The following information is for FCC compliance of Class A devices: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against 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 instructions, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case users will be required to correct the interference at their own expense.

The following information is for FCC compliance of Class B devices: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If the equipment causes interference to radio or television reception, which can be determined by turning the equipment off and on, users are encouraged to try to correct the interference by using one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Modifications to this product not authorized by Cisco could void the FCC approval and negate your authority to operate the product.

The Cisco implementation of TCP header compression is an adaptation of a program developed by the University of California, Berkeley (UCB) as part of UCB’s public domain version of the UNIX operating system. All rights reserved. Copyright © 1981, Regents of the University of California.

NOTWITHSTANDING ANY OTHER WARRANTY HEREIN, ALL DOCUMENT FILES AND SOFTWARE OF THESE SUPPLIERS ARE PROVIDED “AS IS” WITH ALL FAULTS. CISCO AND THE ABOVE-NAMED SUPPLIERS DISCLAIM ALL WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING, WITHOUT LIMITATION, THOSE OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT OR ARISING FROM A COURSE OF DEALING, USAGE, OR TRADE PRACTICE.

IN NO EVENT SHALL CISCO OR ITS SUPPLIERS BE LIABLE FOR ANY INDIRECT, SPECIAL, CONSEQUENTIAL, OR INCIDENTAL DAMAGES, INCLUDING, WITHOUT LIMITATION, LOST PROFITS OR LOSS OR DAMAGE TO DATA ARISING OUT OF THE USE OR INABILITY TO USE THIS MANUAL, EVEN IF CISCO OR ITS SUPPLIERS HAVE BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

Any Internet Protocol (IP) addresses and phone numbers used in this document are not intended to be actual addresses and phone numbers. Any examples, command display output, network topology diagrams, and other figures included in the document are shown for illustrative purposes only. Any use of actual IP addresses or phone numbers in illustrative content is unintentional and coincidental.

All printed copies and duplicate soft copies are considered un-Controlled copies and the original on-line version should be referred to for latest version.

Cisco has more than 200 offices worldwide. Addresses, phone numbers, and fax numbers are listed on the Cisco website at www.cisco.com/go/offices.

Cisco IE 3010 Switch Hardware Installation Guide

© 2010–2015 Cisco Systems, Inc. All rights reserved.
Preface

This guide describes the hardware features of the Cisco Industrial Ethernet (IE) 3010 switch. It describes the physical and performance characteristics of the switch, explains how to install it, and provides troubleshooting information.

This guide does not describe system messages that you might receive or how to configure your switch. See the switch software configuration guide, the switch command reference, and the switch system message guide on Cisco.com:

http://www.cisco.com/go/IE3010_docs

Conventions

This document uses the following conventions.

<table>
<thead>
<tr>
<th>Conventions</th>
<th>Indication</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>bold</strong> font</td>
<td>Commands and keywords and user-entered text appear in <em>bold</em> font.</td>
</tr>
<tr>
<td><em>italic</em> font</td>
<td>Document titles, new or emphasized terms, and arguments for which you supply values are in <em>italic</em> font.</td>
</tr>
<tr>
<td>[ ]</td>
<td>Elements in square brackets are optional.</td>
</tr>
<tr>
<td>{x</td>
<td>y</td>
</tr>
<tr>
<td>[x</td>
<td>y</td>
</tr>
<tr>
<td>string</td>
<td>A nonquoted set of characters. Do not use quotation marks around the string or the string will include the quotation marks.</td>
</tr>
<tr>
<td>courier font</td>
<td>Terminal sessions and information the system displays appear in courier font.</td>
</tr>
<tr>
<td>&lt; &gt;</td>
<td>Nonprinting characters such as passwords are in angle brackets.</td>
</tr>
<tr>
<td>[ ]</td>
<td>Default responses to system prompts are in square brackets.</td>
</tr>
<tr>
<td>!, #</td>
<td>An exclamation point (!) or a pound sign (#) at the beginning of a line of code indicates a comment line.</td>
</tr>
</tbody>
</table>

**Note:** Means *reader take note*. Notes contain helpful suggestions or references to material not covered in the manual.

**Caution:** Means *reader be careful*. In this situation, you might perform an action that could result in equipment damage or loss of data.

**Warning:** IMPORTANT SAFETY INSTRUCTIONS

Means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents. Use the statement number provided at the end of each warning to locate its translation in the translated safety warnings that accompanied this device.

**SAVE THESE INSTRUCTIONS**

**Regulatory:** Provided for additional information and to comply with regulatory and customer requirements.
The safety warnings for this product are translated into several languages in the Regulatory Compliance and Safety Information for the Cisco IE 3010 Switch that ships with the product on the documentation CD. The EMC regulatory statements are also included in that guide.

Related Publications

http://www.cisco.com/go/IE3010_docs

Note: Before installing, configuring, or upgrading the switch, see the release notes on Cisco.com for the latest information.

- Release Notes for the Cisco IE 3010 Switch
- Cisco IE 3010 Switch Getting Started Guide
- Regulatory Compliance and Safety Information for the Cisco IE 3010 Switch
- Cisco IE 3010 Switch Software Configuration Guide
- Cisco IE 3010 Switch Command Reference
- Cisco IE 3010 Switch System Message Guide

Cisco SFP documents:

SFP compatibility matrix documents:

Obtaining Documentation and Submitting a Service Request

For information on obtaining documentation, using the Cisco Bug Search Tool (BST), submitting a service request, and gathering additional information, see What’s New in Cisco Product Documentation at:

Subscribe to What’s New in Cisco Product Documentation, which lists all new and revised Cisco technical documentation as an RSS feed and delivers content directly to your desktop using a reader application. The RSS feeds are a free service.
Product Overview

The Cisco IE 3010 switch provides a rugged and secure switching infrastructure for harsh environments. It is suitable for industrial Ethernet applications, including process manufacturing, intelligent transportation systems (ITSs), rail transportation, and other similar deployments.

In industrial environments, you can connect the switch to any Ethernet-enabled industrial communication devices, including programmable logic controllers (PLCs), human–machine interfaces (HMIs), drives, sensors, and input and output (IO) devices.

This section provides overviews of the following topics:

- Switch Models, page 5
- Cable Side, page 5
- Power-Supply Side, page 14
- Management Options, page 16

Switch Models

Table 1  Switch Models

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cisco IE-3010-24TC</td>
<td>24 10/100 FastEthernet ports, 2 dual-purpose ports (2 10/100/1000BASE-T copper ports and 2 SFP(^1) module slots), and 2 AC and DC power-supply module slots.</td>
</tr>
<tr>
<td>Cisco IE-3010-16S-8PC</td>
<td>16 100BASE-FX SFP-module slots; 8 10/100 FastEthernet PoE(^2) ports, 2 dual-purpose ports (2 10/100/1000BASE-T copper ports and 2 SFP module slots), and 2 AC and DC power-supply module slots.</td>
</tr>
</tbody>
</table>

1. SFP = small form-factor pluggable.
2. PoE = Power over Ethernet.

Cable Side

The 10/100 Fast Ethernet downlink ports in Figure 1 on page 6 are grouped in pairs. The first member of the pair (port 1) is above the second member (port 2) on the left. Port 3 is above port 4, and so on. The dual-purpose ports are numbered 1 and 2.
Product Overview

Cable Side

Figure 1  Cisco IE-3010-24TC Cable-Side View

1. SD\(^1\) flash memory card slot
2. LEDs
3. Express Setup button
4. 10/100 ports
5. Dual purpose ports
6. RJ-45 console port
7. USB (mini-Type B) console port
8. Power-input terminal
9. Alarm port

The 100BASE-FX SFP ports and the 10/100 PoE ports are grouped in pairs. The first member of the pair (port 1) is above the second member (port 2) on the left. Port 3 is above port 4, and so on. The dual-purpose ports are numbered 1 and 2.

Figure 2  Cisco IE-3010-16S-8PC Cable-Side View

1. SD flash memory card slot
2. LEDs
3. Express Setup button
4. 100BASE-FX SFP ports
5. 10/100 PoE ports
6. Dual purpose ports
7. RJ-45 console port
8. USB (mini-Type B) console port
9. Power-input terminal
10. Alarm port

10/100 Fast Ethernet Ports

You can set the 10/100 ports on the switch to operate in any combination of half duplex, full duplex, or 10 or 100 Mb/s. You can set the ports for speed and duplex autonegotiation. The default setting is autonegotiate.
When set for autonegotiation, the switch determines the speed and duplex settings of the attached device and advertises its own capabilities. If the connected device also supports autonegotiation, the switch negotiates the best connection (the fastest line speed that both devices support and full-duplex transmission if the attached device supports it) and configures itself accordingly. In all cases, the attached device must be within 328 feet (100 meters).

10/100/1000BASE-T Copper SFP Module Uplink Slots

The IEEE 802.3 1000BASE-T SFP module slots provide full-duplex 1000BASE-T connectivity over copper wire. These ports use a copper SFP transceiver module that accepts an RJ-45 connector. See SFP Module Cables, page 74 for cable type and length. See SFP Modules, page 8 for model information.

PoE Ports

Warning: Voltages that present a shock hazard may exist on Power over Ethernet (PoE) circuits if interconnections are made using uninsulated exposed metal contacts, conductors, or terminals. Avoid using such interconnection methods, unless the exposed metal parts are located within a restricted access location and users and service people who are authorized within the restricted access location are made aware of the hazard. A restricted access area can be accessed only through the use of a special tool, lock and key or other means of security. Statement 1072

The 10/100 PoE ports on the Cisco IE-3010-16S-8PC switches provide PoE support for devices that are compliant with IEEE 802.3af. The Cisco prestandard PoE is also supported for Cisco IP Phones and Cisco Aironet Access Points. The PoE ports on the switch deliver up to 15.4 W of PoE. Any four of the eight ports are designated as high priority PoE ports, while the other four ports are designated as low priority PoE ports. When both the power-supply modules are installed, the system has enough power to support all eight ports as PoE ports. In case one of the power-supply modules fails, the power to the low priority PoE ports is dropped, while power to the high priority PoE ports remains uninterrupted.

On a per-port basis, you control whether or not a port automatically provides power when an IP phone or an access point is connected.

The 10/100 PoE ports use RJ-45 connectors with Ethernet pinouts. The maximum cable length is 328 feet (100 meters). The 100BASE-TX and 1000BASE-T traffic requires CA5, CAT5e, or CAT6 unshielded twisted pair (UTP) cable. The 10BASE-T traffic can use CAT3 or CAT4 UTP cable.

For information about configuring and monitoring PoE ports, see the switch software configuration guide on Cisco.com.

For information about port connections and port specifications, see Connecting Devices to the Ethernet Ports, page 44 and Connector and Cable Specifications, page 71.

Note: The output of the PoE circuit has been evaluated as a Limited Power Source (LPS) per IEC 60950-1.

Dual-Purpose Ports

You can configure the dual-purpose ports on the switch as either 10/100/1000 ports or as SFP-module ports. You can set the 10/100/1000 ports to autonegotiate, or you can configure them as fixed 10, 100, or 1000 Mb/s (Gigabit) Ethernet ports.

By default, the switch selects the medium for each dual-purpose port (10/100/1000BASE-T or SFP). When a link is achieved on one media type, the switch disables the other media type until the active link goes down. If links are active on both media, the SFP-module port has priority, but you can use the media-type interface configuration command to manually designate the port as an RJ-45 port or an SFP port.

You can configure the speed and duplex settings consistent with the selected media type. For information on configuring interfaces, see the switch software configuration guide.
SFP Modules

The switch Ethernet SFP modules provide connections to other devices. These field-replaceable transceiver modules provide the uplink interfaces. SFP modules have local connectors (LCs) for fiber-optic connections or RJ-45 connectors for copper connections. You can use any combination of the supported SFP modules listed in Table 2 on page 8.

Table 2  SFP Modules Maximum Operating Temperature

<table>
<thead>
<tr>
<th>Type of SFP Module</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rugged and Industrial SFPs</td>
<td>-40 to 185°F (-40 to 85°C)</td>
</tr>
<tr>
<td>- GLC-SX-MM-RGD</td>
<td></td>
</tr>
<tr>
<td>- GLC-LX-SM-RGD</td>
<td></td>
</tr>
<tr>
<td>- GLC-FE-100LX-RGD</td>
<td></td>
</tr>
<tr>
<td>- GLC-FE-100FX-RGD</td>
<td></td>
</tr>
<tr>
<td>- GLC-FE-T-I</td>
<td></td>
</tr>
<tr>
<td>- GLC-ZX-SM-RGD</td>
<td></td>
</tr>
<tr>
<td>- GLC-BX40-D-I with DOM support</td>
<td></td>
</tr>
<tr>
<td>- GLC-BX40-DA-I with DOM support</td>
<td></td>
</tr>
<tr>
<td>- GLC-BX80-D-I with DOM support</td>
<td></td>
</tr>
<tr>
<td>- GLC-BX40-U-I with DOM support</td>
<td></td>
</tr>
<tr>
<td>- GLC-BX80-U-I with DOM support</td>
<td></td>
</tr>
<tr>
<td>Commercial SFPs</td>
<td>32 to 158°F (0 to 70°C)</td>
</tr>
<tr>
<td>- GLC-BX-D with DOM support</td>
<td></td>
</tr>
<tr>
<td>- GLC-BX-U with DOM support</td>
<td></td>
</tr>
<tr>
<td>- GLC-FE-100LX</td>
<td></td>
</tr>
<tr>
<td>- GLC-FE-100BX-D</td>
<td></td>
</tr>
<tr>
<td>- GLC-FE-100BX-U</td>
<td></td>
</tr>
<tr>
<td>- GLC-FE-100FX</td>
<td></td>
</tr>
<tr>
<td>- GLC-FE-100EX</td>
<td></td>
</tr>
<tr>
<td>- GLC-FE-100ZX</td>
<td></td>
</tr>
<tr>
<td>- GLC-T</td>
<td></td>
</tr>
<tr>
<td>- CWDM SFP with DOM support</td>
<td></td>
</tr>
</tbody>
</table>
For minimum software requirements, refer to the Release Notes for your platform.

For the most up-to-date list of supported SFP models for Cisco Industrial Ethernet switches, see http://www.cisco.com/en/US/docs/interfaces_modules/transceiver_modules/compatibility/matrix/OL_6981.html#wp138176

For information about SFP modules, see your SFP module documentation and the Installing and Removing SFP Modules, page 35. For cable specifications, see the SFP Module Cables, page 74.

**SFP Module Patch Cable**

The switch uses an SFP-module patch cable, a 0.5-meter, copper, passive cable with SFP module connectors at each end (see Figure 3 on page 9). The patch cable connects two switches in a cascaded configuration.

**Figure 3  SFP-Module Patch Cable**

See the Inserting and Removing the SFP Module Patch Cable, page 40 for information about using the SFP module patch cable.

You can order this cable (part number CAB-SFP-50CM=).

**Power-Input Terminal**

The power-input terminal provides screw terminals for the AC and DC power connections. The switch can operate with one or two power supplies. If one of the power sources fail, the other continues to power the switch. See Power Supply Installation, page 47 for information.
Alarm Ports

The switch has four alarm inputs and one alarm output. The alarm setting is open or closed.

- Open means that the normal condition has current flowing through the contact (referred to as a *normally closed* contact). The alarm is generated when the current stops.
- Closed means that no current flows through the contact (referred to as a *normally open* contact). The alarm is generated when the current flows.

Alarm Input

The alarm input is a dry-contact alarm port. You can connect up to four alarm inputs from devices, such as a door, a temperature gauge, or a fire alarm, to the alarm port. You can use the CLI to set the alarm severity to minor, major, or critical. An alarm generates a system message and turns on an LED. See the Alarm LEDs, page 12 for the LED descriptions.

Alarm Output

The alarm output can be configured as a minor or major alarm. Output alarms often control an external alarm, such as a bell or a light. To connect an external alarm device to the relay, you connect two relay contact wires to complete the electrical circuit. See for information on the alarm pinouts. see the Alarm Port, page 73.

Management Ports

You can connect the switch to a PC running Microsoft Windows or to a terminal server through either the RJ-45 console port or the USB console port.

- USB mini-Type B console port (5-pin connector). The USB connection uses a USB Type A-to-5-pin mini-Type B cable.

The USB console interface speeds are the same as the RJ-45 console interface speeds.

To use the USB console port, you must install the Cisco Windows USB device driver on the device that is connected to the USB console port (device running with Microsoft Windows).

**Note:** For information about downloading the Cisco USB device driver, see the Installing the Cisco Microsoft Windows USB Device Drivers, page 84.
With the Cisco Windows USB device driver, connecting and disconnecting the USB cable from the console port does not affect Windows HyperTerminal operations. Mac OS X or Linux require no special drivers.

**Note:** The 5-pin mini-Type B connectors resemble the 4-pin mini-Type B connectors. They are not compatible. Use only the 5-pin mini-Type B. See Figure 5 on page 11.

**Figure 5**  USB Mini-Type B Port

The configurable inactivity timeout reactivates the RJ-45 console port if the USB console port is activated, but no input activity occurs on it for a specified time period. When the USB console port deactivates due to a timeout, you can restore its operation by disconnecting and reconnecting the USB cable. For information on using the CLI to configure the USB console interface, see the switch software guide.

**LEDs**

You can use the switch system and port LEDs to monitor switch activity and performance.

**Switch Panel LEDs**

![Switch LEDs (Cable Side)](image)

- 1  SYS (system)
- 2  CON (RJ-45 console)
- 3  USB (mini-USB console)
- 4  SD (SD flash memory card)
- 5  IN1 (alarm input 1)
- 6  IN2 (alarm input 2)
- 7  IN3 (alarm input 3)
- 8  IN4 (alarm input 4)
- 9  OUT (alarm output)
- 10  PSU1 (power supply 1)
- 11  PSU2 (power supply 2)
- 12  PoE
- 13  Express Setup button
- 14  Ethernet ports
Product Overview

Cable Side

7  IN3 (alarm input 3)  15  SFP module port
8  IN4 (alarm input 4)  16  10/100/1000 port
1. Only on the Cisco IE-3010-16S-8PC switch.

System LED

<table>
<thead>
<tr>
<th>Color</th>
<th>System Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Off</td>
<td>System is not powered on.</td>
</tr>
<tr>
<td>Blinking green</td>
<td>POST(^1) is in progress.</td>
</tr>
<tr>
<td>Green</td>
<td>System is operating normally.</td>
</tr>
<tr>
<td>Amber</td>
<td>System is receiving power but is not functioning properly.</td>
</tr>
</tbody>
</table>

1. POST = power-on self-test.

Power-Supply Module LEDs

The switch power-supply module LEDs are labeled PSU1 and PSU2 (on the switch) and PSU OK (on the power-supply module). They show whether power-supply modules 1 and 2 are receiving power. See Figure 6 on page 11 and Figure 9 on page 15.

<table>
<thead>
<tr>
<th>Color</th>
<th>System Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Off</td>
<td>Power-supply module (1 or 2) is not installed.</td>
</tr>
<tr>
<td>Green</td>
<td>Valid input is present, and the output is within the operating range.</td>
</tr>
<tr>
<td>Red</td>
<td>Valid input is present, and the output is outside the operating range or is not present.</td>
</tr>
<tr>
<td>Blinking red</td>
<td>Valid input is not present.</td>
</tr>
</tbody>
</table>

Alarm LEDs

<table>
<thead>
<tr>
<th>Color</th>
<th>System Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Off</td>
<td>No alarm</td>
</tr>
<tr>
<td>Amber</td>
<td>Minor alarm</td>
</tr>
<tr>
<td>Red</td>
<td>Major alarm</td>
</tr>
<tr>
<td>Blinking red</td>
<td>Critical alarm</td>
</tr>
</tbody>
</table>

Alarm Output LED

<table>
<thead>
<tr>
<th>Color</th>
<th>System Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green</td>
<td>No alarm</td>
</tr>
<tr>
<td>Red</td>
<td>Relay closed, alarm present</td>
</tr>
</tbody>
</table>
Console LEDs

The console LEDs show which console port is in use. See Figure 6 on page 11 and Figure 9 on page 15 for the LED locations.

If you connect a cable to a console port, the switch automatically uses that port for console communication. If you connect two console cables, the USB console port has priority.

Table 7  **RJ-45 and USB Console Port LEDs**

<table>
<thead>
<tr>
<th>LED</th>
<th>Color</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>RJ-45 console port</td>
<td>Green</td>
<td>RJ-45 console port is active.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>USB console port LED is off.</td>
</tr>
<tr>
<td></td>
<td>Off</td>
<td>Port is not active.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>USB console port is active.</td>
</tr>
<tr>
<td>USB console port</td>
<td>Green</td>
<td>USB console port is active.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>RJ-45 console port LED is off.</td>
</tr>
<tr>
<td></td>
<td>Off</td>
<td>Port is not active.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>RJ-45 console port is active.</td>
</tr>
</tbody>
</table>

Port LEDs

RJ-45 ports and SFP-module slots have port LEDs. Port LEDs, as a group or individually, provide information about the switch and about the individual ports.

Table 8  **Meaning of Port LED Colors**

<table>
<thead>
<tr>
<th>LED Color</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Off</td>
<td>No link or port was administratively shut down.</td>
</tr>
<tr>
<td>Green</td>
<td>Link present but not sending or receiving data.</td>
</tr>
<tr>
<td>Blinking green</td>
<td>Activity. Port is sending or receiving data.</td>
</tr>
<tr>
<td>Alternating green-amber</td>
<td>Link fault. Error frames can affect connectivity, and errors such as excessive collisions, CRC errors, and alignment and jabber errors are monitored for link faults.</td>
</tr>
<tr>
<td>Amber</td>
<td>Port is blocked by Spanning Tree Protocol (STP) and is not forwarding data. After a port is reconfigured, the port LED is amber for up to 30 seconds as STP searches for loops.</td>
</tr>
</tbody>
</table>

PoE LED

Table 9  **PoE LED**

<table>
<thead>
<tr>
<th>Color</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Off</td>
<td>PoE is not enabled.</td>
</tr>
<tr>
<td>Green</td>
<td>PoE is enabled. Ports are functioning correctly.</td>
</tr>
<tr>
<td>Amber</td>
<td>PoE is enabled, but an error is present.</td>
</tr>
</tbody>
</table>
Power-Supply Side

Dual-Purpose Port LEDs

The dual-purpose port LEDs identify the connection as either a copper-based connector or an SFP module. The ports can autonegotiate, or you can manually configure each dual-purpose port as either 10/100/1000 with copper connectors or as an SFP-module port, but not as both types at the same time. See Table 8 on page 13 for LED descriptions.

SD Flash Memory Card LED

<table>
<thead>
<tr>
<th>Color</th>
<th>System Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Off / blinking green</td>
<td>SD flash memory card transfer in progress.</td>
</tr>
<tr>
<td>Blinking amber</td>
<td>SD flash memory card is not present (slow blinking).</td>
</tr>
<tr>
<td>Amber</td>
<td>Unsupported SD flash memory card is detected (fast blinking).</td>
</tr>
<tr>
<td>Amber</td>
<td>Error accessing the SD flash memory card.</td>
</tr>
<tr>
<td>Green</td>
<td>Cisco IOS boot image cannot be found.</td>
</tr>
<tr>
<td>Green</td>
<td>SD flash memory card is functioning.</td>
</tr>
</tbody>
</table>

SD Flash Memory Card

The switch ships with the Secure Digital (SD) flash memory card installed. See Figure 1 on page 6 and Figure 2 on page 6. The switch stores the Cisco IOS software images and the switch configuration on the card. You should not remove the card unless you want to use it in a replacement switch. You then do not have to reconfigure the new switch. See the Replacing the SD Flash Memory Card, page 41 for information.

Power-Supply Side

The power-supply side has the LED panel and two power-supply slots for the removable power supplies. See Figure 7 on page 14 and Figure 8 on page 15.

Figure 7 Switch with One Power-Supply Module

1. LED panel
2. Power-supply slot 1
3. Power-supply slot 2
Product Overview

Power-Supply Side

Figure 8  Switch with Both Power-Supply Modules

1  PSU OK LED

For a description of the PSU OK LED, see Table 4 on page 12.

Power-Supply Side LEDs

Figure 9  Switch LEDs

1  SYS (system)
2  CON (console)
3  USB LED
4  SD (SD flash memory card)
5  IN1 (alarm input 1)
6  IN2 (alarm input 2)
7  IN3 (alarm input 3)
8  IN4 (alarm input 4)
9  OUT (alarm output)
10 PSU1 (power supply 1)
11 PSU2 (power supply 2)
12 PoE
13 Ethernet ports
14 10/100/1000 port
15 SFP port
Product Overview

Management Options

1. Only on the Cisco IE-3010-16S-8PC switch.

For a description of the LEDs, see the LEDs, page 11.

Power Supply Features

The switch has two slots for power-supply modules:

- PWR-RGD-LOW-DC/IA: low-voltage DC (for voltage information, see Table 18 on page 69)
- PWR-RGD-AC-DC/IA: high-voltage AC or DC (for voltage information, see Table 17 on page 69)

The switch supports these power-supply module combinations:

- Single low-voltage DC
- Single high-voltage AC or DC
- Two high-voltage AC or DC
- Two low-voltage DC
- One high-voltage AC or DC and one low-voltage DC

For information on installing the power-supply modules, see Power Supply Installation, page 47

See Table 4 on page 12 for information on the power supply LEDs.

Management Options

- Cisco IOS CLI
  
  You can configure and monitor the switch from the CLI. Connect your management station to the switch console port or use Telnet from a remote management station. See the switch command reference on Cisco.com for information.

- SNMP network management
  
  You can manage switches from a Simple Network Management Protocol (SNMP)-compatible management station that is running platforms such as HP OpenView or SunNet Manager. The switch supports a comprehensive set of Management Information Base (MIB) extensions and four Remote Monitoring (RMON) groups. See the switch software configuration guide on Cisco.com and the documentation that came with your SNMP application for information.

Network Configurations

See the switch software configuration guide on Cisco.com for an explanation of network configuration concepts. The software configuration guide also provides network configuration examples for creating dedicated network segments that are interconnected through Ethernet connections.
Switch Installation

Read the topics and perform the procedures in this order:

- Warnings, page 17
- Installation Guidelines, page 18
- Verifying Switch Operation, page 18
- Installing the Switch, page 19
- Installing and Removing SFP Modules, page 35
- Inserting and Removing the SFP Module Patch Cable, page 40
- Replacing the SD Flash Memory Card, page 41
- Connecting Devices to the Ethernet Ports, page 44
- Where to Go Next, page 46

Warnings

These warnings are translated into several languages in the Regulatory Compliance and Safety Information for the Cisco IE 3010 Switch document that ships on the documentation CD.

These warning statements apply to all the switches:

**Warning:** Before working on equipment that is connected to power lines, remove jewelry (including rings, necklaces, and watches). Metal objects will heat up when connected to power and ground and can cause serious burns or weld the metal object to the terminals. Statement 43

**Warning:** Read the installation instructions before you connect the system to its power source. Statement 1004

**Warning:** This unit is intended for installation in restricted access areas. A restricted access area can be accessed only through the use of a special tool, lock and key, or other means of security. Statement 1017

**Warning:** This equipment must be grounded. Never defeat the ground conductor or operate the equipment in the absence of a suitably installed ground conductor. Contact the appropriate electrical inspection authority or an electrician if you are uncertain that suitable grounding is available. Statement 1024

**Warning:** This unit might have more than one power supply connection. All connections must be removed to de-energize the unit. Statement 1028

**Warning:** Only trained and qualified personnel should be allowed to install, replace, or service this equipment. Statement 1030

**Warning:** Ultimate disposal of this product should be handled according to all national laws and regulations. Statement 1040
Installation Guidelines

Warning: For connections outside the building where the equipment is installed, the following ports must be connected through an approved network termination unit with integral circuit protection. 10/100/1000 Ethernet Statement 1044

Warning: To prevent the system from overheating, do not operate it in an area that exceeds the maximum recommended ambient temperature of: 140°F (60°C) Statement 1047

Warning: Installation of the equipment must comply with local and national electrical codes. Statement 1074

Note: For U.S. installations, refer to national electrical code ANSI/NFPA 70.

Warning: To prevent airflow restriction, allow clearance around the ventilation openings to be at least: 1.75 in. (4.4 cm). Statement 1076

Warning: Avoid using or servicing any equipment that has outdoor connections during an electrical storm. There may be a risk of electric shock from lightning. Statement 1088

Verifying Switch Operation

Before installing the switch in a rack or on a wall, you should power the switch and verify that the switch passes the power-on self-test (POST).

To wire the switch to the power source, see Power Supply Installation, page 47

When the switch begins POST, the SYS LED blinks green, and the other LEDs stay green. When the switch passes POST, the SYS LED turns green. The other LEDs turn off and return to their operating status. If the switch fails POST, the SYS LED is amber.

Note: Contact Cisco Systems immediately if your switch fails POST.

After a successful POST, disconnect the power from the switch. For more information, see Power Supply Installation, page 47 See the Installing the Switch, page 19 to install the switch in a rack or on a wall.
Installing the Switch

- Rack-Mounting, page 19
- Wall-Mounting, page 30

If the switch is wall-mounted in an enclosure, follow these minimum clearances:

- Sides of switch (facing up and facing down): 3.75 in. (9.52 cm)
- Port side 3.0 in. (7.62 cm)
- Power supply side: 5.25 in. (13.33 cm)
- Cover side (side not facing wall): 1.75 in. (4.44 cm)
- Base side (facing wall): 0 in. (0 cm)

Rack-Mounting

To rack-mount the switch, select the rack size and follow the steps in these sections:

- Attaching Brackets for 19-Inch Racks, page 19
- Attaching Brackets for 19-Inch Racks for IP-30 Compliance (Optional), page 21
- Attaching Brackets for 23-Inch Racks, page 27
- Attaching Brackets for ETSI Racks, page 28
- Rack-Mounting the Switch, page 28

Warning: For mounting railway-application equipment and for EN50155 standard compliance, the switch must be installed only in a rack mid-mounting position. If you install the switch in a front rack-mounting (cable side or power supply side) position or in a wall-mounting position, a mechanical failure can occur that results in the switch becoming detached from the rack. Statement 403

Attaching Brackets for 19-Inch Racks

Figure 10 on page 20 and Figure 11 on page 21 show how to attach brackets to the switches.
Installing the Switch

Figure 10 Attaching Brackets for 19-Inch Racks

1. Mid-mounting position
2. Phillips flat-head screws
3. Cable-side mounting position
4. Power-supply-side mounting position
Attaching Brackets for 19-Inch Racks for IP-30 Compliance (Optional)

Before installing the mounting brackets, you need to install the rubber plugs in the unused mounting holes. The rubber plugs are not supplied with the switch. You can order a kit (part number IE-3010-IP30KIT) containing the rubber plugs.

You can order a kit (part number IE-3010-IP30KIT) that contains the rubber plugs.

Figure 12 on page 22 shows a close-up of the rubber plug. You can install the rubber plugs in the holes as shown in Figure 13 on page 23 and Figure 14 on page 24.
Installing the Switch

1. Identify your bracket mounting position. See Figure 15 on page 25 or Figure 16 on page 26.

2. Insert the rubber plugs in the appropriate holes on both sides of the switch. See Figure 13 on page 23 or Figure 14 on page 24.

3. Use a screwdriver or pen to completely push in the rubber plugs. See Figure 12 on page 22.

4. Install the brackets on both sides of the switch. See Figure 15 on page 25 or Figure 16 on page 26.
Figure 13  Inserting the Rubber Plugs

1  Rubber plug
2  Mid-mounting position
3  Cable-side mounting position
4  Power-supply-side mounting position
Figure 14 Inserting the Rubber Plugs

1 Rubber plug
2 Cable-side-mounting position
3 Power-supply-side mounting position
Figure 15  Attaching Brackets for 19-Inch Racks

1 Mid-mounting position
2 Phillips flat-head screws
3 Cable-side mounting position
4 Power-supply-side mounting position
Figure 16  Attaching Brackets for 19-Inch Racks

1. Phillips flat-head screws
2. Cable-side-mounting position
3. Power-supply-side mounting position

Note: For IP-30 compliance: If you use 23-inch brackets or ETSI brackets, you can insert the rubber plugs in the same holes as shown in Figure 13 on page 23 or Figure 14 on page 24 before installing the brackets.
Attaching Brackets for 23-Inch Racks

Figure 17  Attaching 23-Inch Brackets

1  Phillips flat-head screws
2  Cable-side-mounting position
3  Power-supply-side mounting position

Note: For IP-30 compliance: If you use 23-inch brackets, you can insert the rubber plugs in the same holes as shown in Figure 13 on page 23 or Figure 14 on page 24 before installing the brackets.
Attaching Brackets for ETSI Racks

Figure 18  Attaching Brackets for ETSI Racks

1  Phillips flat-head screws
2  Cable-side-mounting position
3  Power-supply-side mounting position

Note: For IP-30 compliance: If you use ETSI brackets, you can insert the rubber plugs in the same holes as shown in Figure 13 on page 23 or Figure 14 on page 24 before installing the brackets.

Rack-Mounting the Switch

After you attach the brackets on the switch, use the four supplied number-12 Phillips machine screws to attach the brackets to the rack. See Figure 19 on page 29.
Installing the Switch

Figure 19  Rack-Mounting

1. Wire the switch to a power source. See Power Supply Installation, page 47
2. Connect the ports. See the Connecting Devices to the Ethernet Ports, page 44.
3. Attach the cable guide to prevent the cables from obscuring the LED panels on the devices in the rack. Use the supplied black screw shown in Figure 19 on page 29 to attach the cable guide to the left or right bracket.

For configuration instructions about the CLI setup program, go to Configuring the Switch with the CLI Setup Program, page 81
Switch Installation

Installing the Switch

Wall-Mounting

To wall-mount the switch, follow the steps in these sections:

- Attaching Brackets, page 31
- Attaching Brackets for IP-30 Compliance (Optional), page 31
- Wall-Mounting the Switch, page 32

Warning: Read the wall-mounting instructions carefully before beginning installation. Failure to use the correct hardware or to follow the correct procedures could result in a hazardous situation to people and damage to the system. Statement 378

Warning: For mounting railway-application equipment and for EN50155 standard compliance, the switch must be installed only in a rack mid-mounting position. If you install the switch in a front rack-mounting (cable side or power supply side) position or in a wall-mounting position, a mechanical failure can occur that results in the switch becoming detached from the rack. Statement 403

If the switch is wall-mounted in an enclosure, follow these minimum clearances:

- Sides of switch (facing up and facing down): 3.75 in. (9.52 cm)
- Port side 3.0 in. (7.62 cm)
- Power supply side: 5.25 in. (13.33 cm)
- Cover side (side not facing wall): 1.75 in. (4.44 cm)
- Base side (facing wall): 0 in. (0 cm)
Attaching Brackets for IP-30 Compliance (Optional)

1. Insert the rubber plugs in the appropriate holes on both sides of the switch. See Figure 21 on page 32.

   **Note:** The rubber plugs are not supplied with the switch. You can order a kit (part number IE-3010-IP30KIT) containing the rubber plugs.

2. Use a screwdriver or pen to completely push in the rubber plugs. See Figure 12 on page 22.

3. Install the brackets on both sides of the switch. See Figure 22 on page 32.
Switch Installation

Installing the Switch

Figure 21  Inserting the Rubber Plugs in the Switch Holes

1 Rubber plug
2 Switch-side

Figure 22  Attaching 19-inch Rack Brackets

1 Phillips truss-head screws

Wall-Mounting the Switch

For the best support of the switch and cables, ensure that the switch is attached securely to wall studs or to a firmly attached plywood mounting backboard.
Mount the switch with the side panel facing up. Ensure that the Cisco logo is at the top of the switch. See Figure 23 on page 34 and Figure 24 on page 35.
Figure 23  Wall-Mounting the Cisco IE-3010-24TC

1 User-supplied screws
Installing and Removing SFP Modules

This section presents procedures to install and remove fiber-optic and 1000BASE-T SFP transceiver modules.

Installing SFP Modules

These sections describe how to install and remove SFP modules. SFP modules are inserted into SFP module slots on the front of the switch. Field-replaceable SFP modules provide the uplink interfaces, send (TX) and receive (RX).

You can use any combination of rugged SFP modules. See Table 2 on page 8 for a list of supported modules. Each SFP module must be of the same type as the SFP module on the other end of the cable, and the cable must not exceed the stipulated cable length for reliable communications. See Table 20 on page 74 for cable stipulations for SFP module connections.
Installing and Removing SFP Modules

**Caution:** When you use commercial SFP modules such as CWDM and 1000BX-U/D, reduce the maximum operating temperature by 59°F (15°C). The minimum operating temperature is 32°F (0°C).

**Caution:** To prevent electrostatic-discharge (ESD) damage, follow standard board and component handling procedures.

**Warning:** Do not insert and remove SFP modules while power is on; an electrical arc can occur. This could cause an explosion in hazardous location installations. Be sure that power is removed or the area is nonhazardous before proceeding. Statement 1087

**Note:** Removing and installing an SFP module can shorten its useful life. Do not remove and insert any module more often than is absolutely necessary.

**Figure 28 on page 40** shows an LC SFP module with a bale-clasp latch.

**Caution:** Do not install or remove the LC SFP module with fiber-optic cables attached because of potential damage to the cables, the cable connector, or the optical interfaces in the SFP module. Disconnect all cables before removing or installing an SFP module. Removing and installing an SFP module can shorten its useful life. Do not remove and insert SFP modules more often than is absolutely necessary.

Installing Fiber Optic SFP Modules

**Warning:** Class 1 laser product. Statement 1008

To install and cable an optical SFP transceiver uplink port:

1. Attach an ESD-preventive wrist strap to your wrist and to a bare metal surface.

2. Find the send (TX) and receive (RX) markings on the module top.

On some SFP modules, the send and receive (TX and RX) markings might be replaced by arrows that show the direction of the connection, either send or receive (TX or RX).

3. If the module has a bale-clasp latch, move it to the open, unlocked position.

4. Align the module in front of the slot opening, and push until you feel the connector snap into place.

5. If the module has a bale-clasp latch, close it.

6. For fiber-optic SFP modules, remove the dust plugs and save.

7. Connect the SFP cables.
Installing and Removing SFP Modules

Figure 25  Installing an SFP Module

Caution: Do not remove the dust plugs from the fiber-optic SFP module port or the rubber caps from the fiber-optic cable until you are ready to connect the cable. The plugs and caps protect the SFP module ports and cables from contamination and ambient light.

Installing 1000BASE-T SFP Modules

The 1000BASE-T (copper) SFP transceiver, see Figure 26 on page 37, has a bale-clasp locking mechanism that secures the transceiver in the module socket. The SFP network interface is an RJ-45 connector.

Figure 26  1000BASE-T SFP Transceiver

1. RJ-45 connector
2. Bale-clasp latching mechanism in the closed (locked) position.
3. Bale-clasp latching mechanism in the open (unlocked) position.

Caution: To comply with GR-1089 intrabuilding lightning immunity requirements, you must use grounded, shielded, twisted-pair, CAT5 cabling.

Note: When connecting to a 1000BASE-T-compatible server, workstation, or router, use four twisted-pair, straight-through CAT5 cabling for the SFP transceiver port. When connecting to a 1000BASE-T-compatible switch or repeater, use four twisted-pair, crossover CAT5 cabling.

To install a 1000BASE-T SFP transceiver:

1. Attach an ESD-preventive wrist strap to your wrist and to the ESD ground connector on the chassis or to a properly grounded bare metal surface.
Switch Installation

Installing and Removing SFP Modules

**Caution:** To avoid ESD damage, handle the SFP by its sides; do not touch the connector pins.

2. Remove the new 1000BASE-T SFP module from its protective packaging.

3. Check the markings on the SFP transceiver to verify that you have the correct model for your network.

4. Position the SFP transceiver in front of the port socket opening.

   **Note:** Different Cisco devices have different SFP transceiver socket configurations. Your Cisco device might require that the SFP transceiver be installed with the bale-clasp either in a latch–up or a latch–down orientation. Verify that you have the SFP transceiver oriented correctly when you position it in front of the port socket.

5. With the bale-clasp closed (locked), slide the SFP transceiver into the socket until you feel it snap in place in the socket. You may hear an audible click as the SFP transceiver latch engages in the socket (Figure 25 on page 37).

6. Connect the network interface cable RJ-45 plug to the SFP RJ-45 connector.

7. Observe the port status LED:
   - Green indicates that the SFP transceiver and the target device established a link.
   - Amber indicates that the port is discovering the network topology and searching for loops. This process takes about 30 seconds, and then the LED turns green.
   - Off indicates that the target device might not be turned on, there might be a cable problem, or there might be a problem with the adapter installed in the target device. Refer to Troubleshooting, page 59 for solutions to cabling problems.

Connecting to SFP Modules

This section describes how to connect to a fiber-optic or 1000BASE-T SFP port. To connect to an RJ-45 Gigabit Ethernet port, see Connecting to a Dual-Purpose Port, page 43. For instructions on how to install or remove an SFP module, see Connecting Devices to the Ethernet Ports, page 44.

**Warning:** Class 1 laser product. Statement 1008

**Warning:** Do not connect or disconnect cables to the ports while power is applied to the switch or any device on the network because an electrical arc can occur. This could cause an explosion in hazardous location installations. Be sure that power is removed from the switch and cannot be accidentally be turned on, or verify that the area is nonhazardous before proceeding. Statement 1070

**Caution:** Do not remove the rubber plugs from the SFP module port or the rubber caps from the fiber-optic cable until you are ready to connect the cable. The plugs and caps protect the SFP module ports and cables from contamination and ambient light.

Before connecting to the SFP module, ensure that you understand the port and cabling guidelines in the SFP Module Connectors, page 72. See Connector and Cable Specifications, page 71 for information about the LC on the SFP module.

**Caution:** To prevent ESD damage, follow standard board and component handling procedures.

Connecting to a Fiber Optic SFP Module

To connect a fiber-optic cable to an SFP module:

1. Remove the rubber plugs from the module port and fiber-optic cable, and store them for future use.

2. Insert one end of the fiber-optic cable into the SFP module port. See Figure 27 on page 39.
Installing and Removing SFP Modules

3. Insert the other cable end into a fiber-optic receptacle on a target device.

4. Observe the port status LED:
   - The LED turns green when the switch and the target device have an established link.
   - The LED turns amber while the STP discovers the network topology and searches for loops. This process takes about 30 seconds, and then the port LED turns green.
   - If the LED is off, the target device might not be turned on, there might be a cable problem, or there might be a problem with the adapter installed in the target device. See Troubleshooting, page 59 for solutions to cabling problems.

5. If necessary, reconfigure and restart the switch or the target device.

Connecting to a 1000BASE-T SFP Module

To connect a CAT5 cable to a 1000BASE-T SFP module:

Caution: To prevent ESD damage, follow standard board and component handling procedures.

1. When connecting to servers, workstations, and routers, insert a four twisted-pair, straight-through cable in the RJ-45 connector. When connecting to switches or repeaters, insert a four twisted-pair, crossover cable.

Note: When connecting to a 1000BASE-T device, use a four twisted-pair CAT5 cable.

2. Insert the other cable end in an RJ-45 connector on a target device.

3. Observe the port status LED:
   - The LED turns green when the switch and the target device have an established link.
   - The LED turns amber while the STP discovers the network topology and searches for loops. This process takes about 30 seconds, and then the port LED turns green.
Switch Installation

Inserting and Removing the SFP Module Patch Cable

- If the LED is off, the target device might not be turned on, there might be a cable problem, or there might be
  problem with the adapter installed in the target device. See Troubleshooting, page 59 for solutions to cabling
  problems.

4. If necessary, reconfigure and restart the switch or target device.

Removing SFP Modules

1. Attach an ESD-preventive wrist strap to your wrist and to a bare metal surface.

2. Disconnect the cable from the SFP module. For reattachment, note which cable connector plug is send (TX) and
   which is receive (RX).

3. Insert a dust plug into the optical ports of the SFP module.

4. If the module has a bale-clasp latch, pull the bale out and down to eject it. If the latch is obstructed and you cannot
   use your finger, use a small, flat-blade screwdriver or other long, narrow instrument.

5. Grasp the SFP module, and carefully remove it from the slot.

6. Place the module in an antistatic bag or other protective environment.

Figure 28  Removing a Bale-Clasp Latch SFP Module

Inserting and Removing the SFP Module Patch Cable

1. Attach an ESD-preventive wrist strap to your wrist and to a bare metal surface.

2. Insert the SFP module patch cable in the slot until you feel the connector on the cable snap into place at the rear of
   the slot (see Figure 29 on page 41).
Replacing the SD Flash Memory Card

3. Repeat these steps for the second switch that you want to connect to the first switch.

Removing the SFP Module Patch Cable

To remove an SFP module patch cable from the SFP module slot, release the connector, and pull it from the slot.

Replacing the SD Flash Memory Card

1. Locate the SD flash memory card slot on the cable-side of the switch.

2. Use a number-1 Phillips screwdriver to loosen the captive screw. See Figure 31 on page 42.
3. Pull the cover open, and pull the cover tab from the hinge. See Figure 32 on page 42.

4. Gently push the SD flash memory card to eject it. See Figure 33 on page 43. Place it in an antistatic bag to protect it from static discharge.
Replacing the SD Flash Memory Card

5. Push the replacement card (upside down) into the slot, and press it firmly in place. The card is keyed so that you cannot insert it the wrong way.

6. Place the SD slot cover tabs into the hinge.

7. Close the cover, and use a ratcheting torque number-1 Phillips screwdriver to torque the screw to 4.5 in-lb.

Connecting to a Dual-Purpose Port

The dual-purpose port is a single port with two interfaces, one for an RJ-45 cable and another for an SFP module. Only one interface can be active at a time. If both interfaces are connected, the SFP module has priority. For more information about dual-purpose ports, see the Dual-Purpose Ports, page 7.

Warning: Class 1 laser product. Statement 1008

Caution: Do not remove the rubber plugs from the SFP module port or the rubber caps from the fiber-optic cable until you are ready to connect the cable. The plugs and caps protect the SFP module ports and cables from contamination and ambient light. Before connecting to the SFP module, ensure that you understand the port and cabling stipulations in the Installation Guidelines, page 18. See Connector and Cable Specifications, page 71 for information about the LC on the SFP module.

To connect to a dual-purpose port, follow these steps:

1. Connect an RJ-45 connector to the 10/100/1000 port, or install an SFP module into the SFP module slot, and connect a cable to the SFP module port. See Figure 34 on page 44.

For more information about RJ-45 connections, SFP modules, and optical connections, see the Connecting Devices to the Ethernet Ports, page 44, the Connecting Devices to the Ethernet Ports, page 44, and the Connecting to SFP Modules, page 38.
Connecting Devices to the Ethernet Ports

Figure 34 Connecting to a Dual-Purpose Port

1. LC connector (optical)  2. RJ-45 connector (copper)

2. Connect the other end of the cable to the other device.

By default, the switch detects whether an RJ-45 connector or SFP module is connected to a dual-purpose port and configures the port accordingly. You can change this setting and configure the port to recognize only an RJ-45 connector or only an SFP module by using the `media-type` interface configuration command. For more information, see the Cisco IE 3010 Switch Command Reference.

Connecting Devices to the Ethernet Ports

- Connecting to the 10/100 and 10/100/1000 Ports, page 44
- Connecting to the 10/100 PoE Ports, page 45

Connecting to the 10/100 and 10/100/1000 Ports

The 10/100 and 10/100/1000 Ethernet ports use standard RJ-45 connectors with Ethernet pinouts. The maximum cable length is 328 feet (100 meters). The 100BASE-TX and 1000BASE-T traffic requires CAT5, CAT5e, or CAT6 UTP cable. The 10BASE-T traffic uses Category 3 or Category 4 cable.

The autonegotiation feature is enabled by default on the switch. At this setting, the switch ports configure themselves to operate at the speed of the attached device. If the device does not support autonegotiation, you can set the switch port speed and duplex parameters. To maximize performance, either let the ports autonegotiate both speed and duplex, or set the port speed and duplex parameters on both ends of the connection.

For simplified cabling, the automatic medium-dependent interface crossover (auto-MDIX) feature is enabled by default. With auto-MDIX enabled, the switch detects the required cable type for copper Ethernet connections and configures the interface accordingly. Therefore, you can use either a crossover or a straight-through cable for connections to a 10/100/1000 Ethernet port, regardless of the type of connected device.

See the switch software configuration guide or the switch command reference on Cisco.com for more information about autonegotiation and auto-MDIX.
Switch Installation

Connecting Devices to the Ethernet Ports

If auto-MDIX is disabled, use the guidelines in Table 11 on page 45 to select the cable for connecting the 10/100/1000 Ethernet ports to other devices. See the Connector and Cable Specifications, page 71 appendix for cable-pinout descriptions. See Figure 35 on page 45.

Figure 35 Connecting to an Ethernet Port

![Figure 35 Connecting to an Ethernet Port](image)

Table 11 Ethernet Cables (Auto-MDIX Disabled)

<table>
<thead>
<tr>
<th>Device</th>
<th>Crossover Cable(^1)</th>
<th>Straight-Through Cable(^1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switch to switch</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Switch to hub</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Switch to computer or server</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Switch to router</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Switch to IP phone</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>

\(^1\) 100BASE-TX and 1000BASE-T traffic requires twisted four-pair, CAT5, CAT5e, or CAT6 cable. 10BASE-T traffic uses Category 3 or Category 4 cable.

Connecting to the 10/100 PoE Ports

The Cisco IE-3010-16S-8PC switch 10/100 PoE ports have the same autonegotiation settings and cabling requirements as those in the Connecting to the 10/100 and 10/100/1000 Ports, page 44. These ports provide PoE power.

See the PoE Ports, page 7 for information on the cables and connectors.

The ports provide PoE support for devices compliant with IEEE 802.3af and also provide Cisco prestandard PoE support for Cisco IP Phones and Cisco Aironet Access Points.

On a per-port basis, you can control whether or not a port automatically provides power to a connected IP phone or an access point.

To access an advanced PoE planning tool, use the Cisco Power Calculator on Cisco.com:

http://tools.cisco.com/cpc/launch.jsp

You can use this application to calculate the power supply requirements for a specific PoE configuration. The results show output current, output power, and heat dissipation.

**Warning:** Voltages that present a shock hazard may exist on Power over Ethernet (PoE) circuits if interconnections are made using uninsulated exposed metal contacts, conductors, or terminals. Avoid using such interconnection methods, unless the exposed metal parts are located within a restricted access location and users and service
people who are authorized within the restricted access location are made aware of the hazard. A restricted access area can be accessed only through the use of a special tool, lock and key or other means of security. Statement 1072

**Caution:** Category 5e and Category 6 cables can store high levels of static electricity. Always ground the cables to a suitable and safe earth ground before connecting them to the switch or other devices.

Where to Go Next

You can use the default configuration or use any of the management options described in the Management Options, page 16 to change the switch settings.
Power Supply Installation

This chapter describes how to remove and install a new or replacement power supply. Your switch ships with at least one installed power-supply module (AC or DC, depending on your order). The power-supply modules are field-replaceable units (FRUs) and are hot-swappable.

For translations of the safety warnings in this chapter, see the Regulatory Compliance and Safety Information for the Cisco IE 3010 Switch on the documentation CD and also on Cisco.com.

- Power-Supply Modules, page 47
- Installation Guidelines, page 49
- Grounding the Switch, page 50
- Installing the Power-Supply Module in the Switch, page 51
- Wiring the Power Source, page 52
- Removing the Power-Supply Module, page 57

Power-Supply Modules

For information on the power-supply modules, see Power Supply Features, page 16.

Table 12  Power-Supply Modules

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PWR-RGD-LOW-DC/IA</td>
<td>Low-voltage DC. For voltage information, see Table 18 on page 69.</td>
</tr>
<tr>
<td>PWR-RGD-AC-DC/IA</td>
<td>High-voltage AC or DC. For voltage information, see Table 17 on page 69.</td>
</tr>
</tbody>
</table>
For a description of the PSU OK LEDs, see Power-Supply Module LEDs, page 12.

Power-Supply Module Installation

- Installation Guidelines, page 49
- Installing a Power-Supply Module, page 49
- Wiring the Power Source, page 52
- Removing the Power-Supply Module, page 57
Installation Guidelines

Observe these guidelines when removing or installing a power-supply module:

A power-supply module that is only partially connected to the switch disrupts the system operation.

**Warning:** Blank faceplates and cover panels serve three important functions: they prevent exposure to hazardous voltages and currents inside the chassis; they contain electromagnetic interference (EMI) that might disrupt other equipment; and they direct the flow of cooling air through the chassis. Do not operate the system unless all cards, faceplates, front covers, and rear covers are in place. Statement 1029

**Note:** You can order the blank cover (part number RPS-CG-COVER=).

**Warning:** Do not reach into a vacant slot while installing or removing a module. Exposed circuitry is an energy hazard. Statement 206

**Warning:** Only trained and qualified personnel should be allowed to install, replace, or service this equipment. Statement 1030

**Warning:** Avoid using or servicing any equipment that has outdoor connections during an electrical storm. There may be a risk of electric shock from lightning. Statement 1088

Installing a Power-Supply Module

This procedure is for installing a power-supply module in the PSU1 or PSU2 slot.

**Warning:** The covers are an integral part of the safety design of the product. Do not operate the unit without the covers installed. Statement 1077

**Warning:** This unit might have more than one power supply connection. All connections must be removed to de-energize the unit. Statement 1028

**Caution:** Equipment installation must comply with local and national electrical codes.

Equipment That You Need

- Ratcheting torque flathead screwdriver that exerts up to 15-inch pound (in-lb) of torque
- Ring, spade, or flanged spade terminal (terminals should be insulated)
  - Ring terminal (such as Tyco part number 2-34158-1 for 16–14 AWG or 2-34852-1 for 12–10 AWG wire)
  - Spade terminal (such as Tyco part number 54367-2 for 16–14 AWG wire)
  - Flanged spade terminal (such as Tyco part number 2-324165-1 for 16–14 AWG wire or 1-324581-1 for 12–10 AWG wire)

For IP-30 compliance:

- Use the 16–14 AWG wire and appropriate terminals for the AC or high-voltage DC power supply
- Use the 12–10 AWG wire and appropriate terminals for the low-voltage DC power supply
- Crimping tool (such as Thomas & Betts part number WT2000, ERG-2001)
- 6-gauge copper ground wire (such as Belden part number 9906)
- 12-AWG wire (minimum) for the low-voltage power-supply module and 16-AWG (minimum) wire for the high-voltage power-supply module
For power source connections, use wires rated for at least 194°F (90°C).

UL- and CSA-rated style 1007 or 1569 twisted-pair copper wire (such as Belden part number 9318)

Wire-stripping tools for stripping 6-, 10-, 12-, 14-, and 16-gauge wires.

Number-2 Phillips screwdriver

Flat-blade screwdriver

Grounding the Switch

Follow the grounding procedures at your site and observe these warnings:

**Warning:** This equipment must be grounded. Never defeat the ground conductor or operate the equipment in the absence of a suitably installed ground conductor. Contact the appropriate electrical inspection authority or an electrician if you are uncertain that suitable grounding is available. Statement 1024

**Warning:** When installing or replacing the unit, the ground connection must always be made first and disconnected last. Statement 1046

**Caution:** Follow the grounding procedure instructions, and use a UL-listed lug (included with the switch) for number-6 AWG wire and 10-32 ground-lug screws.

**Note:** You can use the grounding lug to attach a wrist strap for ESD protection during servicing.

Follow these steps to install a dual-hole lug on the switch. Be sure to follow any grounding requirements at your site.

1. Use a Phillips screwdriver or a ratcheting torque screwdriver with a Phillips head to remove the ground screw from the cable side of the switch. You need the screw in Step 4.

2. Strip the 6-gauge ground wire to 0.5 inch (12.7 mm) ± 0.02 inch (0.5 mm). See Figure 38 on page 50. Stripping more than the recommended amount of wire can leave exposed wire from the connector.

**Figure 38** Stripping the Ground Wire

3. Insert the ground wire into the terminal lug, and crimp the terminal to the wire. (see Figure 39 on page 51).
4. Slide the ground screw from Step 1 through the terminal lug. Insert the ground screws into the opening on the cable side.

5. Use a ratcheting torque screwdriver to tighten the ground screws to 30 in-lb (± 2 in-lb).

6. Attach the other end of the ground wire to a grounded bare metal surface, such as a ground bus or a grounded bare rack.

Installing the Power-Supply Module in the Switch

1. Ensure that the power is off at the AC or DC circuits.

   Locate the circuit breakers, turn them OFF, and tape them in the OFF position.

   **Warning:** If the power is not off at the AC or DC circuit breaker, do not touch the power-input terminal.

2. Use a Phillips screwdriver to loosen the two captive screws of the blank power-supply module and gently pull it out. See Figure 41 on page 52 and Figure 42 on page 52.
3. Insert the power-supply module into the slot, and gently push it in. See Figure 43 on page 52.

   Note: Ensure that the power supply module is flush with the switch.

4. Use a ratcheting torque screwdriver to torque each screw to 8–10 in-lb.

Wiring the Power Source

Before you wire the power source, review these warnings:

Warning: This product relies on the building’s installation for short-circuit (overcurrent) protection. Ensure that the protective device is rated not greater than:

- AC: 5 A, DC: 15 A Statement 1005

Warning: A readily accessible two-poled disconnect device must be incorporated in the fixed wiring. Statement 1022
Warning: Only trained and qualified personnel should be allowed to install or replace this equipment.
Statement 1030

Warning: Hazardous voltage or energy may be present on power terminals. Always replace cover when terminals are not in service. Be sure uninsulated conductors are not accessible when cover is in place. Statement 1086

1. Ensure that the power is off at the AC or DC circuits.
   Locate the circuit breakers, turn them OFF, and tape them in the OFF position.
   Warning: If the power is not off at the AC or DC circuit breaker, do not touch the power-input terminal.
   Note: Do not connect the switch to a power source that has an ON/OFF switch.

2. Use a Phillips screwdriver to loosen the captive screw on the power-input terminal, and open the cover.

Figure 44  Opening the Power-Input Terminal Cover

The terminal screws labels are on the power-input terminal cover. See Figure 45 on page 54.
Power Supply Installation

Power-Supply Module Installation

Figure 45 Power-Input Terminal

| 1 | Line connection for high-voltage AC (PSU1) |
| 2 | Neutral connection for high-voltage AC (PSU1) |
| 3 | Positive connection for high-voltage DC (PSU1) |
| 4 | Negative connection for high-voltage DC (PSU1) |
| 5 | PSU1 (power-supply module 1) |
| 6 | Positive connection for low-voltage DC (PSU1) |
| 7 | Negative connection for low-voltage DC (PSU1) |
| 8 | Line connection for high-voltage AC (for PSU2) |
| 9 | Neutral connection for high-voltage AC (PSU2) |
| 10 | Positive connection for high-voltage DC (PSU2) |
| 11 | Negative connection for high-voltage DC (PSU2) |
| 12 | PSU2 (power-supply module 2) |
| 13 | Positive connection for low-voltage DC (PSU2) |
| 14 | Negative connection for low-voltage DC (PSU2) |

**Note:** The power-supply module 1 connection is labeled PSU1, and the power-supply module 2 connection is labeled PSU2. Make sure that you connect the wires to the correct terminal screws.

3. Use twisted-pair copper wire (14- to 18-AWG) to connect from the power-input terminal to the power source.

**Note:** Use 12-AWG (minimum) for the low-voltage DC power supply module. Use 16-AWG (minimum) for the high-voltage AC or DC power supply module.

4. Strip each of the two wires to 0.25 inch (6.3 mm) ± 0.02 inch (0.5 mm).

**Note:** Do not strip more than 0.27 inch (6.8 mm) of insulation from the wire. Stripping more than the recommended amount of wire can leave exposed wire from the connector after installation.

Figure 46 Stripping the Input Power Source Wire

5. Insert the wire into a spade terminal, and crimp it to the wire.
You can also use a ring or flanged spade terminal as listed in the Equipment That You Need, page 49.

Figure 47  Crimping the Spade Terminal Lug

6. Loosen the terminal screw, and slide the terminal under the screw and washer. See Figure 49 on page 56.

    Note: Use the appropriate terminal screws based on power supply type: high-voltage (AC or DC) or low-voltage (DC).

7. Make the power connection:

AC Power Connection

- Connect the line wire into the terminal screw labeled $L$ and the neutral wire into the terminal screw labeled $N$ to complete the AC connection.
Figure 48  Connecting the Wires to the High-Voltage AC Power (PSU1)

**DC Power Connection**
- Connect the positive wire into the terminal screw labeled “+”, and the negative wire into the terminal screw labeled “−”.

**Low-voltage DC Power-Supply Module**
- Connect the wires to the terminals labeled Lo.

**High-voltage DC Power-Supply Module**
- Connect the wires to the terminals labeled Hi.

**Note:** Ensure that you cannot see any wire lead. Only wire with insulation should extend from the terminal screw.

Figure 49  Connecting the Wires to the Low-Voltage DC Power (PSU2)

8. Torque the captive screws (above the wires) to 8.5 in-lb (± 0.5 in-lb).
9. Complete the power connection:
Power Supply Installation

Removing the Power-Supply Module

AC Power Connection

- Connect the other end of the line wire (the one connected to $L$) to the line terminal on the AC-power source, and connect the other end of the neutral wire (the one connected to $M$) to the neutral terminal on the AC power source.

DC Power Connection

- Connect the other end of the positive wire (the one connected to "+") to the positive terminal on the DC-power source, and connect the other end of the negative wire (the one connected to "−") to the negative terminal on the DC power source.

**Note:** Ensure that you cannot see any wire lead. Only wire with insulation should extend from the terminal screw.

If you have two power supplies, repeat steps 1 through 10.

10. Close the power-input terminal cover.

11. Use a ratcheting torque screwdriver to torque the screw to 6–8 in-lb.

12. Turn on the power at the AC or DC circuit.

13. Verify that the **PSU1 or PSU2 LED** on the switch and **PSU OK LED** on the power-supply module are green.

See the switch software guide for information on how to configure the power supply settings.

Removing the Power-Supply Module

The power-supply modules are hot-swappable. By removing the power-supply modules, you can power off the switch without disconnecting the wiring from the power-input terminal.

1. Ensure that the power is off at the AC or DC circuits.

   Locate the circuit breakers, turn them OFF, and tape them in the OFF position.

   **Warning:** If the power is not off at the AC or DC circuit breaker, do not touch the power-input terminal.

2. Verify that the PSU LED and PSU OK LED is blinking red or is off.

3. Use a Phillips screwdriver to loosen the captive screws that secure the power-supply module to the switch. See Figure 50 on page 57.

   **Warning:** Hot surface. Statement 1079

Figure 50  Removing the Screws

4. Remove the power-supply module from the power slot. The power-supply module might be hot. See Figure 51 on page 58.
5. Install a new power-supply module or a blank cover.

**Figure 51  Removing the Power-Supply Module**

**Caution:** To prevent exposure to hazardous voltages and to contain electromagnetic interference (EMI), either a power-supply module or a blank cover must be in each power-supply module slot at all times. You can order the blank cover (part number RPS-CG-COVER=).
Troubleshooting

- Diagnosing Problems, page 59
- Resetting the Switch to the Factory Default Settings, page 62
- Finding the Switch Serial Number, page 62

Diagnosing Problems

The switch LEDs provide troubleshooting information about the switch. They show POST failures, port-connectivity problems, and overall switch performance. You can also get statistics from Device Manager, the CLI, or an SNMP workstation. See the software configuration guide, the switch command reference guide on Cisco.com, or the documentation that came with your SNMP application for details.

Switch POST Results

See Verifying Switch Operation, page 18 for information on POST.

Note: POST failures are usually fatal. Contact your Cisco technical support representative if your switch does not pass POST.

Switch LEDs

Look at the port LEDs information when troubleshooting the switch. See LEDs, page 11 for a description of the LED colors and their meanings.

Switch Connections

Bad or Damaged Cable

Always examine the cable for marginal damage or failure. A cable might be just good enough to connect at the physical layer, but it could corrupt packets as a result of subtle damage to the wiring or connectors. You can identify this problem because the port has many packet errors or it constantly flaps (loses and regains link).

- Exchange the copper or fiber-optic cable with a known good cable.
- Look for broken or missing pins on cable connectors.
- Rule out any bad patch panel connections or media converters between the source and the destination. If possible, bypass the patch panel, or eliminate media converters (fiber-optic-to-copper).
- Try the cable in another port to see if the problem follows the cable.

Ethernet and Fiber-Optic Cables

Make sure that you have the correct cable:
For Ethernet, use CAT3 copper cable for 10 Mb/s UTP connections. Use either CAT5, CAT5e, or CAT6 UTP for 10/100 or 10/100/1000 Mb/s connections.

- Verify that you have the correct fiber-optic cable for the distance and port type. Make sure that the connected device ports match and use the same type encoding, optical frequency, and fiber type.

- Determine if a copper crossover cable was used when a straight-through was required or the reverse. Enable auto-MDIX on the switch, or replace the cable. See Table 11 on page 45 for recommended Ethernet cables.

**Link Status**

Verify that both sides have link. A broken wire or a shutdown port can cause one side to show link even though the other side does not have link.

A port LED that is on does not guarantee that the cable is functional. It might have encountered physical stress, causing it to function at a marginal level. If the port LED does not turn on:

- Connect the cable from the switch to a known good device.

- Make sure that both ends of the cable are connected to the correct ports.

- Verify that both devices have power.

- Verify that you are using the correct cable type. See Connector and Cable Specifications, page 71 for information.

- Look for loose connections. Sometimes a cable appears to be seated but is not. Disconnect the cable, and then reconnect it.

**10/100 and 10/100/1000 Port Connections**

A port appears to malfunction:

- Verify the status of all ports. See Table 8 on page 13 for descriptions of the LEDs and their meanings.

- Use the `show interfaces` privileged EXEC command to see if the port is error-disabled, disabled, or shut down. Re-enable the port if necessary.

- Verify the cable type. See Connector and Cable Specifications, page 71

**10/100 PoE Port Connections**

A powered device connected to a PoE port does not receive power:

- Verify the status of all the ports. See Table 8 on page 13 for descriptions of the LEDs and their meanings.

- Use the `show interfaces` privileged EXEC command to see if the port is error-disabled, disabled, or shutdown. Re-enable the port if necessary.

- Verify the cable type. Many legacy powered devices, including older Cisco IP phones and access points that do not fully support IEEE 802.3af might not support PoE when connected to the switch by a crossover cable. Replace the crossover cable with a straight-through cable.

**Caution:** Non-compliant cabling or powered devices can cause a PoE port fault. Use only compliant cabling to connect Cisco prestandard IP Phones, and wireless access points, or IEEE 802.3af-compliant devices.

**SFP Module**

Use only Cisco SFP modules. Each Cisco module has an internal serial EEPROM that is encoded with security information. This encoding verifies that the module meets the requirements for the switch.
Troubleshooting

Diagnosing Problems

- Inspect the SFP module. Exchange the suspect module with a known good module.
- Verify that the module is supported on this platform. (The switch release notes on Cisco.com list the SFP modules that the switch supports.)
- Use the `show interfaces` privileged EXEC command to see if the port or module is error-disabled, disabled, or shutdown. Re-enable the port if needed.
- Ensure that all connections are clean and securely connected.

Interface Settings

Verify that the interface is not disabled or powered off. If an interface is manually shut down on either side of the link, it does not come up until you re-enable the interface. Use the `show interfaces` privileged EXEC command to see if the interface is error-disabled, disabled, or shut down on either side of the connection. If needed, re-enable the interface.

Ping End Device

Ping from the directly connected switch first, and then work your way back port by port, interface by interface, trunk by trunk, until you find the source of the connectivity issue. Make sure that each switch can identify the end device MAC address in its Content-Addressable Memory (CAM) table.

Spanning Tree Loops

STP loops can cause serious performance issues that look like port or interface problems.

A unidirectional link can cause loops. It occurs when the traffic sent by the switch is received by the neighbor, but the traffic from the neighbor is not received by the switch. A broken cable, other cabling problems, or a port issue could cause this one-way communication.

You can enable UniDirectional Link Detection (UDLD) on the switch to help identify unidirectional link problems. For information about enabling UDLD on the switch, see the “Understanding UDLD” section in the switch software configuration guide on Cisco.com.

Switch Performance

Speed, Duplex, and Autonegotiation

Port statistics that show a large amount of alignment errors, frame check sequence (FCS), or late-collisions errors, might mean a speed or duplex mismatch.

A common issue occurs when duplex and speed settings are mismatched between two switches, between a switch and a router, or between the switch and a workstation or server. Mismatches can happen when manually setting the speed and duplex or from autonegotiation issues between the two devices.

To maximize switch performance and to ensure a link, follow one of these guidelines when changing the duplex or the speed settings.

- Let both ports autonegotiate both speed and duplex.
- Manually set the speed and duplex parameters for the interfaces on both ends of the connection.
- If a remote device does not autonegotiate, use the same duplex settings on the two ports. The speed parameter adjusts itself even if the connected port does not autonegotiate.
Troubleshooting

Resetting the Switch to the Factory Default Settings

Autonegotiation and Network Interface Cards

Problems sometimes occur between the switch and third-party network interface cards (NICs). By default, the switch ports and interfaces autonegotiate. Laptops or other devices are commonly set to autonegotiate, yet sometimes issues occur.

To troubleshoot autonegotiation problems, try manually setting both sides of the connection. If this does not solve the problem, there could be a problem with the firmware or software on the NIC. You can resolve this by upgrading the NIC driver to the latest version.

Cabling Distance

If the port statistics show excessive FCS, late-collision, or alignment errors, verify that the cable distance from the switch to the connected device meets the recommended guidelines. See Cables and Adapters, page 73.

Resetting the Switch to the Factory Default Settings

Follow these steps to return your switch to the factory default settings.

Note: Resetting the switch deletes the configuration and reboots the switch.

To reset the switch:

1. At the switch prompt, enter enable, and press Return or Enter.

2. At the Privileged EXEC prompt, switch#, enter setup and press Return or Enter.

   The switch displays the prompt to run the initial configuration dialog. See Configuring the Switch with the CLI Setup Program, page 81

Finding the Switch Serial Number

If you contact Cisco Technical Assistance, you need to know the switch serial number. Figure 52 on page 62 and Figure 53 on page 63 show the serial number locations. You can also use the show version privileged EXEC command to see the switch serial number.

Figure 52   Serial Number Location for Cisco IE-3010-24TC and IE-3010-16S-8PC Switches
Troubleshooting

Finding the Switch Serial Number

Figure 53  Serial Number Location for the Power-Supply Modules
Troubleshooting

Finding the Switch Serial Number
Technical Specifications

- Switch Specifications, page 65
- Power-Supply Module Specifications, page 68
- Alarm Ratings, page 69

Switch Specifications

Table 13 Environmental and Physical Specifications

<table>
<thead>
<tr>
<th>Environmental Ranges</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating temperature(^1)</td>
<td>-40°C to +74°C</td>
</tr>
<tr>
<td></td>
<td>-40°C to +70°C (Vented Enclosure Operating)</td>
</tr>
<tr>
<td></td>
<td>-40°C to +60°C (Sealed Enclosure Operating)</td>
</tr>
<tr>
<td></td>
<td>-34°C to +74°C (100LFM or more Fan or Blower equipped Enclosure Operating)</td>
</tr>
<tr>
<td></td>
<td>-40°C to +85°C (Type Tested to +85°C for 16 hours) (^2)</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>-40°F to 185°F (-40°C to 85°C)</td>
</tr>
<tr>
<td>Relative humidity</td>
<td>5 to 95% (noncondensing)</td>
</tr>
<tr>
<td>Operating altitude</td>
<td>Up to 10,000 ft (3049 m)</td>
</tr>
<tr>
<td>Storage altitude</td>
<td>Up to 15,000 ft (4570 m)</td>
</tr>
<tr>
<td>Thermal spacing</td>
<td>1.75 in. (4.4 cm)</td>
</tr>
<tr>
<td>Operating shock</td>
<td>30 g at 11 ms</td>
</tr>
</tbody>
</table>

Physical Specifications

<table>
<thead>
<tr>
<th>Weight</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Cisco IE-3010-24TC</td>
<td>9.1 lb (4.1 kg) (no power-supply module)</td>
</tr>
<tr>
<td>Cisco IE-3010-16S-8PC</td>
<td>10 lb (4.5 kg) (no power-supply module)</td>
</tr>
<tr>
<td>Dimensions (H x W x D)</td>
<td></td>
</tr>
<tr>
<td>Cisco IE-3010-24TC</td>
<td>1.75 x 17.5 x 14.0 in. (4.45 x 44.5 x 35.6 cm)</td>
</tr>
<tr>
<td>Cisco IE-3010-16S-8PC</td>
<td>1.75 x 17.5 x 14.0 in. (4.45 x 44.5 x 35.6 cm)</td>
</tr>
</tbody>
</table>

1. Operating temperatures exceeding 60°C are not covered by the product safety certifications and approvals. However, the switch can function in the installations under the environmental conditions listed.

2. The maximum operating temperature of the switch varies depending on the type of SFP module that you use.
### Table 14  Technical Specifications for the Cisco IE 3010-16S-8PC Switch

<table>
<thead>
<tr>
<th>Power Requirements</th>
<th>AC: 147 BTUs per hour</th>
<th>DC: 137 BTUs per hour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal input voltage</td>
<td>43.2 W</td>
<td>40.3 W</td>
</tr>
<tr>
<td></td>
<td>Power rating: 0.044 KVA@115 V</td>
<td>Power rating: 0.0403 KVA@125 V</td>
</tr>
<tr>
<td>Absolute maximum (short term) input voltage</td>
<td>85 to 265 VAC, 47 to 63 Hz</td>
<td>88 to 300 VDC</td>
</tr>
<tr>
<td></td>
<td>PWR-RGD-AC-DC/IA:</td>
<td>PWR-RGD-LOW-DC/IA:</td>
</tr>
<tr>
<td>Power consumption with one PWR-RGD-AC-DC/IA power-supply module</td>
<td>100 to 240 VAC, 50 to 60 Hz</td>
<td>24 to 60 VDC</td>
</tr>
<tr>
<td></td>
<td>100 to 250 VDC</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PWR-RGD-LOW-DC/IA:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>24 to 60 VDC</td>
<td></td>
</tr>
<tr>
<td>Power consumption with one PWR-RGD-AC-DC/IA power-supply module (with PoE on 4 ports)</td>
<td>AC: 376 BTUs per hour</td>
<td>DC: 375 BTUs per hour</td>
</tr>
<tr>
<td></td>
<td>110.1 W</td>
<td>109.8 W</td>
</tr>
<tr>
<td></td>
<td>Power rating 0.11 KVA@115 V</td>
<td>Power rating: 0.109 KVA@125 V</td>
</tr>
<tr>
<td>Power consumption with two PWR-RGD-AC-DC/IA power-supply modules</td>
<td>AC: 166 BTUs per hour</td>
<td>DC: 167 BTUs per hour</td>
</tr>
<tr>
<td></td>
<td>48.8 W</td>
<td>48.9 W</td>
</tr>
<tr>
<td></td>
<td>Power rating: 0.051 KVA@115 V</td>
<td>Power rating: 0.0489 KVA@125 V</td>
</tr>
</tbody>
</table>
### Technical Specifications for the Cisco IE 3010-16S-8PC Switch (continued)

<table>
<thead>
<tr>
<th>Power Consumption</th>
<th>AC Consumption</th>
<th>DC Consumption</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Power consumption with two PWR-RGD-AC-DC/IA power-supply modules (with PoE on 8 ports)</strong></td>
<td>628 BTUs per hour</td>
<td>622 BTUs per hour</td>
</tr>
<tr>
<td>184.1 W</td>
<td>182.2 W</td>
<td></td>
</tr>
<tr>
<td>Power rating: 0.185 KVA@115 V</td>
<td>Power rating: 0.182 KVA@125 VDC</td>
<td></td>
</tr>
<tr>
<td><strong>Power consumption with one PWR-RGD-LOW-DC/IA power-supply module</strong></td>
<td>116 BTUs per hour</td>
<td>34.2 W</td>
</tr>
<tr>
<td>DC: 116 BTUs per hour</td>
<td>Power rating: 0.034 KVA@24 VDC</td>
<td></td>
</tr>
<tr>
<td><strong>Power consumption with one PWR-RGD-LOW-DC/IA power-supply module (with PoE on 4 ports)</strong></td>
<td>363 BTUs per hour</td>
<td>106 W</td>
</tr>
<tr>
<td>DC: 363 BTUs per hour</td>
<td>Power rating: 0.106 KVA@24 VDC</td>
<td></td>
</tr>
<tr>
<td><strong>Power consumption with two PWR-RGD-LOW-DC/IA power-supply modules</strong></td>
<td>127 BTUs per hour</td>
<td>37.1 W</td>
</tr>
<tr>
<td>DC: 127 BTUs per hour</td>
<td>Power rating: 0.037 KVA@24 VDC</td>
<td></td>
</tr>
<tr>
<td><strong>Power consumption with two PWR-RGD-LOW-DC/IA power-supply modules (with PoE on 8 ports)</strong></td>
<td>622 BTUs per hour</td>
<td>181.9 W</td>
</tr>
<tr>
<td>DC: 622 BTUs per hour</td>
<td>Power rating: 0.182 KVA@24 VDC</td>
<td></td>
</tr>
</tbody>
</table>

### Technical Specifications for the Cisco IE-3010-24TC Switch

#### Power Requirements

<table>
<thead>
<tr>
<th>Nominal Input Voltage</th>
<th>PWR-RGD-AC-DC/IA:</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 to 240 VAC, 50 to 60 Hz</td>
<td>100 to 250 VDC</td>
</tr>
<tr>
<td>24 to 60 VDC</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Absolute Maximum (Short Term) Input Voltage</th>
<th>PWR-RGD-AC-DC/IA:</th>
</tr>
</thead>
<tbody>
<tr>
<td>85 to 265 VAC, 47 to 63 Hz</td>
<td>88 to 300 VDC</td>
</tr>
<tr>
<td>18 to 75 VDC</td>
<td></td>
</tr>
</tbody>
</table>
Technical Specifications

Power-Supply Module Specifications

### Table 15  Technical Specifications for the Cisco IE-3010-24TC Switch (continued)

| Power consumption with one PWR-RGD-AC-DC/IA power-supply module | AC: 102 BTUs per hour  
29.8 W  
Power rating: 0.031 KVA@115 V  
DC: 98 BTUs per hour  
28.6 W  
Power rating: 0.0286 KVA@125 VDC |
|---|---|
| Power consumption with two PWR-RGD-AC-DC/IA power-supply modules | AC: 121 BTUs per hour  
35.5 W  
Power rating: 0.0367 KVA@115 V  
DC: 117 BTUs per hour  
34.4 W  
Power rating: 0.0344 KVA@125 VDC |
| Power consumption with one PWR-RGD-LOW-DC/IA power-supply module | DC: 92 BTUs per hour  
26.8 W  
Power rating: 0.027 KVA@24 VDC |
| Power consumption with two PWR-RGD-LOW-DC/IA power-supply modules | DC: 105 BTUs per hour  
30.7 W  
Power rating: 0.030 KVA@24 VDC |

### Table 16  Environmental and Physical Specifications for the AC- and DC-Power-Supply Modules

<table>
<thead>
<tr>
<th>Environmental Ranges</th>
<th>Physical Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating temperature</td>
<td>Weight</td>
</tr>
</tbody>
</table>
| -40 to 140°F (-40 to 60°C) | PWR-RGD-AC-DC/IA  
2.55 lb (1.15 kg) |
| Storage temperature | PWR-RGD-LOW-DC/IA  
2.5 lb (1.13 kg) |
| -49 to 185°F (-45 to 85°C) | Dimensions (H x W x D) |
| Relative humidity | PWR-RGD-AC-DC/IA  
1.58 x 7 x 5 in. (4 x 17.8 x 12.7 cm) (without mounting flanges) |
| 5 to 95% (noncondensing) | PWR-RGD-LOW-DC/IA  
1.58 x 8.15 x 5 in. (4 x 20.7 x 12.7 cm) (with mounting flanges) |
| Altitude | Up to 10,000 ft (3049 m) |
Table 17  Technical Specifications for the PWR-RGD-AC-DC/IA Power-Supply Module

<table>
<thead>
<tr>
<th>Power Specifications</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum output power</td>
<td>150 W</td>
</tr>
<tr>
<td>Nominal input voltage</td>
<td>100 to 240 VAC, 50 to 60 Hz</td>
</tr>
<tr>
<td></td>
<td>100 to 250 VDC</td>
</tr>
<tr>
<td>Absolute maximum (short term) input voltage</td>
<td>85 to 265 VAC, 47 to 63 Hz</td>
</tr>
<tr>
<td></td>
<td>88 to 300 VDC</td>
</tr>
<tr>
<td>Input current</td>
<td>AC: 2.2 to 0.7 A, 85 to 265 VAC</td>
</tr>
<tr>
<td></td>
<td>DC: 2.5 to 0.6 A, 88 to 300 VDC</td>
</tr>
<tr>
<td>Total input BTU</td>
<td>AC: 638 BTUs per hour</td>
</tr>
<tr>
<td></td>
<td>DC: 750 BTUs per hour</td>
</tr>
</tbody>
</table>

Table 18  Technical Specifications for the PWR-RGD-LOW-DC/IA Power-Supply Module

<table>
<thead>
<tr>
<th>Power Specifications</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum output power</td>
<td>150 W</td>
</tr>
<tr>
<td>Nominal input voltage</td>
<td>24 to 60 VDC</td>
</tr>
<tr>
<td>Absolute maximum (short term) input voltage</td>
<td>18 to 75 VDC</td>
</tr>
<tr>
<td>Input current</td>
<td>12 to 2.5 A, 18 to 75 VDC</td>
</tr>
<tr>
<td>Total input BTU</td>
<td>737 BTUs per hour</td>
</tr>
</tbody>
</table>

Alarm Ratings

Table 19  Alarm Input and Output Ratings

<table>
<thead>
<tr>
<th>Alarm Ratings</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Alarm input electrical specification</td>
<td>8 V @ 1mA</td>
</tr>
<tr>
<td>Alarm output electrical specification</td>
<td>30 V @ 1A</td>
</tr>
</tbody>
</table>

Note: The alarm output does not support AC voltage because the RJ-45 connector pin spacing is too small.
Technical Specifications

Alarm Ratings
Connector and Cable Specifications

- Connector Specifications, page 71
- Cables and Adapters, page 73

Connector Specifications

- 10/100, page 71
- SFP Module Connectors, page 72
- Dual-Purpose Ports, page 72
- Alarm Port, page 73

10/100

The 10/100 Ethernet ports use standard RJ-45 connectors and Ethernet pinouts with internal crossovers. These ports have the send (TD) and receive (RD) signals internally crossed so that a twisted-pair straight-through cable and adapter can be attached.

Figure 54 10/100 Port Pinouts

<table>
<thead>
<tr>
<th>Pin</th>
<th>Label</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>RD+</td>
</tr>
<tr>
<td>2</td>
<td>RD-</td>
</tr>
<tr>
<td>3</td>
<td>TD+</td>
</tr>
<tr>
<td>4</td>
<td>NC</td>
</tr>
<tr>
<td>5</td>
<td>NC</td>
</tr>
<tr>
<td>6</td>
<td>TD-</td>
</tr>
<tr>
<td>7</td>
<td>NC</td>
</tr>
<tr>
<td>8</td>
<td>NC</td>
</tr>
</tbody>
</table>

When connecting 10/100 ports to devices such as servers, workstations, and routers, you can use a two or four twisted-pair straight-through cable wired for 10BASE-T and 100BASE-TX. Figure 59 on page 77 shows the two twisted-pair straight-through cable schematics. Figure 61 on page 77 shows the four twisted-pair straight-through cable schematics.

When connecting the ports to other devices, such as switches or repeaters, you can use a two or four twisted-pair crossover cable. Figure 60 on page 77 shows the two twisted-pair crossover cable schematics. Figure 62 on page 77 shows the four twisted-pair crossover cable schematics.
If auto-MDIX is disabled, use a straight-through cable to connect ports when only one port is labeled with an X. Use a crossover cable to connect ports when both ports are labeled with an X or when both ports are not labeled with an X.

You can use Category 3, 4, or 5 cabling when connecting to 10BASE-T-compatible devices. You must use Category 5 (or higher) cabling when connecting to 100BASE-TX-compatible devices.

**Note:** You can use the `mdix auto` interface configuration command in the CLI to enable the automatic medium-dependent interface crossover (auto-MDIX) feature. When the auto-MDIX feature is enabled, the switch detects the required cable type for copper Ethernet connections and configures the interfaces accordingly. Therefore, you can use either a crossover or a straight-through cable for connections to a copper 10/100, 10/100/1000, or 1000BASE-T SFP module port on the switch, regardless of the type of device on the other end of the connection.

### SFP Module Connectors

**Figure 55 on page 72** shows the MT-RJ SFP module fiber-optic connector.

![Figure 55 Fiber-Optic SFP Module LC Connector](image)

**Warning:** Invisible laser radiation may be emitted from disconnected fibers or connectors. Do not stare into beams or view directly with optical instruments. Statement 1051

**Figure 56 on page 72** shows the 1000BASE-T SFP module RJ-45 connector.

![Figure 56 1000BASE-T SFP Module Connector](image)

1. RJ-45 connector
2. Bale-clasp latching mechanism in the closed (locked) position
3. Bale-clasp latching mechanism in the open (unlocked) position

### Dual-Purpose Ports

The 10/100/1000 Ethernet ports on the dual-purpose ports use RJ-45 connectors.
Cables and Adapters

Figure 57 10/100/1000 Port Pinouts

<table>
<thead>
<tr>
<th>Pin</th>
<th>Label</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>TP0+</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>TP0-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>TP1+</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>TP2+</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>TP2-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>TP1-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>TP3+</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>TP3-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Alarm Port

The alarm port uses an RJ-45 connector. See the Alarm Ports, page 10 for more information. For information on alarm ratings, see the Alarm Ratings, page 69.

Figure 58 Alarm Port Pinouts

<table>
<thead>
<tr>
<th>Pin</th>
<th>Alarm connection</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Alarm 1 input</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Alarm 2 input</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Normally closed</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Alarm 3 input</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Alarm 4 input</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Normally open</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Alarm output common</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Alarm input common</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Cables and Adapters

- SFP Module Cables, page 74
- Cable Pinouts, page 77
- Console Port Adapter Pinouts, page 78
SFP Module Cables

Each port must match the wavelength specifications on each end of the cable, and for reliable communications, the cable must not exceed the allowable length. Copper 1000BASE-T SFP transceivers use standard four twisted-pair, CAT5 (or greater) cable at lengths up to 328 feet (100 meters).

Notes

- The maximum operating temperature of the switch varies depending on SFP module type. See Table 2 on page 8 for information on the supported temperature ranges.
- Modal bandwidth applies only to multimode fiber (MMF).
- A mode-field diameter/cladding diameter = 9 micrometers/125 micrometers.
- 1000BASE-LX/LH SFP modules connected with MMF over a short link distance require a mode-conditioning patch cord.

Ordinary patch cords can cause transceiver saturation, resulting in an elevated bit error rate (BER). Using the 1000BASE-LX/LH SFP module with 62.5-micron diameter multimode fiber (MMF) requires a mode-conditioning patch cord between the single mode fiber (SMF) SFP module and the MMF cable on both the send and receive link ends.

- Link distances greater than 984 feet (300 m) require a mode-conditioning patch cord.
- 1000BASE-ZX SFP modules can send data up to 62 miles (100 km) by using dispersion-shifted SMF or low-attenuation SMF. The distance depends on fiber quality, the number of splices, and the connectors.
- When the fiber-optic cable span is less than 15.43 miles (25 km), insert a 5-decibel (dB) or 10-dB inline optical attenuator between the fiber-optic cable plant and the receiving port on the 1000BASE-ZX SFP module.

Table 20 Fiber-Optic SFP Module Port Cabling Specifications

<table>
<thead>
<tr>
<th>SFP Module</th>
<th>Wavelength (nanometers)</th>
<th>Fiber Type</th>
<th>Core Size/Cladding Size (micron)</th>
<th>Modal Bandwidth (MHz/km)</th>
<th>Cable Distance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industrial and Rugged SFPs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1000BASE-SX (GLC-SX-MM-RGD)</td>
<td>850</td>
<td>MMF</td>
<td>62.5/125</td>
<td>160</td>
<td>722 feet (220 m)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>62.5/125</td>
<td>200</td>
<td>902 feet (275 m)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>50/125</td>
<td>400</td>
<td>1640 feet (500 m)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>50/125</td>
<td>500</td>
<td>1804 feet (550 m)</td>
</tr>
<tr>
<td>1000BASE-LX/LH (GLC-LX-MM-RGD)</td>
<td>1310</td>
<td>SMF</td>
<td>G.652</td>
<td>–</td>
<td>32,810 feet (10 km)</td>
</tr>
<tr>
<td>100BASE-LX (GLC-FE-100LX-RGD)</td>
<td>1310</td>
<td>SMF</td>
<td>G.652</td>
<td>–</td>
<td>32,810 feet (10 km)</td>
</tr>
<tr>
<td>100BASE-FX (GLC-FE-100FX-RGD)</td>
<td>1310</td>
<td>MMF</td>
<td>50/125</td>
<td>500</td>
<td>6,562 feet (2 km)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>62.5/125</td>
<td>500</td>
<td>6,562 feet (2 km)</td>
</tr>
<tr>
<td>1000BASE-ZX (GLC-ZX-SM-RGD)</td>
<td>1550</td>
<td>SMF</td>
<td>G.652</td>
<td>–</td>
<td>43.4 to 62 miles (70 to 100 km)</td>
</tr>
<tr>
<td>1000BASE-BX-D (GLC-BX40-D-I GLC-BX40-DA-I GLC-BX80-D-I)</td>
<td>1550</td>
<td>SMF</td>
<td>G.652</td>
<td>–</td>
<td>24.9 miles (40 km)</td>
</tr>
<tr>
<td></td>
<td>1490</td>
<td></td>
<td></td>
<td></td>
<td>24.9 miles (40 km)</td>
</tr>
<tr>
<td></td>
<td>1570</td>
<td></td>
<td></td>
<td></td>
<td>49.8 miles (80 km)</td>
</tr>
</tbody>
</table>
### Connector and Cable Specifications

Cables and Adapters

---

#### Table 20  Fiber-Optic SFP Module Port Cabling Specifications (continued)

<table>
<thead>
<tr>
<th>SFP Module</th>
<th>Wavelength (nanometers)</th>
<th>Fiber Type</th>
<th>Core Size/Cladding Size (micron)</th>
<th>Modal Bandwidth (MHz/km)</th>
<th>Cable Distance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1000BASE-BX-U (GLC-BX40-U-I)</td>
<td>1310, 1490</td>
<td>SMF</td>
<td>G.652</td>
<td></td>
<td>24.9 miles (40 km)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>49.8 miles (80 km)</td>
</tr>
<tr>
<td><strong>Commercial SFPs</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1000BASE-BX10-D (GLC-BX-D)</td>
<td>1490 TX, 1310 RX</td>
<td>SMF</td>
<td>G.652</td>
<td></td>
<td>32,810 feet (10 km)</td>
</tr>
<tr>
<td>100BASE-LX (GLC-FE-100LX)</td>
<td>1310</td>
<td>SMF</td>
<td>G.652</td>
<td></td>
<td>32,810 feet (10 km)</td>
</tr>
<tr>
<td>100BASE-BX (GLC-FE-100BX-D)</td>
<td>1310 TX, 1550 RX</td>
<td>SMF</td>
<td>G.652</td>
<td></td>
<td>32,810 feet (10 km)</td>
</tr>
<tr>
<td>100BASE-FX (GLC-FE-100FX)</td>
<td>1310</td>
<td>MMF</td>
<td>50/125</td>
<td>500</td>
<td>6,562 feet (2 km)</td>
</tr>
<tr>
<td>100BASE-EX (GLC-FE-100EX)</td>
<td>1310</td>
<td>SMF</td>
<td>G.652</td>
<td></td>
<td>131,240 feet (40 km)</td>
</tr>
<tr>
<td>100BASE-ZX (GLC-FE-100ZX)</td>
<td>1550</td>
<td>SMF</td>
<td>G.652</td>
<td></td>
<td>262,480 feet (80 km)</td>
</tr>
<tr>
<td><strong>CWDM</strong></td>
<td>1470, 1490, 1510, 1530, 1550, 1570, 1590, 1610</td>
<td>SMF</td>
<td>G.652</td>
<td></td>
<td>62 miles (100 km)</td>
</tr>
<tr>
<td><strong>Extended temperature SFPs</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1000BASE LX/LH (SFP-GE-L)</td>
<td>1300</td>
<td>MMF or SMF</td>
<td>62.2</td>
<td>500</td>
<td>1804 feet (550 m)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>50</td>
<td>400</td>
<td>1804 feet (550 m)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>50</td>
<td>500</td>
<td>1804 feet (550 m)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>9/10</td>
<td></td>
<td>6.2 miles (10 km)</td>
</tr>
<tr>
<td>1000BASE SX (SFP-GE-S)</td>
<td>850</td>
<td>MMF</td>
<td>62.5</td>
<td>160</td>
<td>722 feet (220 m)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>62.5</td>
<td>200</td>
<td>902 feet (275 m)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>50.0</td>
<td>400</td>
<td>1640 feet (500 m)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>50.0</td>
<td>500</td>
<td>1804 feet (550 m)</td>
</tr>
<tr>
<td>1000BASE ZX (SFP-GE-Z)</td>
<td>1550</td>
<td>SMF</td>
<td>9/10</td>
<td></td>
<td>43.5 miles (70 km)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>8</td>
<td></td>
<td>62.1 miles (100 km)</td>
</tr>
</tbody>
</table>

---

75
## Table 20  Fiber-Optic SFP Module Port Cabling Specifications (continued)

<table>
<thead>
<tr>
<th>SFP Module</th>
<th>Wavelength (nanometers)</th>
<th>Fiber Type</th>
<th>Core Size/Cladding Size (micron)</th>
<th>Modal Bandwidth (MHz/km)</th>
<th>Cable Distance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1000BASE LX/LH GLC-LH-SMD</td>
<td>1310</td>
<td>MMF</td>
<td>62.5</td>
<td>500</td>
<td>1804 feet (550 m)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>50.0</td>
<td>400</td>
<td>1804 feet (550 m)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>50.0</td>
<td>500</td>
<td>1804 feet (550 m)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SMF</td>
<td>G.652</td>
<td>–</td>
<td>6.2 miles (10 km)</td>
</tr>
<tr>
<td>1000BASE EX (GLC-EX-SMD)</td>
<td>1310</td>
<td>SMF</td>
<td>G.652</td>
<td>–</td>
<td>24.9 miles (40 km)</td>
</tr>
<tr>
<td>1000BASE ZX (GLC-ZX-SMD)</td>
<td>1550</td>
<td>SMF</td>
<td>–</td>
<td>–</td>
<td>43.5 miles (70 km)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>62.1 miles (100 km)</td>
</tr>
</tbody>
</table>
Cable Pinouts

Figure 59  Two Twisted-Pair Straight-Through Cable Schematic for 10/100 Ports

Switch  
3 TD+  3 RD+
6 TD–  6 RD–
1 RD+  1 TD+
2 RD–  2 TD–

Figure 60  Two Twisted-Pair Crossover Cable Schematic for 10/100 Ports

Switch  
3 TD+  3 TD–
6 TD–  6 TD–
1 RD+  1 RD–
2 RD–  2 RD–

Figure 61  Four Twisted-Pair Straight-Through Cable Schematic for 1000BASE-T Ports

Switch  
1 TP0+  1 TP0+
2 TP0–  2 TP0–
3 TP1+  3 TP1+
6 TP1–  6 TP1–
4 TP2+  4 TP2+
5 TP2–  5 TP2–
7 TP3+  7 TP3+
8 TP3–  8 TP3–

Figure 62  Four Twisted-Pair Crossover Cable Schematics for 1000BASE-T Ports

Switch  
1 TP0+  1 TP0+
2 TP0–  2 TP0–
3 TP1+  3 TP1+
6 TP1–  6 TP1–
4 TP2+  4 TP2+
5 TP2–  5 TP2–
7 TP3+  7 TP3+
8 TP3–  8 TP3–
To identify a crossover cable, hold the cable ends side-by-side, with the tab at the back. The wire connected to pin 1 on the left end should be the same color as the wire connected to pin 3 on the right end. The wire connected to pin 2 on the left end should be the same color as the wire connected to pin 6 on the right end.

**Figure 63 Identifying a Crossover Cable**

Console Port Adapter Pinouts

The console port uses an 8-pin RJ-45 connector, which is described in Table 21 on page 78 and Table 22 on page 79. If you did not order a console cable, you need to provide an RJ-45-to-DB-9 adapter cable to connect the switch console port to a PC console port. You need to provide an RJ-45-to-DB-25 female DTE adapter if you want to connect the switch console port to a terminal. You can order an adapter (part number ACS-DSBUASYN=). For console port and adapter pinout information, see Table 21 on page 78 and Table 22 on page 79.

**Table 21 on page 78** lists the pinouts for the console port, the RJ-45-to-DB-9 adapter cable, and the console device.

<table>
<thead>
<tr>
<th>Switch Console Port (DTE)</th>
<th>RJ-45-to-DB-9 Terminal Adapter</th>
<th>Console Device</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signal</td>
<td>DB-9 Pin</td>
<td>Signal</td>
</tr>
<tr>
<td>RTS</td>
<td>8</td>
<td>CTS</td>
</tr>
<tr>
<td>DTR</td>
<td>6</td>
<td>DSR</td>
</tr>
<tr>
<td>TxD</td>
<td>2</td>
<td>RxD</td>
</tr>
<tr>
<td>GND</td>
<td>5</td>
<td>GND</td>
</tr>
<tr>
<td>RxD</td>
<td>3</td>
<td>TxD</td>
</tr>
<tr>
<td>DSR</td>
<td>4</td>
<td>DTR</td>
</tr>
<tr>
<td>CTS</td>
<td>7</td>
<td>RTS</td>
</tr>
</tbody>
</table>

**Table 22 on page 79** lists the pinouts for the switch console port, RJ-45-to-DB-25 female DTE adapter, and the console device.

**Note:** The RJ-45-to-DB-25 female DTE adapter is not supplied with the switch. You can order this adapter from Cisco (part number ACS-DSBUASYN=).
Table 22  Console Port Signaling Using a DB-25 Adapter

<table>
<thead>
<tr>
<th>Switch Console Port (DTE)</th>
<th>RJ-45-to-DB-25 Adapter</th>
<th>Console Device</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signal</td>
<td>DB-25 Pin</td>
<td>Signal</td>
</tr>
<tr>
<td>RTS</td>
<td>5</td>
<td>CTS</td>
</tr>
<tr>
<td>DTR</td>
<td>6</td>
<td>DSR</td>
</tr>
<tr>
<td>TxD</td>
<td>3</td>
<td>RxD</td>
</tr>
<tr>
<td>GND</td>
<td>7</td>
<td>GND</td>
</tr>
<tr>
<td>RxD</td>
<td>2</td>
<td>TxD</td>
</tr>
<tr>
<td>DSR</td>
<td>20</td>
<td>DTR</td>
</tr>
<tr>
<td>CTS</td>
<td>4</td>
<td>RTS</td>
</tr>
</tbody>
</table>
Configuring the Switch with the CLI Setup Program

This appendix provides a command-line interface (CLI) setup procedure for a standalone switch. To set up the switch by using Express Setup, see the Cisco IE 3010 Switch Getting Started Guide. Before connecting the switch to a power source, review the safety warnings in Switch Installation, page 17 and Power Supply Installation, page 47.

Accessing the CLI Through the Console Port

You can enter Cisco IOS commands and parameters through the CLI. Use one of these options to access the CLI:

- RJ-45 Console Port, page 81
- USB Console Port, page 82

RJ-45 Console Port

1. Connect the RJ-45-to-DB-9 adapter cable to the 9-pin serial port on the PC. Connect the other end of the cable to the switch console port.

2. Start the terminal-emulation program on the PC or the terminal. The program, frequently a PC application such as HyperTerminal or ProcommPlus, makes communication between the switch and your PC or terminal possible.
Configuring the Switch with the CLI Setup Program

Accessing the CLI Through the Console Port

3. Configure the baud rate and character format of the PC or terminal to match the console port characteristics:
   - 9600 baud
   - 8 data bits
   - 1 stop bit
   - No parity
   - None (flow control)

4. Connect power to the switch as described in Power Supply Installation, page 47

5. The PC or terminal displays the bootloader sequence. Press Enter to display the setup prompt. Follow the steps in Completing the Setup Program, page 86.

USB Console Port

1. If you are connecting the switch USB console port to a Windows-based PC for the first time, install a USB driver. See Figure 65 on page 83.

   - Installing the Cisco Microsoft Windows XP USB Driver, page 84
   - Installing the Cisco Microsoft Windows 2000 USB Driver, page 84
2. Connect an USB cable to the PC USB port, and connect the other end of the cable to the switch mini-B (5-pin-connector) USB console port. See Figure 65 on page 83.

3. To identify the COM port assigned to the USB console port:
   a. Choose Start > Control Panel > Systems
   b. Click the Hardware tab and choose Device Manager.
   c. Expand the Ports section.

   The assigned COM port appears in parenthesis at the end of the line with this entry: Cisco USB System Management Console.

4. Start the terminal-emulation program on the PC or the terminal.

   The program, frequently a PC application such as HyperTerminal or ProcommPlus, makes communication possible between the switch and your PC or terminal.

5. Configure the COM port.

6. Configure the baud rate and character format of the PC or terminal to match the console port characteristics:
Configuring the Switch with the CLI Setup Program

Accessing the CLI Through the Console Port

- 9600 baud
- 8 data bits
- 1 stop bit
- No parity
- None (flow control)

7. Connect power to the switch as described in Power Supply Installation, page 47

   The PC or terminal displays the bootloader sequence.

8. Press Enter to display the setup prompt.

9. Follow the steps in the Completing the Setup Program, page 86.

Installing the Cisco Microsoft Windows USB Device Drivers

Installing the Cisco Microsoft Windows XP USB Driver

1. Obtain the file Cisco_usbconsole_driver.zip from Cisco.com, and unzip it.

   Note: You can download the driver file from the Cisco.com software download site.

   - If using 32-bit Windows XP, double-click the setup.exe file in the Windows_32 folder.
   - If using 64-bit Windows XP, double-click the setup(x64).exe file in the Windows_64 folder.

   The Cisco Virtual Com InstallShield Wizard begins.

   The Ready to Install the Program window appears.

2. Click Install.

   The InstallShield Wizard Completed window appears.

3. Click Finish.

4. Connect the USB cable to the PC and to the switch console port.

   The USB console port LED turns green, and the Found New Hardware Wizard appears.

5. Follow the instructions to complete the driver installation.

Installing the Cisco Microsoft Windows 2000 USB Driver

1. Obtain the file Cisco_usbconsole_driver.zip from Cisco.com, and unzip it.

   Note: You can download the driver file from the Cisco.com software download site.

2. Double-click the setup.exe file.

   The Cisco Virtual Com InstallShield Wizard begins.

3. Click Next.

   The Ready to Install the Program window appears.
4. Click **Install**.
   The InstallShield Wizard Completed window appears.

5. Click **Finish**.

6. Connect the USB cable to the PC and to the switch console port.
   The USB console port LED turns green, and the Found New Hardware Wizard appears.

7. Follow the instructions to complete the driver installation.

### Installing the Cisco Microsoft Windows Vista USB Driver

1. Obtain the file Cisco_usbconsole_driver.zip from Cisco.com, and unzip it.
   **Note:** You can download the driver file from the Cisco.com software download site.

2. Start the Cisco Virtual Com InstallShield Wizard:
   - If using 32-bit Windows Vista, **double-click the setup.exe** file in the Windows_32 folder.
   - If using 64-bit Windows Vista, **double-click the setup(x64).exe** file in the Windows_64 folder.
   The Cisco Virtual Com InstallShield Wizard begins.

3. Click **Next**.
   The Ready to Install the Program window appears.

4. Click **Install**.
   **Note:** If a User Account Control warning appears, click **Allow - I trust this program**.
   The InstallShield Wizard Completed window appears.

5. Click **Finish**.

6. Connect the USB cable to the PC and to the switch console port.
   The USB console port LED turns green, and the Found New Hardware Wizard appears.

7. Follow the instructions to complete the driver installation.

### Uninstalling the Cisco Microsoft Windows USB Drivers

**Uninstalling the Cisco Microsoft Windows XP and 2000 USB Driver**

The driver can be removed with the Windows Add or Remove Programs utility or with the setup.exe file.

**Using the Add or Remove Programs Utility**

**Note:** Disconnect the switch console terminal before uninstalling the driver.

1. Choose **Start > Control Panel > Add or Remove** Programs.

2. Scroll to Cisco Virtual Com, and click **Remove**.

3. When the Program Maintenance window appears, select the **Remove** radio button. Click **Next**.
Entering the Initial Configuration Information

Using the Setup.exe Program

Note: Disconnect the switch console terminal before uninstalling the driver.

1. Run setup.exe for Windows 32-bit or setup(x64).exe for Windows-64-bit. Click **Next**.
2. The InstallShield Wizard for Cisco Virtual Com appears. Click **Next**.
3. When the Program Maintenance window appears, select the **Remove** radio button. Click **Next**.
4. When the Remove the Program window appears, click **Remove**.
5. When the InstallShield Wizard Completed window appears, click **Finish**.

Uninstalling the Cisco Microsoft Windows Vista USB Driver

Note: Disconnect the switch console terminal before uninstalling the driver.

1. Run setup.exe for Windows 32-bit or setup(x64).exe for Windows-64-bit. Click **Next**.
2. The InstallShield Wizard for Cisco Virtual Com appears. Click **Next**.
3. When the Program Maintenance window appears, select the **Remove** radio button. Click **Next**.
4. When the Remove the Program window appears, click **Remove**.
   
   Note: If a User Account Control warning appears, click **Allow – I trust this program** to proceed.
5. When the InstallShield Wizard Completed window appears, click **Finish**.

Entering the Initial Configuration Information

To set up the switch, you need to complete the setup program, which runs automatically after the switch powers on. You must assign an IP address and other configuration information necessary for the switch to communicate with the local routers and the Internet.

IP Settings

You need this information:

- Switch IP address
- Subnet mask (IP netmask)
- Default gateway (router)
- Enable secret password
- Enable password
- Telnet password

Completing the Setup Program

Follow these steps to complete the setup program and to create an initial configuration for the switch:

1. Enter **Yes** at the following prompts:

   Would you like to enter the initial configuration dialog? [yes/no]: **yes**
At any point you may enter a question mark '?' for help. Use ctrl-c to abort configuration dialog at any prompt. Default settings are in square brackets '{[}'.

Basic management setup configures only enough connectivity for management of the system, extended setup will ask you to configure each interface on the system.

Would you like to enter basic management setup? [yes/no]: yes

2. Enter a host name for the switch, and press Return.
   On a command switch, the host name is limited to 28 characters and on a member switch to 31 characters. Do not use `-n`, where `n` is a number, as the last character in a host name for any switch.

   Enter host name [Switch]: host_name

3. Enter an enable secret password, and press Return.
   The password can be from 1 to 25 alphanumeric characters, can start with a number, is case sensitive, allows spaces, but ignores leading spaces. The secret password is encrypted, and the enable password is in plain text.

   Enter enable secret: secret_password

4. Enter an enable password, and press Return.

   Enter enable password: enable_password

5. Enter a virtual terminal (Telnet) password, and press Return.
   The password can be from 1 to 25 alphanumeric characters, is case sensitive, allows spaces, but ignores leading spaces.

   Enter virtual terminal password: terminal-password

6. (Optional) Configure Simple Network Management Protocol (SNMP) by responding to the prompts. You can also configure SNMP later through the CLI. To configure SNMP later, enter no.

   Configure SNMP Network Management? [no]: no

7. Enter the interface name (physical interface or VLAN name) of the interface that connects to the management network, and press Return. For this release, always use vlan1 as that interface.

   Enter interface name used to connect to the management network from the above interface summary: vlan1

8. Configure the interface by entering the switch IP address and subnet mask and pressing Return. The IP address and subnet masks shown below are examples.

   Configuring interface vlan1:
   Configure IP on this interface? [yes]: yes
   IP address for this interface: 10.4.120.106
   Subnet mask for this interface [255.0.0.0]: 255.0.0.0
   - Enter Y to configure the switch as the cluster command switch.
   - Enter N to configure it as a member switch or as a standalone switch.

   You can enter N to configure the switch as a command switch later through the CLI. To configure it later, enter no.

   Would you like to enable as a cluster command switch? [yes/no]: no
You have completed the initial configuration of the switch, and the switch displays its configuration. This is an example of the configuration output:

The following configuration command script was created:

```
hostname switch1
enable secret 5 $1$Ulq8$DlA/OiaEbl90WcBPd9cOn1
enable password enable_password
line vty 0 15
  password terminal-password
no snmp-server
!
no ip routing
!
interface Vlan1
  no shutdown
  ip address 10.4.120.106 255.0.0.0
!
interface FastEthernet1/0/1
!
interface FastEthernet1/0/2
!
interface FastEthernet1/0/3
!
...<output abbreviated>
end
```

These choices appear:

- [0] Go to the IOS command prompt without saving this config.
- [1] Return back to the setup without saving this config.
- [2] Save this configuration to nvram and exit.

To save the configuration and use it the next time the switch reboots, select option 2 to save it in NVRAM.

Enter your selection [2]: 2


After you complete the setup program, the switch can run the default configuration that you created. To change this configuration or to perform other management tasks, enter commands at the Switch> prompt.