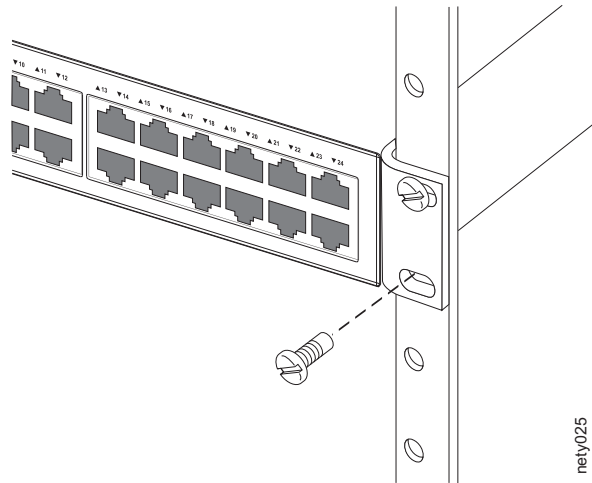
Figure 21. Installing the device in a rack

4. If installing only a single switch, proceed to "Powering on the system" on page 22.
5. If installing multiple switches, mount them in the rack, one below the other, in any order.

Connecting devices in a stack

4002-Y2B and 4002-Y4B devices

Figure 22 on page 20 shows how the stack cables are connected between switches in a stack. The connection is based on 16/10 Gbps Ethernet, using CX4 cables. y-series devices support linear and ring stack topologies and can also operate as standalone devices.

In a linear stack topology there is a single stack cable connection between each switch that carries two-way communications across the stack. In ring stack topology, an extra cable is connected between the top and bottom switches forming a "ring" or "closed-loop." The closed-loop cable provides a redundant path for the stack link, so if one link fails, stack communications can be maintained. Figure 22 on page 20 illustrates a ring-topology stacking configuration.

You can form a stack containing up to eight y-series units. To connect switches in a stack, do the following steps:

1. Plug one end of a stack cable into one of the CX4 stacking ports of the top unit.
2. Plug the other end of the stack cable into one of the stacking ports of the next unit.
3. Repeat steps 1 and 2 for each unit in the stack. Form a simple chain starting with a stacking port on the top unit and ending at a stacking port on the bottom unit (stacking up to eight units).
4. To form a ring stack topology, plug one end of a stack cable into the remaining stacking port on the bottom unit and the other end into the remaining stacking port on the top unit.
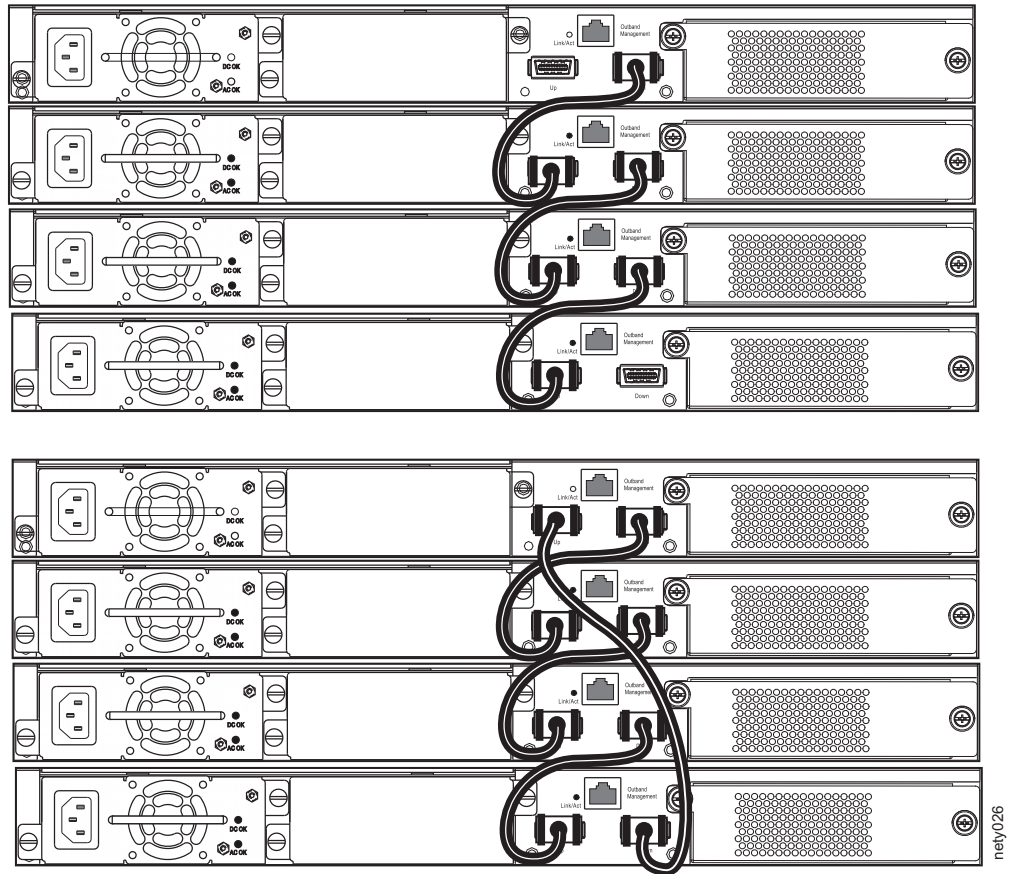
Figure 22. Connecting switches in linear (top) and ring (bottom) topology stacks

5. One device in the stack will operate as the Active Controller, one will operate as Standby Controller, with the rest of the units operating as stack members. For information about how to configure your stack, see the *FastIron Configuration Guide*.

4002-Y2A, Y4A, Y2C, and Y4C devices

Figure 23 on page 21 and Figure 24 on page 21 show how stacking cables are connected between 4002-Y2A, Y4A, Y2C, and Y4C devices in a stack. The connection is based on 10 Gbps SFP+ using LC-LC MM fiber cables. These devices support linear and ring stack topologies with the optional SFP+ modules installed, and can also operate in standalone mode.

Note: 4002-Y2A, Y4A, Y2C, and Y4C devices must have a 4-port 10 Gbps SFP+ module (optional) installed to operate in a stack.

You can form a stack containing up to 4002-Y2A, Y4A, Y2C, and Y4C units. The first two ports on the 4-port 10 GbE SFP+ module are pre-configured to support stacking.

Note: If you want to use all four ports on the four-port 10 Gbps SFP+ module to pass regular traffic the global CLI command, **stack disable**, must be configured on the device to disable stacking.

To connect switches in a stack, complete the following steps:

1. Plug one end of an LC-LC MM fiber cable into one of the SFP+ stacking ports of the top unit.
2. Plug the other end of the cable into one of the stacking ports of the next unit.
3. Repeat steps 1 and 2 for each unit in the stack. Form a simple chain starting with a stacking port on the top unit and ending at a stacking port on the bottom unit (stacking up to eight units). See Figure 23.
4. (Optional) To form a ring stack topology, plug one end of an LC-LC MM Fiber cable into the remaining stacking port on the bottom unit and the other end into the remaining stacking port on the top unit. See Figure 24.
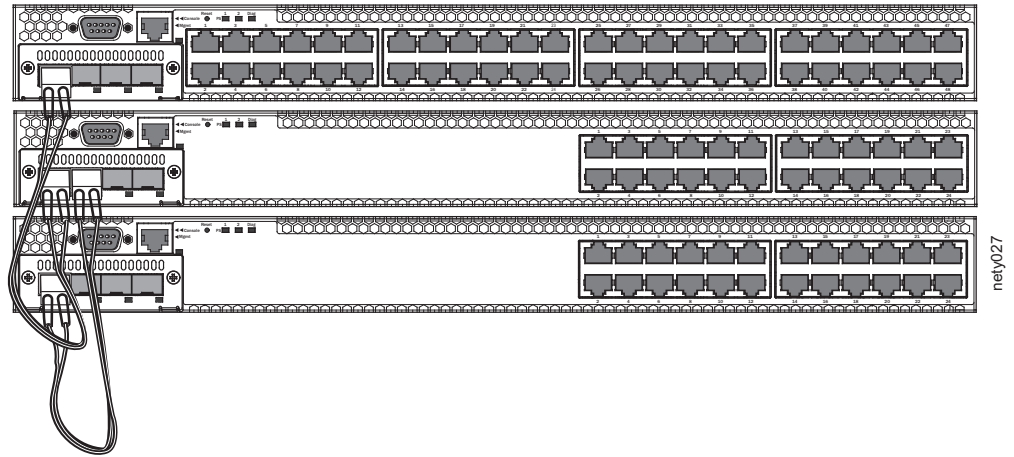
Figure 23. Connecting 4002-Y2A, Y4A, Y2C, and Y4C devices in a linear stack topology
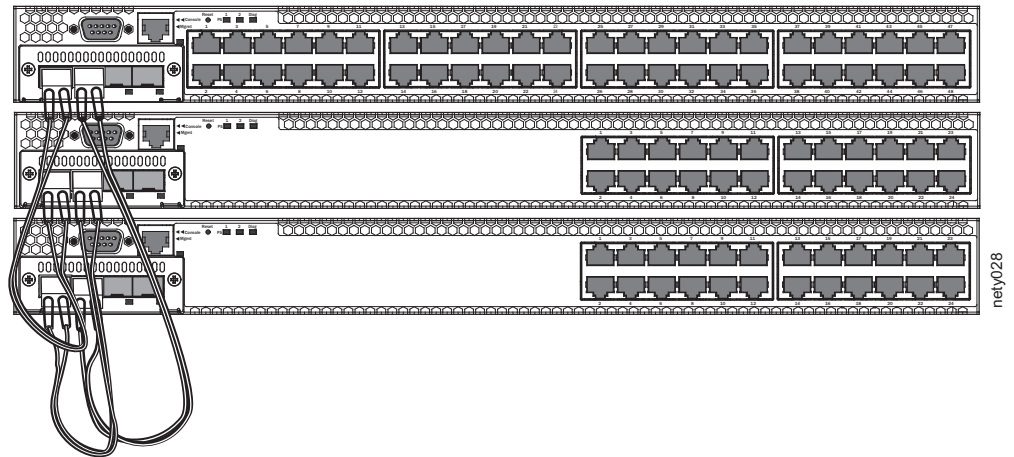
Figure 24. Connecting 4002-Y2A, Y4A, Y2C, and Y4C devices in a ring stack topology

The 4002-Y2A, Y4A, Y2C, and Y4C devices can also be stacked with the 4002-Y2B and 4002-Y4B devices. This requires installing the optional 2-port 10 GbE XFP module on the 4002-Y2B and 4002-Y4B. You will need to configure the ports on the 2-port 10 GbE XFP module to be stacking ports using the **default-ports** command. See the *FastIron Configuration Guide* for additional information.

Powering on the system

After you have completed the physical installation, you can power on the system.

1. Remove the power cable from the shipping package.
2. Attach the AC power cable to the AC connector on the rear panel.
3. Insert the power cable plug into a 10A 120V or 240V outlet.

Notes:

1. To turn the system off, simply unplug the power cable or cables.
2. The socket should be installed near the equipment and should be easily accessible.
3. If the outlet is not rated 10A 120V or 240V, stop and get the appropriate cable for the outlet.

Attaching a PC or terminal

To assign an IP address, you must have access to the *Command Line Interface (CLI)*. The CLI is a text-based interface that can be accessed through a direct serial connection to the device and through Telnet connections. The CLI is described in detail in the *FastIron Configuration Guide*.

Access the CLI by attaching a serial cable to the Console port. After you assign an IP address, you can access the system through Telnet, the Web management interface, or IronView Network Manager.

Use the following steps to attach a management station to the serial port.

1. Connect a PC or terminal to the serial port of the system using a straight-through cable. The serial port has a male DB-9 connector. See Figure 25.
2. On the PC, launch a terminal emulation program and set the following session parameters:
   - Baud: 9600 bps
   - Data bits: 8
   - Parity: None
   - Stop bits: 1
   - Flow control: None

The EIA or TIA 232 serial communication port serves as a connection point for management by a PC or SNMP workstation. The y-series devices come with a standard male DB-9 connector, shown in Figure 25.
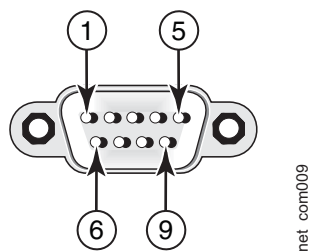
Figure 25. Serial port (DB-9 DTE) pin-out

Most PC serial ports also require a cable with a female DB-9 connector. Terminal connections will vary, requiring either a DB-9 or DB-25 connector, male or female. Serial cable options between a y-series device and a PC or terminal are shown in Table 17.

Table 17. Wiring map for serial cable

Switch 9-Pin Serial Port	Null Modem	PC 9-Pin DTE Port
2 TXD (transmit data)	————————————>	2 RXD (receive data)
3 RXD (receive data)	<————————————	3 TXD (transmit data)
5 SGND (signal ground)	<———————————>	5 SGND (signal ground)
No other pins are used.		

Note: As indicated in Table 17 some of the wires should not be connected.

Installing or replacing a power supply unit

The power supplies are hot-swappable and can be replaced while the device is powered on.

Attention: For the 4002-Y2A, Y4A, Y2C, and Y4C devices, be sure that the airflow direction of the power supply unit matches that of the installed fan tray. The power supplies and fan trays are clearly labeled with an arrow with an "E" or an "I" as shown in Table 2 on page 3.
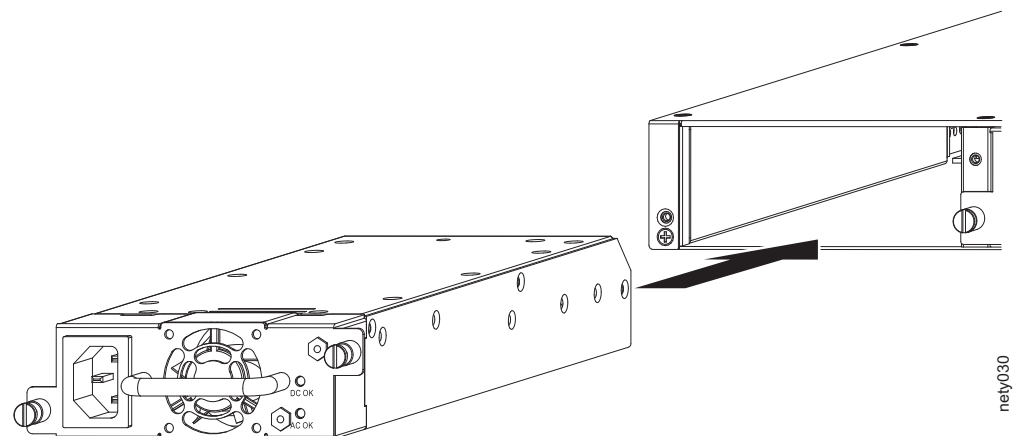
Figure 26. Installing a power supply unit

To install a power supply unit in the switch, do the following steps.

1. Remove the blank metal plate (or a previously installed PSU) from the appropriate slot by removing the two screws with a flat-head screwdriver.
2. Before opening the package that contains the PSU, touch the bag to the switch casing to discharge any potential static electricity. Using an ESD wrist strap during installation is recommended.
3. Remove the PSU from the antistatic shielded bag.
4. Holding the PSU level, guide it into the carrier rails on each side and gently push it all the way into the slot, ensuring that it firmly engages with the connector.
5. When you are sure the PSU has properly engaged the connector, tighten the retainer screws to secure the in PSU the slot.

When the device is powered on, the PSU AC and DC LEDs on the PSU back panel should turn green to confirm that the PSU is correctly installed and supplying power.

Attention: If you do not install a PSU in a slot, you must keep the slot panel in place. If you run the device with an uncovered slot, the system will overheat.

Installing and replacing a fan tray on the 4002-Y2B and 4002-Y4B
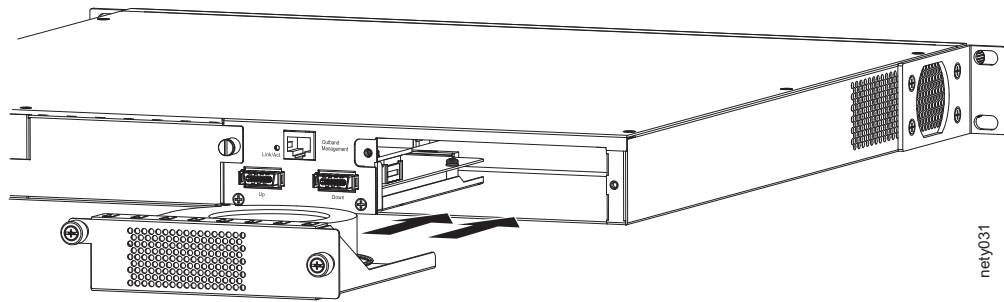
Figure 27. Installing a fan tray on the 4002-Y2B and 4002-Y4B

The fan tray is hot-swappable and can be replaced while the device is powered on. If the device remains operational during fan tray replacement the procedure must be completed within 30 seconds.

To install a fan tray in the switch, do the following steps.

1. Remove the previously installed fan tray from the slot by removing the two screws with a crosshead or Philips #2 screwdriver.
2. Before opening the package that contains the new fan tray, touch the bag to the switch casing to discharge any potential static electricity. Using an ESD wrist strap during installation is recommended.
3. Remove the fan tray from the antistatic shielded bag.
4. Holding the fan tray level, guide it into the carrier rails on each side and gently push it all the way into the slot, ensuring that it firmly engages with the connector.
5. When you are sure the fan tray has properly engaged the connector, tighten the retainer screws to secure the fan tray in the slot.

Note: The fans are controlled by software, and their speed is set according to the environmental temperature surrounding the switch.

Installing and replacing a fan tray on the 4002-Y2A, Y4A, Y2C, and Y4C

Attention: For the 4002-Y2A, Y4A, Y2C, and Y4C devices, be sure that the airflow direction of the power supply unit matches that of the installed fan tray. The power supplies and fan trays are clearly labeled with an arrow with an "E" or an "I", as shown in Table 2 on page 3.

nety032
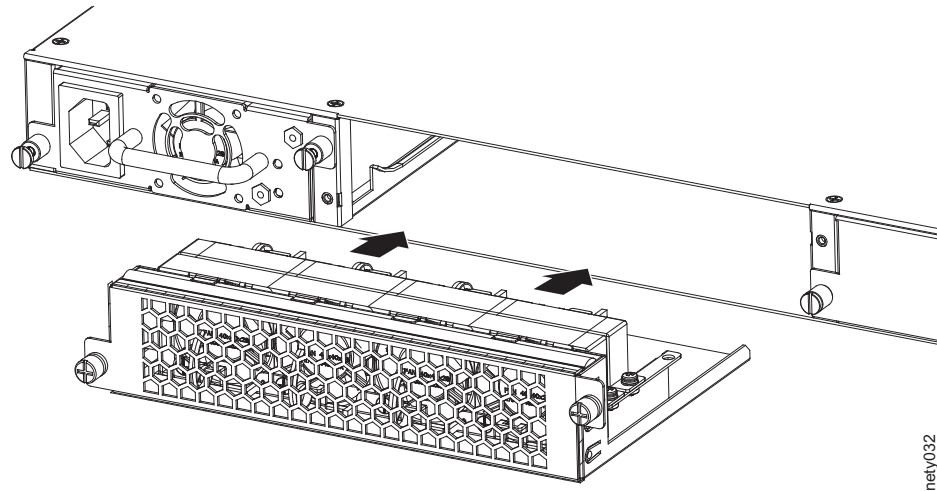
Figure 28. Installing a fan tray on the 4002-Y2A, Y4A, Y2C, and Y4C

The fan tray is hot-swappable and can be replaced while the device is powered on. If the device remains operational during fan tray replacement the procedure must be completed within 30 seconds.

Use the following procedure to install a fan tray in the switch.

1. Remove the previously installed fan tray from the slot by removing the two screws with a crosshead or Philips #2 screwdriver.
2. Before opening the package that contains the new fan tray, touch the bag to the switch casing to discharge any potential static electricity. Using an ESD wrist strap during installation is recommended.
3. Remove the fan tray from the antistatic shielded bag.
4. Holding the fan tray level, guide it into the carrier rails on each side and gently push it all the way into the slot, ensuring that it firmly engages with the connector.
5. When you are sure the fan tray has properly engaged the connector, tighten the retainer screws to secure the fan tray in the slot.

Note: The fans are controlled by software, and their speed is set according to the environmental temperature surrounding the switch.

Installing an optional module on the 4002-Y2B and 4002-Y4B

Figure 29. Installing an optional module

The 4002-Y2B and 4002-Y4B switches support an optional two-port 10 Gbps
Ethernet XFP module. This module is hot-swappable / hot-installable, however a
reload command is required to recognize the new ports. It is recommended that
the device be powered off prior to installing this module.

Use the following procedure to install an optional module into the switch.

1. Power off the device by removing all power cords connected to the power
   supplies.

2. Remove the blank metal plate (or a previously installed module) from the slot
   by removing the two screws with a Phillips #2 screwdriver.

3. Before opening the package that contains the module, touch the bag to the
   switch casing to discharge any potential static electricity. Using an ESD wrist
   strap during installation is recommended.

4. Remove the module from the antistatic shielded bag.

5. Holding the module level, guide it into the carrier rails on each side and gently
   push it all the way into the slot, ensuring that it firmly engages with the
   connector.

6. When you are sure the module has properly engaged the connector, tighten the
   retainer screws to secure the module in the slot.

7. Power on the switch by plugging in the power cords into the power supplies.
   When the switch is powered on, the LEDs will follow the LED status as
   described in "Port, system, and power status LEDs for the 4002-Y2B and
   4002-Y4B" on page 8.

Attention: If you do not install a module in a slot, you must keep the slot panel
in place. If you run the device with an uncovered slot, the system will overheat.

Installing an optional module on the 4002-Y2A, Y4A, Y2C, and Y4C

The 4002-Y2A, Y4A, Y2C, and Y4C switches support an optional four-port 100/1000 Mbps SFP module or four-port 10 Gbps SFP+ module. The 10 Gbps SFP+ module allows you to use your device in a stack. Figure 30 shows how to install an optional SFP or SFP+ module.
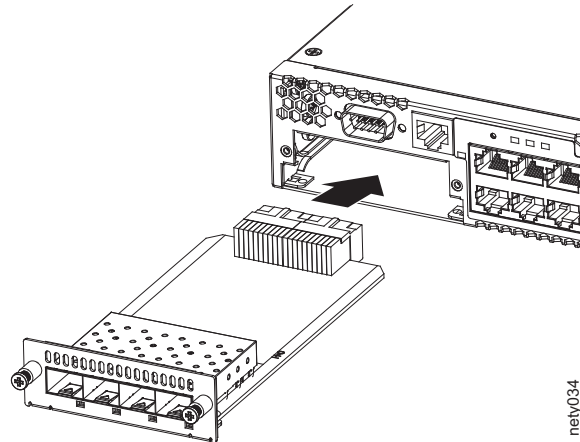
Figure 30. Installing an optional module on the 4002-Y2A, Y4A, Y2C, and Y4C

Attention: The optional SFP and SFP+ modules are not hot-swappable. Be sure to power-down your device before you install or replace a module.

Use the following procedure to install an optional module into the switch.

1. Remove the blank metal plate (or a previously installed module) from the slot by removing the two screws with a Phillips #2 screwdriver.
2. Before opening the module package, touch the bag to the switch casing to discharge any static electricity. Using an ESD wrist strap during installation is recommended.
3. Remove the module from the antistatic shielded bag.
4. Hold the module level, guide it into the carrier rails and gently push it into the slot until it firmly engages with the connector.
5. When the module is engaged, tighten the retainer screws to secure the module in the slot.
6. Power on the switch by plugging in the power cords into the power supplies. When the switch is powered on, the LEDs will follow the LED status as described in "Port, system, and power status LEDs for the 4002-Y2A, Y4A, Y2C, and Y4C" on page 10.

Note: The two left ports (ports <stack id>/2/1 and <stack id>/2/2) on the four-port 10 Gbps SFP+ module do not pass regular Ethernet traffic by default. If you want all four ports on the four-port 10 Gbps SFP+ module to pass regular traffic the global CLI command, **stack disable**, must be configured on the device to disable stacking. For more information, see the *FastIron Configuration Guide*.

Attention: If you do not install a module in a slot, you must keep the slot panel in place. If you run the device with an uncovered slot, the system will overheat.

Chapter 3. Checking network devices and testing connectivity

The procedures in this chapter are for qualified system administrators and users.

Assigning permanent passwords

By default, the CLI is not protected by passwords. To secure CLI access, it is strongly recommended that you assign passwords. See the *FastIron Configuration Guide*.

Note: You cannot assign a password using the Web management interface. You can assign passwords using IronView Network Manager if an enable password for a Super User has been configured on the device.

The CLI contains the following access levels:

User EXEC
> The level you enter when you first start a CLI session. At this level, you can view some system information but you cannot configure system or port parameters.

Privileged EXEC
> This level is also called the Enable level and can be secured by a password. You can perform tasks such as manage files on the flash module, save the system configuration to flash, and clear caches at this level.

CONFIG
> The configuration level. This level lets you configure the system IP address and configure switching and routing features. To access the CONFIG mode, you must already be logged into the Privileged level of the EXEC mode.

You can set the following levels of Enable passwords:

Super User
> Allows complete read-and-write access to the system. This is generally for system administrators and is the only password level that allows you to configure passwords.
>
> **Note:** You must set a super user password before you can set other types of passwords.

Port Configuration
> Allows read-and-write access for specific ports but not for global (system-wide) parameters.

Read Only
> Allows access to the Privileged EXEC mode and CONFIG mode but only with read access.

Setting passwords

1. At the opening CLI prompt, enter the following command to change to the Privileged level of the EXEC mode:

   ```
   FCX648SHPOE Switch> enable
   ```

2. Access the CONFIG level of the CLI by entering the following command:

```
FCX648SHPOE Switch# configure terminal
FCX624 Router(config)#
```

3. Enter the following command to set the super user password:

   ```
   FCX648SHPOE Switch(config)# enable super-user-password <text>
   ```

   Note: You must set the super user password before you can set other types of passwords.

4. Enter the following commands to set the port configuration and read-only passwords:

   ```
   FCX648SHPOE Switch(config)# enable port-config-password <text>
   FCX648SHPOE Switch(config)# enable read-only-password <text>
   ```

   Note: If you forget your super user password, refer to "Recovering from a lost password."

   ```
   Syntax: enable super-user-password | read-only-password |
   port-config-password <text>
   ```

   Passwords can be up to 32 characters long.

Recovering from a lost password

By default, the CLI does not require passwords. However, if someone has configured a password for the device but the password has been lost, you can regain super user access to the device using the following procedure.

Note: Recovery from a lost password requires direct access to the serial port and a system reset.

Use the following procedure to recover from a lost password.

1. Start a CLI session over the serial interface to the y-series device.
2. Reboot the device.
3. While the system is booting, before the initial system prompt appears, enter **b** to enter the boot monitor mode.
4. Enter **no password** at the prompt. (You cannot abbreviate this command.)
5. Enter **boot system flash primary** at the prompt. This command causes the device to bypass the system password check.

After the console prompt reappears, assign a new password.

Configuring IP addresses

You must configure at least one IP address using the serial connection to the CLI before you can manage the system using the other management interfaces.

y-series devices support both classical IP network masks (Class A, B, and C subnet masks, and so on) and Classless Interdomain Routing (CIDR) network prefix masks.

• To enter a classical network mask, enter the mask in IP address format. For example, enter
"209.157.22.99 255.255.255.0" for an IP address with a Class-C subnet mask.

• To enter a prefix number for a network mask, enter a forward slash (/) and the number of bits in the mask immediately after the IP address. For example, enter
"209.157.22.99/24" for an IP address that has a network mask with 24 significant ("mask") bits.

By default, the CLI displays network masks in classical IP address format (example: 255.255.255.0). You can change the display to the prefix format. See the *FastIron Configuration Guide*.

Devices running Layer 2 software

Use the following procedure to configure an IP Address on a device running Layer 2 software.

1. At the opening CLI prompt, enter **enable**.

   ```
   FCX648SHPOE Switch> enable
   ```

2. Access the configuration level of the CLI by entering the following command:

   ```
   FCX648SHPOE Switch# configure terminal (Privileged EXEC Level)
   FCX648SHPOE Switch(config)# (Global CONFIG Level)
   ```

3. Configure the IP address and mask for the switch.

   ```
   FCX648SHPOE Switch(config)# ip address 192.22.3.44 255.255.255.0
   ```

4. Set a default gateway address for the switch.

   ```
   FCX648SHPOE Switch(config)# ip default-gateway 192.22.3.1
   ```

   Note: You do not need to assign a default gateway address for single subnet networks.

```
Syntax: enable [<password>]
Syntax: configure terminal
Syntax: [no] ip address <ip-addr> <ip-mask>
```

or

```
Syntax: [no] ip address <ip-addr>/<mask-bits>
Syntax: ip default-gateway <ip-addr>
```

Devices running Layer 3 software

Before attaching equipment to a y-series Layer 3 Switch, you must assign an interface IP address to the subnet on which the router will be located. You must use the serial connection to assign the first IP address. For subsequent addresses, you also can use the CLI through Telnet or the Web management interface.

By default, you can configure up to 24 IP interfaces on each port, virtual interface, and loopback interface. You can increase this amount to up to 64 IP subnet addresses per port by increasing the size of the subnet-per-interface table.

The following procedure shows how to add an IP address and mask to a router port.

1. At the opening CLI prompt, enter **enable**.

   ```
   FCX624 Router> enable
   ```

2. Access the configuration level of the CLI by entering the following command:

   ```
   FCX624 Router# configure terminal       Privileged EXEC Level
   FCX624 Router(config)#       Global CONFIG Level
   ```

3. Configure the IP addresses and mask addresses for the interfaces on the router.

   ```
   FCX624 Router(config)# int e 2
   FCX624 Router(config-if-e1000-2)# ip address 192.22.3.44 255.255.255.0
   ```

   Note: You can use the syntax **ip address** *<ip-addr>/<mask-bits>* if you know the subnet mask length. In the above example, you could enter **ip address 192.22.3.44/24**.

```
Syntax: enable [<password>]
Syntax: configure terminal
Syntax: [no] ip address <ip-addr> <ip-mask> [secondary]
```

or

```
Syntax: [no] ip address <ip-addr>/<mask-bits> [secondary]
```

Use the **secondary** parameter if you have already configured an IP address within the same subnet on the interface.

Configuring IP parameters for devices running Layer 3 software

This section describes how to configure IP parameters for devices running Layer 3 software.

Configuring IP addresses: You can configure an IP address on the following types of Layer 3 switch interfaces:

- Ethernet port
- Virtual routing interface (also called a Virtual Ethernet or "VE")
- Loopback interface

By default, you can have up to 24 IP addresses on each interface except the out-of-band management port, but you can increase this number to 128 IP addresses.

Note: Once you configure a virtual routing interface on a VLAN, you cannot configure Layer 3 interface parameters on individual ports in the VLAN. Instead, you must configure the parameters on the virtual routing interface itself.

y-series devices support both classical IP network masks (Class A, B, and C subnet masks, and so on) and Classless Interdomain Routing (CIDR) network prefix masks.

- To enter a classical network mask, enter the mask in IP address format. For example, enter
  "209.157.22.99 255.255.255.0" for an IP address with a Class-C subnet mask.
- To enter a prefix network mask, enter a forward slash (/) and the number of bits in the mask immediately after the IP address. For example, enter "209.157.22.99/24" for an IP address that has a network mask with 24 significant bits (ones).

By default, the CLI displays network masks in classical IP address format (for example: 255.255.255.0). You can change the display to prefix format.

Assigning an IP address to an Ethernet port: Enter the following commands to assign an IP address to port 1/1/1.

```
FCX624 Router(config)# interface ethernet 1/1/1
FCX624 Router(config-if-1/1/1)# ip address 192.45.6.1 255.255.255.0
```

Note: You also can enter the IP address and mask in CIDR format, as follows:

```
FCX624 Router(config-if-1/1/1)# ip address 192.45.6.1/24
Syntax: [no] ip address <ip-addr> <ip-mask>
```

or

```
Syntax: [no] ip address <ip-addr>/<mask-bits>
```

Assigning an IP address to a loopback interface: Loopback interfaces are always up, regardless of the states of physical interfaces. They can add stability to the network because they are not subject to route flap problems that can occur due to unstable links between a Layer 3 Switch and other devices. You can configure up to four loopback interfaces on a Layer 3 switch.

You can add up to 24 IP addresses to each loopback interface.

Note: If you configure the y-series switch to use a loopback interface to communicate with a BGP4 neighbor, you must also configure a loopback interface on the neighbor and configure the neighbor to use that loopback interface to communicate with the y-series switch.

To add a loopback interface, enter commands such as those shown in the following example:

```
FCX624 Router(config)# exit
FCX624 Router(config)# int loopback 1
FCX624 Router(config-lbif-1)# ip address 10.0.0.1/24
Syntax: interface loopback <num>
```

The <num> parameter specifies the virtual interface number. You can specify from 1 to the maximum number of virtual interfaces supported on the device. To display the maximum number of virtual interfaces supported on the device, enter the **show default values** command. The maximum is listed in the System Parameters section, in the Current column of the virtual-interface row.

Assigning an IP address to a virtual routing interface: A virtual interface is a logical port associated with a Layer 3 Virtual LAN (VLAN) configured on a Layer 3 switch. You can configure routing parameters on the virtual interface to enable the Layer 3 switch to route protocol traffic from one Layer 3 VLAN to the other, without using an external router.

This section describes how to configure an IP address on a virtual interface.

Note: The switch uses the lowest MAC address on the device (the MAC address of port 1 or 1/1/1) as the MAC address for all ports within all virtual interfaces you configure on the device.

Enter commands similar to the following to add a virtual interface to a VLAN and configure an IP address on the interface.

```
FCX624 Router(config)# vlan 2 name IP-Subnet_1.1.2.1/24
FCX624 Router(config-vlan-2)# untag 1/1/1 to 1/1/4
FCX624 Router(config-vlan-2)# router-interface ve1
FCX624 Router(config-vlan-2)# interface ve1
FCX624 Router(config-vif-1)# ip address 1.1.2.1/24
```

The first two commands in this example create a Layer 3 protocol-based VLAN name "IP-Subnet_1.1.2.1/24" and add a range of untagged ports to the VLAN. The **router-interface** command creates virtual interface 1 as the routing interface for the VLAN. The last two commands change to the interface configuration level for the virtual interface and assign an IP address to the interface.

```
Syntax: router-interface ve <num>
Syntax: interface ve <num>
```

Deleting an IP address
Enter a command similar to the following to delete an IP address.

```
FCX624 Router(config-if-1/1/1)# no ip address 1.1.2.1
```

This command deletes IP address 1.1.2.1. You do not need to enter the subnet mask.

To delete all IP addresses from an interface, enter the following command:

```
FCX624 Router(config-if-1/1/1)# no ip address *
Syntax: no ip address <ip-addr> | *
```

Connecting network devices

y-series devices support connections to other vendors' routers, switches, and hubs, as well other IBM devices.

Connectors

For port pinouts, refer to "Pinouts and signaling" on page 52.

Cable specifications

Refer to "Cable specifications" on page 53 for cable lengths and types.

Connecting to Ethernet or fast Ethernet hubs

For copper connections to Ethernet hubs, a 10/100BaseTX or 1000BaseT switch, or another device, a crossover cable is required. SeeFigure 31. If the hub is equipped with an uplink port, it will require a straight-through cable instead of a crossover cable. See Figure 32 on page 35.

Note: The 802.3ab standard (automatic MDI or MDIX detection) calls for automatic negotiation of the connection between two 1000Base-T ports. In this case a straight-through cable may work just as well as a crossover cable. For more information about this feature, see the *FastIron Configuration Guide*.

10/100BASE-TX Crossover Cable
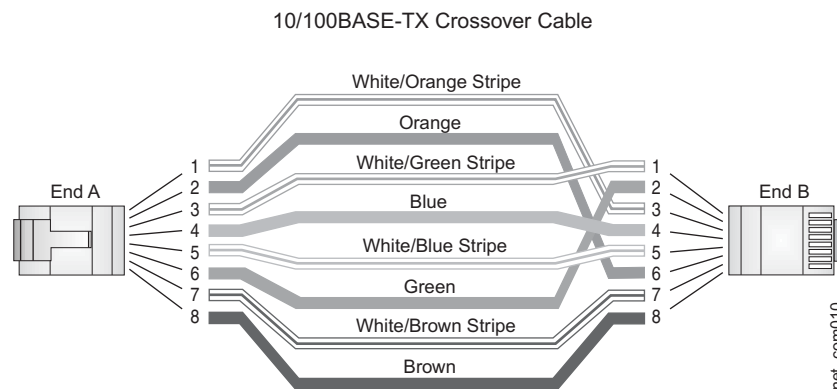
Figure 31. UTP crossover cable

10/100BASE-TX Straight-through Cable
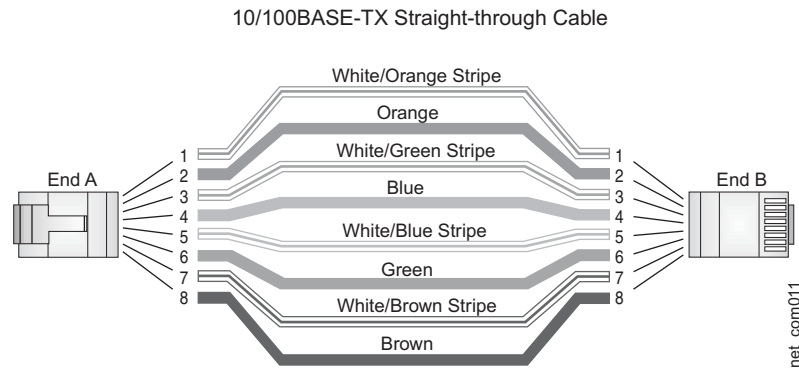
Figure 32. Straight-through cable

Connecting to workstations, servers, or routers

Straight-through UTP cabling is required for direct UTP attachment to workstations, servers, or routers using network interface cards (NICs).

Fiber cabling is required for direct attachment to Gigabit NICs or switches and routers through fiber ports. Refer to "Connecting a network device to a fiber port."

Automatic MDI or MDIX detection

All 10/100/1000 Mbps Ethernet Copper ports on the devices support automatic Media Dependent Interface (MDI) and Media Dependent Interface Crossover (MDIX) detection. This feature is enabled on all 10/100 and Gigabit copper ports by default. For each port, you can disable auto MDI or MDIX, designate the port as an MDI port, or designate the port as an MDIX port.

For more information about this feature and how configure it, refer to *FastIron Configuration Guide*.

Connecting a network device to a fiber port

For direct attachment from the device to a Gbps NIC, switch, or router, using a fiber optic transceiver, you will need fiber cabling with an LC connector.

To connect the device to another network device using a fiber port, you must do the following tasks:

- Install a fiber optic transceiver (XFP, SFP, or SFP+)
- Cable the fiber optic transceiver

The following sections describe these tasks.

Fiber Optic transceivers

Table 18 lists supported XFP transceivers (for stacking and non-stacking y-series models). Table 19 on page 36 shows supported SFP and SFP+ transceivers. For information about cabling for transceivers, see Table 28 on page 53.

Table 18. Supported XFP transceivers for 4002-Y2B and 4002-Y4B

10 Gigabit Optic	Distance	Supported for stacking
10GBase-SR	300M	Yes
10GBase-LR	10km	No

Table 18. Supported XFP transceivers for 4002-Y2B and 4002-Y4B (continued)

10 Gigabit Optic	Distance	Supported for stacking
10GBase-ER	40km	No

Table 19. Supported SFP transceivers for 4002-Y2A, Y4A, Y2C, and Y4C

10 Gigabit Optic	Distance	Supported for stacking
10GSFPP-SR	300km	Yes
10GSFPP-LR	10km	No

Note: Distances supported on -SR optics depends on type of multi-mode fiber cabling used. OM3, 50 micometer (2000 MHz*km) fiber is required to support maximum distances.

Installing a transceiver

You can install a new transceiver in an XFP, SFP, or SFP+ slot while the device is powered on and running.

While installing a transceiver, wear an ESD wrist strap with a plug for connection to a metal surface.

Note: For safety reasons, the ESD wrist strap should contain a series 1 meg ohm resistor.

CAUTION:
Data processing environments can contain equipment transmitting on system links with laser modules that operate at greater than Class 1 power levels. For this reason, never look into the end of an optical fiber cable or open receptacle. (C027)

Use the following steps to install a transceiver.
1. Put on the ESD wrist strap and ground yourself by attaching the clip end to a metal surface (such as an equipment rack) to act as ground.
2. Remove the new transceiver from the protective packaging.
3. Gently insert the transceiver into the slot until it clicks into place. Transceivers are keyed to prevent incorrect insertion.
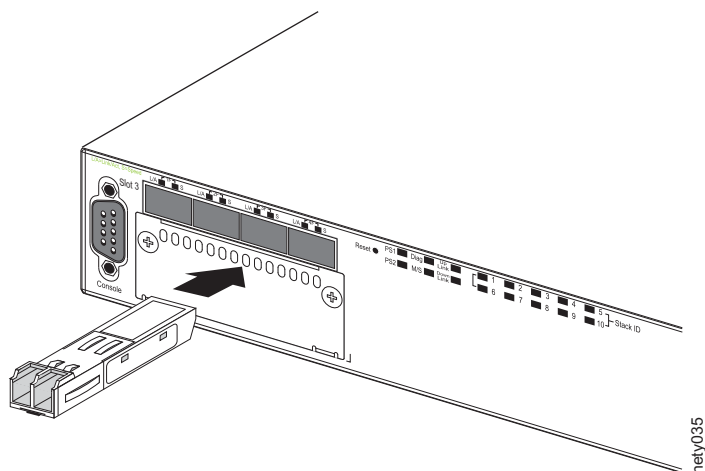
Figure 33. Installing a transceiver in 4002-Y2B and 4002-Y4B devices
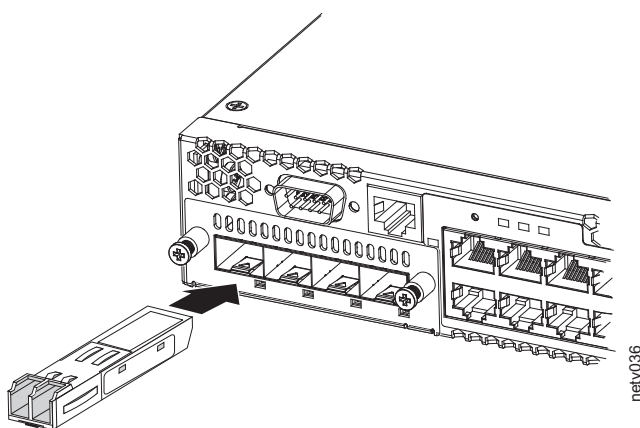
Figure 34. Installing a transceiver in 4002-Y2A, Y4A, Y2C, and Y4C devices

Cabling a fiber optic transceiver

Use the following steps to cable a fiber optic transceiver.

1. Remove the protective covering from the fiber-optic port connectors and store the covering for future use.

2. Before cabling a fiber optic transceiver, it is strongly recommended that you clean the cable connectors and the port connectors. For more information, refer to "Cleaning the fiber optic connectors."

3. Gently insert the cable connector (a tab on each connector should face upward) into the transceiver connector until the tabs lock into place.

4. Observe the link and active LEDs to determine if the network connections are functioning properly. For more information about the LED indicators, refer to Table 20 on page 38.

Cleaning the fiber optic connectors

To avoid problems with the connection between the fiber optic transceiver (SFP, SFP+, or mini-GBIC) and the fiber cable connectors, it is strongly recommended that you clean both connectors each time you disconnect and reconnect them. Dust can accumulate in the connectors and cause problems such as reducing the optic launch power.

To clean the fiber cable connectors, it is recommended that you use a fiber optic reel-type cleaner. You can purchase this type of cleaner from the following Web site:

http://www.fisfiber.com/Home_Page.asp

When not using an SFP connector, make sure to keep the protective covering in place.

Testing connectivity

Test for connectivity by observing the LEDs related to network connection.

Pinging an IP address

To verify that a y-series device can reach another device through the network, enter a command similar to the following at any level of the CLI.

```
FCX648SHPOE Switch> ping 192.33.4.7

Syntax: ping <ip addr> [source <ip addr>] [count <num>] [timeout <msec>] [ttl <num>]
[verify] [no-fragment] [quiet] [data <1-to-4 byte hex#, e.g. abcdef00>] [numeric]
[size <byte>] [brief [max-print-per-sec <num 0-2047>]]
```

Note: If you address the ping to the IP broadcast address, the device lists the first four responses.

Observing LEDs

After you install the network cables, you can observe certain LEDs to determine if the network connections are functioning properly. Table 20 outlines the LEDs related to the network connections, the desired state of each LED, possible abnormal states of each LED, and what to do if an LED indicates an abnormal state. For the locations of the LEDs, see "Control features" on page 3.

Table 20. Network connection-related LED states.

LED	Desired State	Meaning	Abnormal State	Meaning or Action
Ethernet (1-24/48) Link or Activity or Speed	On or Blinking (Green or Amber)	A link is established with the remote port and user packets are being transmitted or received.	Off	A link is not established with the remote port. You can do the following: • Verify that the connection to the other network device has been properly made. Also, make certain that the other network device is powered on and operating correctly. • Verify that the port has not been disabled through a configuration change. You can use the CLI. If you have configured an IP address on the device, you also can use the Web management interface or IronView Network Manager. • For the combination ports (ports 1~4), check that the shared SFP port (1F~4F) is not being used. • If the other actions don't resolve the problem, try using a different port or a different cable.

Table 20. Network connection-related LED states. (continued)

LED	Desired State	Meaning	Abnormal State	Meaning or Action
HPOE (1-24/48)	On Green	The port is providing HPOE power.	Off	A link is not established with the HPOE device. You can do the following: • Verify that the connection to the other network device has been properly made. • If the other actions don't resolve the problem, try using a different port or a different cable.
SFP (1F~4F) Link or Activity	On Green	A link is established with the remote port.	Off	A link is not established with the remote port. You can do the following: • Verify that the connection to the other network device has been properly made. Also, make certain that the other network device is powered on and operating correctly. • Verify that the transmit port on the y-series device is connected to the receive port on the other network device, and that the receive port on the y-series device is connected to the transmit port on the other network device. If you are not certain, remove the two cable connectors from the port connector and reinsert them in the port connector, reversing their order. • Dust may have accumulated in the cable connector or port connector. For information about cleaning the connectors, refer to "Cleaning the fiber optic connectors" on page 37. • Verify that the port has not been disabled through a configuration change. • Check that the configuration has not forced the use of the RJ45 port shared with the SFP port. • If the other actions don't resolve the problem, try using a different port or a different cable.
SFP (1F~4F) Speed	On (Green or Amber)	A link is established with the remote port.	Off	A link is not established with the remote port. You can do the following: • Check the Link LED to make sure the link is still established with the remote port. If not, take the actions described in the Meaning or Action column for the Link LED.

Table 20. Network connection-related LED states. (continued)

LED	Desired State	Meaning	Abnormal State	Meaning or Action
SFP+ (1F~4F) Link or Activity	On Green	A link is established with the remote port.	Off	A link is not established with the remote port. You can do the following: • Verify that the connection to the other network device has been properly made. Also, make certain that the other network device is powered on and operating correctly. • Verify that the transmit port on the y-series device is connected to the receive port on the other network device, and that the receive port on the y-series device is connected to the transmit port on the other network device. If you are not certain, remove the two cable connectors from the port connector and reinsert them in the port connector, reversing their order. • Dust may have accumulated in the cable connector or port connector. For information about cleaning the connectors, refer to "Cleaning the fiber optic connectors" on page 37. • Verify that the port has not been disabled through a configuration change. • Check that the configuration has not forced the use of the RJ45 port shared with the SFP port. • If the other actions don't resolve the problem, try using a different port or a different cable.
SFP+ (1F~4F) Speed	On (Green or Amber)	A link is established with the remote port.	Off	A link is not established with the remote port. You can do the following: • Check the Link LED to make sure the link is still established with the remote port. If not, take the actions described in the Meaning or Action column for the Link LED.

If a problem persists after taking these actions, contact IBM customer support.

Tracing a route

To determine the path through which a y-series device can reach another device, enter a command similar to the following at any level of the CLI on the device.

```
FCX648SHPOE Switch> traceroute 192.33.4.7

Syntax: traceroute <host-ip-addr> [maxttl <value>] [minttl <value>] [numeric]
 [timeout <value>] [source-ip <ip addr>]
```

The CLI displays trace route information for each hop as soon as the information is received. Traceroute requests display all responses to a given TTL. In addition, if there are multiple equal-cost routes to the destination, the y-series device displays up to two responses by default.

Troubleshooting network connections

• For the indicated port, verify that both ends of the cabling (at the device and the connected device) are snug.

- Verify that the device and the connected device are both powered on and operating correctly.
- Verify that you have used the correct cable type for the connection:
  - For twisted-pair connections to an end node, use straight-through cabling.
  - For fiber optic connections, verify that the transmit port on the device is connected to the receive port on the connected device, and that the receive port on the device is connected to the transmit port on the connected device.
- Use the CLI to verify that the port has not been disabled through a configuration change. If you have configured an IP address on the device, you also can use the Web management interface or IronView Network Manager.
- If the other procedures don't resolve the problem, try using a different port or a different cable.

Using Virtual Cable Testing to diagnose a cable

These devices support Virtual Cable Test (VCT) technology. VCT technology enables you to diagnose a conductor (wire or cable) by sending a pulsed signal into the conductor, then examining the reflection of that pulse. This method of cable analysis is referred to as Time Domain Reflectometry (TDR). By examining the reflection, the device can detect and report cable statistics such as local and remote link pair, cable length, and link status.

Configuration notes
- This feature is supported on copper ports only. It is not supported on fiber ports.
- The port to which the cable is connected must be enabled when you issue the command to diagnose the cable. If the port is disabled, the command is rejected.
- If the port is operating at 100 Mbps half-duplex, the TDR test on one pair will fail.
- If the remote pair is set to forced 100 Mbps, any change in MDI or MDIX may cause the device to interpret the Multilevel Threshold-3 (MLT-3) as a reflected pulse, in which case, the device will report a faulty condition. In this case, it is recommended that you run the TDR test a few times for accurate results.

Command syntax

To diagnose a cable using TDR, enter a command such as the following at the Privileged EXEC level of the CLI.

```
FCX648SHPOE Switch# phy cable-diag tdr 1/1/1
```

This command diagnoses the cable attached to port 1/1/1.

```
Syntax: phy cable-diag tdr <port-num>
```

Viewing the results of the cable analysis

To display the results of the cable analysis, enter a command similar to the following at the Privileged EXEC level of the CLI.

```
FCX648SHPOE Switch# show cable-diag tdr 1/1/1
```

```
Syntax: show cable-diag tdr <port-num>
```

Table 21 defines the fields shown in cable statistics.

Table 21. Cable statistics

This Line...	Displays...
Port	The port that was tested.
Speed	The current line speed of the port.

Table 21. Cable statistics (continued)

This Line...	Displays...
Local pair	The local link name.
Pair Length	The cable length when terminated, or the distance to the point of fault when the line is not up.
Remote pair	The remote link name.
Pair status	The status of the link. This field displays one of the following: • Terminated: The link is up. • Shorted: A short is detected in the cable. • Open: An opening is detected in the cable. • ImpedMis: The impedance is mismatched. • Failed: The TDR test failed.

Digital optical monitoring

You can configure your device to monitor optical transceivers in the system, either globally or by specified port. When this feature is enabled, the system monitors the temperature and signal power levels for the optical transceivers in the specified ports. Console messages and syslog messages are sent when optical operating conditions fall below or rise above the XFP, SFP, and SFP+ manufacturer's recommended thresholds. For more information about digital optical monitoring, refer to *FastIron Configuration Guide*.

Chapter 4. Managing y-series Ethernet switches

Attention: The procedures in this chapter are for qualified users and administrators.

Managing temperature settings

This section describes how to display temperature settings on the device and how to change the temperature warning and shutdown levels.

Using the temperature sensor

The device ships with three built-in temperature sensors that cause the device to generate a Syslog message and SNMP trap if the temperature exceeds a specified warning level or shutdown level. If the device temperature exceeds the safe threshold (shutdown level), the device will reboot.

The software reads the temperature sensors based on the device poll time, which is by default 60 seconds. If the temperature equals or exceeds the shutdown temperature for five consecutive polls by the software, the software will reboot the device to prevent damage.

You can use the CLI or Web management interface to perform the following tasks:
* Display the temperature of the device
* Change the warning and shutdown temperature levels
* Change the device poll time

Displaying the temperature

By default, the software polls the temperature sensor every 60 seconds to get the current temperature. This poll rate is controlled by the device poll time, which also controls how often the software polls other system components.

To display the temperature of a device, enter the **show chassis** command at any level of the CLI.

```
FCX624S Switch# show chassis
The stack unit 1 chassis info:
Power supply 1 (NA - AC - Regular) present, status ok
Power supply 2 not present
Fan ok, speed (auto): [[1]]<->2<->3
Fan speed switching temperature thresholds:
        1 -> 2 @ 61 deg-C
        1 <- 2 @ 56 deg-C
        2 -> 3 @ 67 deg-C
        2 <- 3 @ 62 deg-C
MAC 1 Temperature Readings:
        Current temperature : 50.5 deg-C
        Warning level.......: 80.0 deg-C
        Shutdown level......: 90.0 deg-C
CPU Temperature Readings:
        Current temperature : 49.0 deg-C
Boot Prom MAC : 0012.f2d4.69c0
Management MAC: 0012.f2d4.69c0

Syntax: show chassis
```

Displaying Syslog messages for temperature

The software sends a Syslog message and an SNMP trap if the temperature crosses the warning or shutdown thresholds. The following methods describe how to view the system log on the device. If you have configured the device to use a Syslog server or SNMP trap receiver, see the documentation for the server or receiver.

To display the system log, enter the **show log** command at any CLI level.

```
FCX648SHPOE Switch# show log
Syslog logging: enabled (0 messages dropped, 0 flushes, 0 overruns)
Buffer logging: level ACDMEINW, 8 messages logged
level code: A=alert C=critical D=debugging M=emergency E=error
I=informational N=notification W=warning

Static Log Buffer:

Dynamic Log Buffer (50 entries):

at 0 days 0 hours 2 minutes 0 seconds, level alert
Temperature 48.0 C degrees, warning level 45.0 C degrees, shutdown level 55.0 C
degrees

at 0 days 0 hours 1 minutes 0 seconds, level alert
Temperature 40.0 C degrees, warning level 35.0 C degrees, shutdown level 45.0 C
degrees
```

Changing temperature warning and shutdown levels

The default warning temperatures and the default shutdown temperatures for the device are:

- Warning temperature is 85° C (measured on mainboard)

- Shutdown temperature is 90° C (measured on mainboard)

Note: These temperatures reflect the temperature of the board inside the device.

To change the temperature at which the device sends a warning, enter a command similar to the following at the Privileged EXEC level of the CLI:

```
FCX624 Router# temperature warning 1 85
```

```
Syntax: temperature warning <stack-unit> <value>
```

<stack-unit> can be 1 - 8.

<value> can be 0 - 125

To display the current temperature readings, enter the **temp** command as shown.

```
FCX624S Switch# temperature
  temperature        temperature sensor commands
FCX624S Switch# temperature warning
  warning    Temperature at which the module sends a warning
FCX624S Switch# temperature warning
  DECIMAL    Stack Number
FCX624S Switch# temperature warning 1 87
FCX624S Switch# show chassis
The stack unit 1 chassis info:
Power supply 1 (NA - AC - Regular) present, status ok
Power supply 2 not present
Fan ok, speed (auto): [[1]]<->2<->3
Fan speed switching temperature thresholds:
        1 -> 2 @ 61 deg-C
        1 <- 2 @ 56 deg-C
```

```
        2 -> 3 @ 67 deg-C
        2 <- 3 @ 62 deg-C
MAC 1 Temperature Readings:
        Current temperature : 51.5 deg-C
        Warning level.......: 87.0 deg-C
        Shutdown level......: 90.0 deg-C
CPU Temperature Readings:
        Current temperature : 51.0 deg-C
Boot Prom MAC : 0012.f2d4.69c0
Management MAC: 0012.f2d4.69c0
```

Changing the shutdown temperature

You can change the shutdown temperature using the **fan-threshold** command as shown. The valid range is 0-125° C.

```
FCX624S Switch(config)# stack unit 1
FCX624S Switch(config-unit-1)# fan-threshold mp speed-3 62 95
FCX624S Switch(config-unit-1)# show chassis
The stack unit 1 chassis info:
Power supply 1 (NA - AC - Regular) present, status ok
Power supply 2 not present
Fan ok, speed (auto): [[1]]<->2<->3
Fan speed switching temperature thresholds:
        1 -> 2 @ 61 deg-C
        1 <- 2 @ 56 deg-C
        2 -> 3 @ 67 deg-C
        2 <- 3 @ 62 deg-C
MAC 1 Temperature Readings:
        Current temperature : 56.5 deg-C
        Warning level.......: 85.0 deg-C
        Shutdown level......: 95.0 deg-C
CPU Temperature Readings:
        Current temperature : 53.0 deg-C
Boot Prom MAC : 0012.f2d4.69c0
Management MAC: 0012.f2d4.69c0

Syntax: fan-threshold speed-3 mp <lowest value> <highest value>
```

The device will automatically reset and reload the software when the internal temperature reaches or exceeds the configured shutdown level for five minutes. The system is also capable of registering negative temperature settings.

To change the temperature at which the y-series switch sends a warning, you must change the fan speed threshold. To view the current temperature thresholds, enter the **show chassis** command:

```
FCX648SHPOE Switch# show chassis
The stack unit 1 chassis info:
Power supply 1 (NA-AC-Regular)present, status ok
Power supply 2 not present
Fan ok, speed (auto): 1<->[[2]]<->3
Fan ok, speed (auto): 1<->[[2]]<->3
Fan speed switching temperature thresholds:
        1 -> 2 @ 53 deg-C
        1 <- 2 @ 37 deg-C
        2 -> 3 @ 55 deg-C
        2 <- 3 @ 50 deg-C
MAC 1 Temperature Readings:
        Current temperature : 53.0 deg-C
MAC 2 Temperature Readings:
        Current temperature : 53.0 deg-C
Temperature Readings:
        Current temperature : 53.0 deg-C
        Warning level.......: 60.0 deg-C
        Shutdown level......: 80.0 deg-C
CPU Temperature Readings:
        Current temperature : 47.5 deg-C
```

Enter a command to the following to change the temperature shutdown level from 80° C to 90° C.

```
FCX648SHPOE Switch#stack unit 1
FCX648SHPOE Switch(config-unit-1)#fan-threshold mp speed-3 50 90

Syntax: fan-threshold speed-3 mp <lowest value> <highest value>
```

The values can be 0 - 125.

Enter the show chassis command to confirm the change:

```
FCX648SHPOE Switch# show chassis
The stack unit 1 chassis info:
Power supply 1 (NA-AC-Regular)present, status ok
Power supply 2 not present
Fan ok, speed (auto): 1<->[[2]]<->3
Fan ok, speed (auto): 1<->[[2]]<->3
Fan speed switching temperature thresholds:
        1 -> 2 @ 53 deg-C
        1 <- 2 @ 37 deg-C
        2 -> 3 @ 55 deg-C
        2 <- 3 @ 50 deg-C
MAC 1 Temperature Readings:
        Current temperature : 53.0 deg-C
MAC 2 Temperature Readings:
        Current temperature : 53.0 deg-C
Temperature Readings:
        Current temperature : 53.0 deg-C
        Warning level.......: 60.0 deg-C
        Shutdown level......: 90.0 deg-C
CPU Temperature Readings:
        Current temperature : 47.5 deg-C
```

Changing the temperature polling interval

The software reads the temperature sensor and polls other hardware sensors according to the value set for the poll time, which is 60 seconds by default. You can change the poll time using the CLI.

To change the poll time, enter a command similar to the following at the global CONFIG level:

```
FCX648SHPOE Switch(config)# chassis poll-time 2 200

Syntax: chassis poll-time <stack-id> <value>
```

<stack-id> can be 1 - 8

<value> can be 0 - 65535.

Removing MAC address entries

You can remove the following types of learned MAC address entries from the system MAC address table:

- All MAC address entries
- All MAC address entries for a specified Ethernet port
- All MAC address entries for a specified VLAN
- A specified MAC address entry in all VLANs

For example, to remove entries for the MAC address 000d.cb80.00d in all VLANs, enter the following command at the Privileged EXEC level of the CLI:

```
FCX648SHPOE Switch# clear mac-address 000d.cb80.00d0
```

Syntax: clear mac-address <mac-address> | ethernet <port-num> | vlan <number>

If you enter the **clear mac-address** command without any parameters, the software removes all MAC entries.

Use the *<mac-address>* parameter to remove a specified MAC address from all VLANs. Specify the MAC address in the following format: HHHH.HHHH.HHHH.

Use the **ethernet** *<port-num>* parameter to remove all MAC addresses for a specified Ethernet port.

Use the **vlan** *<number>* parameter to remove all MAC addresses for a specified VLAN.

Displaying y-series CPU usage

You can display the percentage of the y-series CPU in use. To do so, enter the **show cpu** command at any level of the CLI:

```
FCX648SHPOE Switch# show cpu
31 percent busy, from 3248 sec ago
1   sec avg:  10 percent busy
5   sec avg:  10 percent busy
60  sec avg:  10 percent busy
300 sec avg:  10 percent busy
```

Syntax: show cpu

Hardware maintenance schedule

The y-series switch hardware components require minimal maintenance. It is recommended that you clean the fiber-optic connectors on a fiber-optic port and the connected fiber cable each time you disconnect the cable.

You can replace the copper and fiber optic modules (SFPs or mini-GBICs).

Replacing a copper or fiber optic module

You can remove an SFP from a slot and replace it with a new one while the y-series switch is powered on and running.

This section provides information about the following tasks:
- Removing a copper or fiber optic module
- Installing a new copper or fiber optic module
- Cabling a fiber optic module

Removing a copper or fiber optic module

You can remove a copper or fiber SFP (also called a mini-GBIC) from a slot while the y-series switch is powered on and running.

While removing a copper or fiber optic module, be sure to wear an ESD wrist strap with a plug for connection to the ESD connector on the y-series switch.

CAUTION:
For safety reasons, the ESD wrist strap should contain a series 1 meg ohm resistor.

To remove a copper or fiber optic module from an SFP slot, do the following.

1. Put on the ESD wrist strap and ground yourself by attaching the clip end to a metal surface (such as an equipment rack).
2. Disconnect the copper or fiber cable connector from the port connector.
3. Unlock the copper or fiber optic module by pulling the bail latch forward, away from the front panel of the module.

   On 1000BaseSX ports, the bail latch is enclosed in a black sleeve, and on 1000BaseLX ports, the bail latch is enclosed in a blue sleeve.
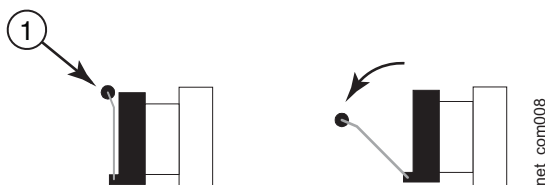
Figure 35. Unlocking the bail latch

1   Bail Latch

Note: The bail latch may be attached to either the top or the bottom of the mini-GBIC.

4. Grasp the bail latch and pull the copper or fiber optic module out of the port.
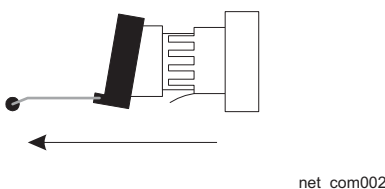
Figure 36. Removing the fiber optic module

5. Store the copper or fiber optic module in a safe, static-free place or in an anti-static bag.
6. Install a new copper or fiber optic module in the port.

Cabling a fiber optic module

For instructions on cabling a fiber optic module refer to "Cabling a fiber optic transceiver" on page 37.

Cleaning the fiber optic connectors

For instructions on cleaning a fiber optic module refer to "Cleaning the fiber optic connectors" on page 37.

Chapter 5. Hardware specifications

This chapter provides the hardware specifications for y-series devices.

Physical dimensions and weight

Table 22 lists the physical dimensions and weight for the y-series devices.

Table 22. Physical dimensions

Model	Height	Width	Depth	Weight
4002-Y2B, 4002-Y4B	4.4 cm 1.7 in.	44 cm 17.32 in.	44 cm 17.32 in.	4.5 kg (9.9 lb)
4002-Y2A, 4002-Y2C	4.4 cm 1.7 in.	44 cm 17.32 in.	43.5 cm 17.13 in.	5.35 kg (11.79 lb)
4002-Y4A, 4002-Y4C	4.4 cm 1.7 in.	44 cm 17.32 in.	43.5 cm 17.13 in.	5.71 kg (12.59 lb)

Environmental considerations

For optimal performance, operate or store your device in compliance with the following environmental conditions.

Operating Environment

Table 23 provides the operating environment specifications.

Table 23. Operating environment

Operating Temperature	Relative Humidity	Operating Altitude
0° - 40° C (32° - 104° F)	5 to 95%, @ 40° C (104.9° F), non-condensing	0 - 3000 meters (10,000 feet)

Storage environment

Table 24 provides the storage environment specifications.

Table 24. Storage environment

Storage Temperature	Storage Humidity	Storage Altitude
-40° to 70° C (-40° to 158° F)	95% maximum, non-condensing	3,000 meter (10,000 feet) maximum

Cooling system and fans

The fans cool the CPU, main memory, and voltage regulators. For the 4002-Y2B and 4002-Y4B switches, the fans use either a push or pull configuration to move the air from the right side of the device to the left side of the device.

Table 25. Cooling system specifications for 4002-Y2B and 4002-Y4B switches

Total cooling capacity	80 to 130 watts

Total air flow	200 LFM
Operating noise	ideal 51 dB-A

For the 4002-Y2A and 4002-Y4A models, the air flows from the front to the back of the device. For the 4002-Y2C and 4002-Y4C models, the air flows from the back to the front of the device.

Table 26. Cooling system specifications for 4002-Y2A, Y4A, Y2C, and Y4C model switches
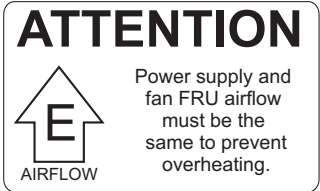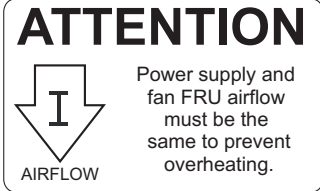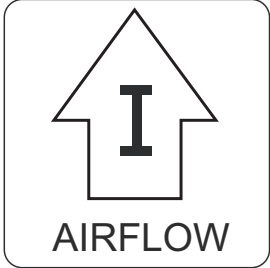
Total cooling capacity	180 watts
Total air flow	1152 LFM
Operating noise	ideal 60 dB-A

Note: Operating noise is based on the ISO 7779 standard.

Figure 37 on page 51 shows the airflow for the 4002-Y2B and 4002-Y4B models. Figure 38 on page 51 shows airflow for 4002-Y2A and 4002-Y4A devices. Figure 39 on page 52 shows the airflow for the 4002-Y2C and 4002-Y4C models.

Attention: For the 4002-Y2A, Y4A, Y2C, and Y4C devices, be sure that the airflow direction of the power supply unit matches that of the installed fan tray. The power supplies and fan trays are clearly labeled with an arrow with an "E"or "I", as shown in Table 27.

Table 27. Power supply and fan tray labels for 4002-Y2A ,Y4A, Y2C, and Y4C devices

Devices	Label on required power supply	Label on required fan tray
4002-Y2A and 4002-Y4A	4002-Y2A and Y4A power supply airflow label	4002-Y2A and Y4A fan tray airflow label
4002-Y2C and 4002-Y4C	4002-Y2C and Y4C power supply airflow label	4002-Y2C and Y4C fan tray airflow label

Figure 37. 4002-Y2B and 4002-Y4B device airflow

1	Air inflow	2	Air outlet
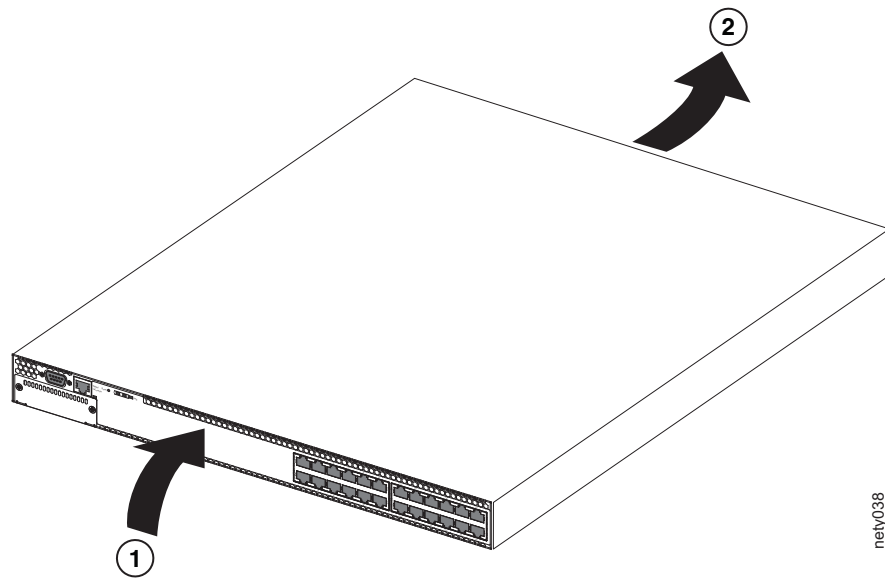
Figure 38. 4002-Y2A and 4002-Y4A device airflow

1	Air inflow	2	Air outlet
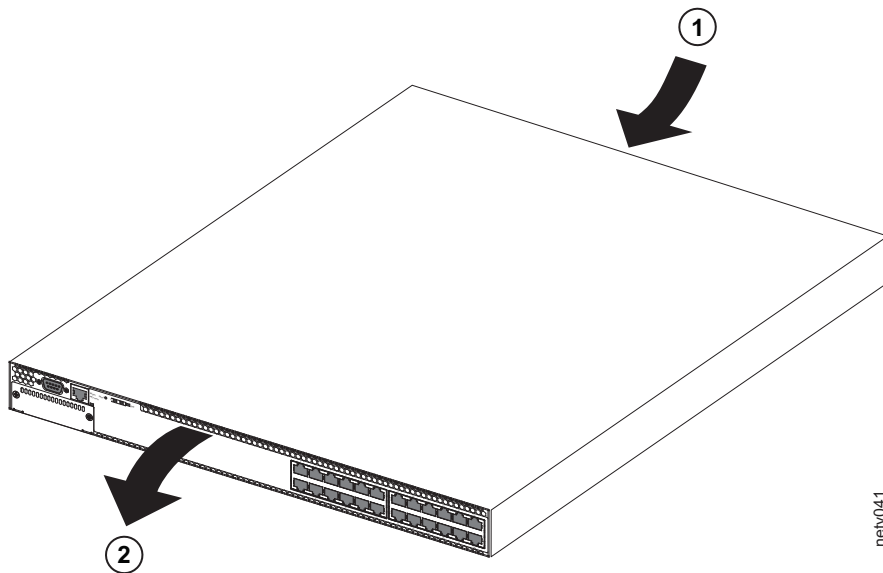
Figure 39. 4002-Y2C and 4002-Y4C device airflow

1	Air inflow	**2**	Air outlet

Pinouts and signaling

This section describes the pinout diagrams for the DB-9 connector and RJ45 port jacks.

Serial (Console) port pinouts

The Console port is a standard male DB-9 connector, as shown in Figure 40.
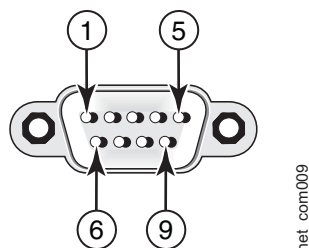
Figure 40. Serial port pinouts

Most PC serial ports require a cable with a female DB-9 connector. However, terminal connections will vary, requiring a cable with either a DB-9 or DB-25 connector, male or female.

Serial cable options between a y-series switch and a PC or terminal are shown in Figure 41 on page 53.

Note: As indicated in Figure 41 on page 53 and Figure 42 on page 53, some of the wires should not be connected. If you do connect the wires that are labeled "Reserved", you may get unexpected results with some terminals.

```
DB-9 to DB-9                                    DB-9 to DB-25
Female switch          Terminal or PC           Female switch          Terminal or PC

   1      Reserved        1                        1      Reserved        8
   2   ───────────────▶   2                        2   ───────────────▶   3
   3   ◀───────────────   3                        3   ◀───────────────   2
   4      Reserved        4                        4      Reserved       20
   5   ───────────────    5                        5   ───────────────    7
   6      Reserved        6                        6      Reserved        6
   7   ◀───────────────   7                        7   ◀───────────────   4
   8   ───────────────▶   8                        8   ───────────────▶   5
   9      Reserved        9                        9      Reserved       22
```

net_com005

Figure 41. Console port pin assignments showing cable connection options to a terminal or PC

| | 10BaseT | | 100BaseTX and 1000BaseT | |
Pin assignment	Pin number	MDI-X ports	Pin number	MDI-X ports
	1	RD+	1	RD+
	2	RD-	2	RD-
	3	TD+	3	TD+
	4	Not used	4	CMT
	5	Not used	5	CMT
	6	TD-	6	TD-
	7	Not used	7	CMT
	8	Not used	8	CMT

net_com006

Figure 42. Pin assignment and signalling for 10/100BaseTX and 1000BaseT ports

Cable specifications

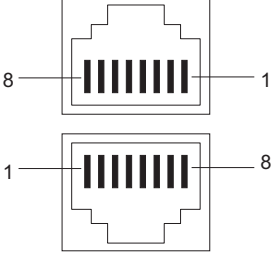Table 28 lists the specifications for the cables used with the 10/100 Ethernet ports. For information about supported transceivers, see Table 18 on page 35 and Table 19 on page 36.

Note: Cable installation and network configuration will affect overall transmission capability. The numbers provided below represent the accepted recommendations of the various standards. For network-specific recommendations, contact your IBM representative.

Table 28. Cable length summary

	Cable Type	Connector Type	Core Diameter (microns)	Modal Bandwidth (MHz*km) or Wavelength (nm)	Range (meters)
1000Base-BX-D	Single-mode Fiber (SMF)	LC connector for SFP module	9	1490 nm	2 - 10000 (10km)

Table 28. Cable length summary (continued)

	Cable Type	Connector Type	Core Diameter (microns)	Modal Bandwidth (MHz*km) or Wavelength (nm)	Range (meters)
1000Base-BX-U	SMF	LC connector for SFP module	9	1310 nm	2 - 10000 (10km)
1000Base-LHA	SMF	LC connector for SFP module	9	1550 nm	2 - 70000 (70km)
1000Base-LHB	SMF	LC connector for SFP module	9	1550 nm	2 - 120000 (120km)
1000Base-LX	Multi-mode Fiber (MMF)	LC connector for SFP module	62.5	500	2 - 550
	MMF		50	400	2 - 550
	MMF		50	500	2 - 550
	SMF		9	1300 nm	2 - 10000
1000Base-SX	MMF	LC connector for SFP module	62.5/125	200	.5 - 275
	MMF		62.5/125	500	.5 - 550
	MMF		50/125	900	.5 - 595
	MMF		50/125	1500	.5 - 740
	MMF		50/125	2000	.5 - 860
1000Base-T	Copper	RJ-45 jack for standard unshielded twisted pair (UTP or Category 5)	n/a	n/a	up to 100 meters
100Base-BX-U 100Base-BX-D	SMF	LC connector for SFP module	9	1310/1490	10000 (10 km)
100Base-FX	MMF	LC connector for SFP module	62.5	500	up to 2000 (2 km)
100Base-FX-IR	MMF	SC	62.5	125	2 km (1.24 miles)
100Base-FX-LR	SMF	SC	9	125	20 km (12.43 miles)
10GBase-CX4	Infiniband 4x copper	XAUI connector	n/a	n/a	up to 15
10G SFP+	TWNX	SFP	n/a	n/a	up to 15

Power cords

All devices ship with US-compatible power cords unless otherwise specified at the time of order. United Kingdom-compatible and European-compatible power cords are also available.

AC power supply specifications

All devices ship with one removable AC power supply unit with a standard IEC type (IEC320) input connector, operating 100 VAC to 240 VAC input, universal or wide input. Table 29 on page 55 lists the AC power supply specifications for these devices.

Note: For HPOE+ Class 4 power usage, y-series devices with two power supplies can only support up to 27 HPOE ports. For Class 1, 2, or 3 power usage, these devices can support up to 48 ports.

Table 29. AC power supply specifications

	Input voltage range	Input current (PSU x 1)	Inrush current	Power draw	Max output power (PSU x1)
4002-Y2B	100 - 240 VAC	3.3 - 7.8 Amps	< 75 Amps peak maximum	107.79 W 509.79 W with HPOE 509.79 W with HPOE+	620 W
4002-Y4B	100 - 240 VAC	3.3 - 7.8 Amps	< 75 Amps peak maximum	140.94 W 542.94 W with HPOE 542.94 W with HPOE+	620 W
4002-Y2A , 4002-Y2C	100 - 240 VAC	1.2 - 2.8 Amps	< 75 Amps peak maximum	57.36 W	210 W
4002-Y4A,4002-Y4C	100 - 240 VAC	1.2 - 2.8 Amps	< 75 Amps peak maximum	57.36 W	210 W

Chapter 6. Troubleshooting

Diagnosing switch indicators

Table 30. Troubleshooting chart

Symptom	Action
Power LED is off	• Internal power supply is disconnected. • Check connections between the switch, the power cord, and the wall outlet. • Contact Technical Support.
Power LED is amber	Internal power supply has failed. Contact Technical Support.
Diag LED is amber	• The switch self test has detected a fault. • Power cycle the switch to try and clear the condition. If the condition persists, contact Technical Support.
Link LED is off	• Verify that the switch and attached device are powered on. • Be sure the cable is plugged into both the switch and corresponding device. • Verify that the proper cable type is used and its length does not exceed specified limits. • Check the adapter on the attached device and cable connections for possible defects. Replace the defective adapter or cable if necessary.

Power and cooling problems

If the power indicator does not turn on when the power cord is plugged in, you may have a problem with the power outlet, power cord, or internal power supply. However, if the unit powers off after running for a while, check for loose power connections, power losses or surges at the power outlet, and verify that the fans on the unit are unobstructed and running prior to shutdown. If you still cannot isolate the problem, then the internal power supply may be defective. In this case, contact Technical Support for assistance.

Installation

Verify that all system components have been properly installed. If one or more components appear to be malfunctioning (such as the power cord or network cabling), test them in an alternate environment where you are sure that all the other components are functioning properly.

In-band access

You can access the management agent in the switch from anywhere within the attached network using Telnet, a Web browser, or other network management software. However, you must first configure the switch with a valid IP address, subnet mask, and default gateway. If you have trouble establishing a link to the management agent, check to see if you have a valid network connection. Then verify that you entered the correct IP address. Also, be sure the port through which you are connecting to the switch has not been disabled. If it has not been disabled,

then check the network cabling that runs between your remote location and the switch.

Notices

This information was developed for products and services offered in the USA.

IBM may not offer the products, services, or features discussed in this document in other countries. Consult your local IBM representative for information on the products and services currently available in your area. Any reference to an IBM product, program, or service is not intended to state or imply that only that IBM product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe on any IBM intellectual property right may be used instead. However, it is the user's responsibility to evaluate and verify the operation of any non-IBM product, program, or service.

IBM may have patents or pending patent applications covering subject matter described in this document. The furnishing of this document does not give you any license to these patents. You can send license inquiries, in writing, to:

IBM Director of Licensing
IBM Corporation
North Castle Drive
Armonk, N.Y. 10504-1785
U.S.A.

For additional information, visit the web at:
http://www.ibm.com/ibm/licensing/contact/

The following paragraph does not apply to the United Kingdom or any other country where such provisions are inconsistent with local law: INTERNATIONAL BUSINESS MACHINES CORPORATION PROVIDES THIS PUBLICATION "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Some states do not allow disclaimer of express or implied warranties in certain transactions, therefore, this statement may not apply to you.

This information could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of the publication. IBM may make improvements and/or changes in the product(s) and/or the program(s) described in this publication at any time without notice.

Any references in this information to non-IBM web sites are provided for convenience only and do not in any manner serve as an endorsement of those web sites. The materials at those web sites are not part of the materials for this IBM product and use of those web sites is at your own risk.

IBM may use or distribute any of the information you supply in any way it believes appropriate without incurring any obligation to you.

Any performance data contained herein was determined in a controlled environment. Therefore, the results obtained in other operating environments may vary significantly. Some measurements may have been made on development-level

systems and there is no guarantee that these measurements will be the same on generally available systems. Furthermore, some measurement may have been estimated through extrapolation. Actual results may vary. Users of this document should verify the applicable data for their specific environment.

Information concerning non-IBM products was obtained from the suppliers of those products, their published announcements or other publicly available sources. IBM has not tested those products and cannot confirm the accuracy of performance, compatibility or any other claims related to non-IBM products. Questions on the capabilities of non-IBM products should be addressed to the suppliers of those products.

If you are viewing this information in softcopy, the photographs and color illustrations may not appear.

Trademarks

IBM, the IBM logo, and ibm.com® are trademarks or registered trademarks of International Business Machines Corporation in the United States, other countries, or both. A complete and current list of other IBM trademarks is available on the Web at http://www.ibm.com/legal/copytrade.shtml

Adobe, the Adobe logo, PostScript, and the PostScript logo are either registered trademarks or trademarks of Adobe Systems Incorporated in the United States, and/or other countries.

Java and all Java-based trademarks and logos are trademarks of Sun Microsystems, Inc. in the United States, other countries, or both.

Linux® is a registered trademark of Linus Torvalds in the United States, other countries, or both.

Microsoft and Windows are trademarks of Microsoft Corporation in the United States, other countries, or both.

UNIX® is a registered trademark of The Open Group in the United States and other countries.

Other product and service names might be trademarks of IBM or other companies.

Electronic emission notices

The following statements apply to this product. The statements for other products intended for use with this product will appear in their accompanying manuals.

Federal Communications Commission (FCC) Class A Statement

This equipment has been tested and complies 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 harmful 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 harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

Properly shielded and grounded cables and connectors must be used in order to meet FCC emission limits. IBM is not responsible for any radio or television interference caused by using other than recommended cables and connectors or by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the user's authority to operate the equipment.

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

Industry Canada Class A Emission Compliance Statement

This Class A digital apparatus complies with Canadian ICES-003.

Avis de conformité à la réglementation d'Industrie Canada

Cet appareil numérique de la classe A est conform à la norme NMB-003 du Canada.

European Union EMC Directive Conformance Statement

This product is in conformity with the protection requirements of EU Council Directive 2004/108/EC on the approximation of the laws of the Member States relating to electromagnetic compatibility. IBM cannot accept responsibility for any failure to satisfy the protection requirements resulting from a non-recommended modification of the product, including the fitting of non-IBM option cards.

Attention: This is an EN55022 Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Responsible manufacturer:
International Business Machines Corp.
New Orchard Road
Armonk, New York 10504
Tel: 919-499-1900

European community contact:
IBM Technical Regulations, Department M456

IBM-Allee 1, 71137 Ehningen, Germany
Tel: +49 7032 15-2937
E-mail: tjahn@de.ibm.com

Germany Electromagnetic Compatibility Directive

Deutschsprachiger EU Hinweis:

Hinweis für Geräte der Klasse A EU-Richtlinie zur Elektromagnetischen Verträglichkeit

Dieses Produkt entspricht den Schutzanforderungen der EU-Richtlinie 2004/108/EG zur Angleichung der Rechtsvorschriften über die elektromagnetische Verträglichkeit in den EU-Mitgliedsstaaten und hält die Grenzwerte der EN 55022 Klasse A ein.

Um dieses sicherzustellen, sind die Geräte wie in den Handbüchern beschrieben zu installieren und zu betreiben. Des Weiteren dürfen auch nur von der IBM empfohlene Kabel angeschlossen werden. IBM übernimmt keine Verantwortung für die Einhaltung der Schutzanforderungen, wenn das Produkt ohne Zustimmung der IBM verändert bzw. wenn Erweiterungskomponenten von Fremdherstellern ohne Empfehlung der IBM gesteckt/eingebaut werden.

EN 55022 Klasse A Geräte müssen mit folgendem Warnhinweis versehen werden: "Warnung: Dieses ist eine Einrichtung der Klasse A. Diese Einrichtung kann im Wohnbereich Funk-Störungen verursachen; in diesem Fall kann vom Betreiber verlangt werden, angemessene Maßnahmen zu ergreifen und dafür aufzukommen."

Deutschland: Einhaltung des Gesetzes über die elektromagnetische Verträglichkeit von Geräten

Dieses Produkt entspricht dem "Gesetz über die elektromagnetische Verträglichkeit von Geräten (EMVG)". Dies ist die Umsetzung der EU-Richtlinie 2004/108/EG in der Bundesrepublik Deutschland.

Zulassungsbescheinigung laut dem Deutschen Gesetz über die elektromagnetische Verträglichkeit von Geräten (EMVG) (bzw. der EMC EG Richtlinie 2004/108/EG) für Geräte der Klasse A

Dieses Gerät ist berechtigt, in Übereinstimmung mit dem Deutschen EMVG das EG-Konformitätszeichen - CE - zu führen.

Verantwortlich für die Einhaltung der EMV Vorschriften ist der Hersteller:
International Business Machines Corp.
New Orchard Road
Armonk, New York 10504
Tel: 919-499-1900

Der verantwortliche Ansprechpartner des Herstellers in der EU ist:
IBM Deutschland
Technical Regulations, Department M456
IBM-Allee 1, 71137 Ehningen, Germany
Tel: +49 7032 15-2937
E-mail: tjahn@de.ibm.com

Generelle Informationen:

Das Gerät erfüllt die Schutzanforderungen nach EN 55024 und EN 55022 Klasse A.

People's Republic of China Class A Electronic Emission Statement

中华人民共和国 "A类" 警告声明

声 明
此为A级产品，在生活环境中，该产品可能会造成无线电干扰。在这种情况下，
可能需要用户对其干扰采取切实可行的措施。

Japan VCCI Council Class A Statement

この装置は、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。　　　　　　　VCCI–A

Translation: This is a Class A product based on the standard of the VCCI Council. If this equipment is used in a domestic environment, radio interference may occur, in which case, the user may be required to take corrective actions.

Japan Electronics and Information Technology Industries Association (JEITA) Statement

Japanese Electronics and Information Technology Industries Association (JEITA) Confirmed Harmonics Guideline (products less than or equal to 20 A per phase).

高調波ガイドライン適合品   jiieta1

Korea Communications Commission (KCC) Statement

Please note that this equipment has obtained EMC registration for commercial use. In the event that it has been mistakenly sold or purchased, please exchange it for equipment certified for home use.

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

Russia Electromagnetic Interference (EMI) Class A Statement

ВНИМАНИЕ! Настоящее изделие относится к классу А. В жилых помещениях оно может создавать радиопомехи, для снижения которых необходимы дополнительные меры

rusemi

Australia and New Zealand Class A Statement

Attention: This is a Class A product. In a domestic environment this product might cause radio interference in which case the user might be required to take adequate measures.

Index

Numerics

10/100
   cabling   34

A

about this document
   how to send your comments   xxiii
Access levels   29
accessibility   xxi
   documentation formats   xxii
   keyboard navigation   xxi
   links   xxii
accessibility features   xxi
Address
   IP   30, 32
Assigning
   IP address   30, 32
attention notice
   definition   x
   example   x
attention notices   x

B

Brocade
   product names   xviii

C

Cable
   crossover   34
   straight-through   35
caution notices   x
   definition   x
   examples   xi
Chassis
   poll interval   46
CIDR   30, 32
CLI
   access levels   29
   attaching serial cable   22
   CONFIG Level   29
   Privileged EXEC level   29
   securing access   29
   User EXEC level   29
comments
   sending   xxiii
CONFIG Level   29
Connector
   console   22
   module   34
Console
   attaching   22
conventions
   typographical   xxiii
cooling problems   57

D

danger notices   xi
   definitions   xi
   examples   xi
Desktop installation   17
director of licensing, address   59
documentation
   improvement   xxiii
documents
   Brocade   xviii
   product   xviii
   software   xviii

E

electrical danger
   general notice   xii
electronic emission notices   62
electrostatic discharge (ESD)
   precautions   x
Enable password
   assigning   29
environmental notices   xvii
   translations   xvii
ESD
   precautions   x

F

Fast Ethernet
   cabling   34
Fiber
   cabling   34, 35

G

getting help   xxii

H

Hardware
   installation   15
help   xxii
how to send your comments   xxiii

I

IBM
   notices   59
   product names   xviii
   trademarks   61
installation
   problems   57
Installation
   desktop   17
   hardware   15
   location and clearance   16
intellectual property   59

IP

   network mask   30, 32
IP address
   assigning   30, 32
   CIDR notation   30, 32

L

labels   xiv
LED indicators
   Diag   9
   Power   9, 11
   RPU   9, 12
license, for patents   59

M

manual nomenclature   xxiii
Module
   connectors   34

N

Network
   connection   34
network connections
   troubleshooting   40
Network mask   30, 32
notices
   attention   x
   caution   x
   danger   xi
   environmental   xvii
   general   59
   IBM   59
   patents   59
   safety   ix
   types   ix
notices and labels
   safety   ix
notices, attention   x

P

Package contents   15
Password
   assigning   29
patents   59
PC
   attaching   22
Pin assignments
   serial port   22
Poll interval   46
preface   ix
Privileged EXEC level   29
product
   disposal   xvii
   publications   xviii
   recycling   xvii

IBM®

Part Number: 45W7657

Printed in USA

GC27-2269-00

53- 1001545- 01